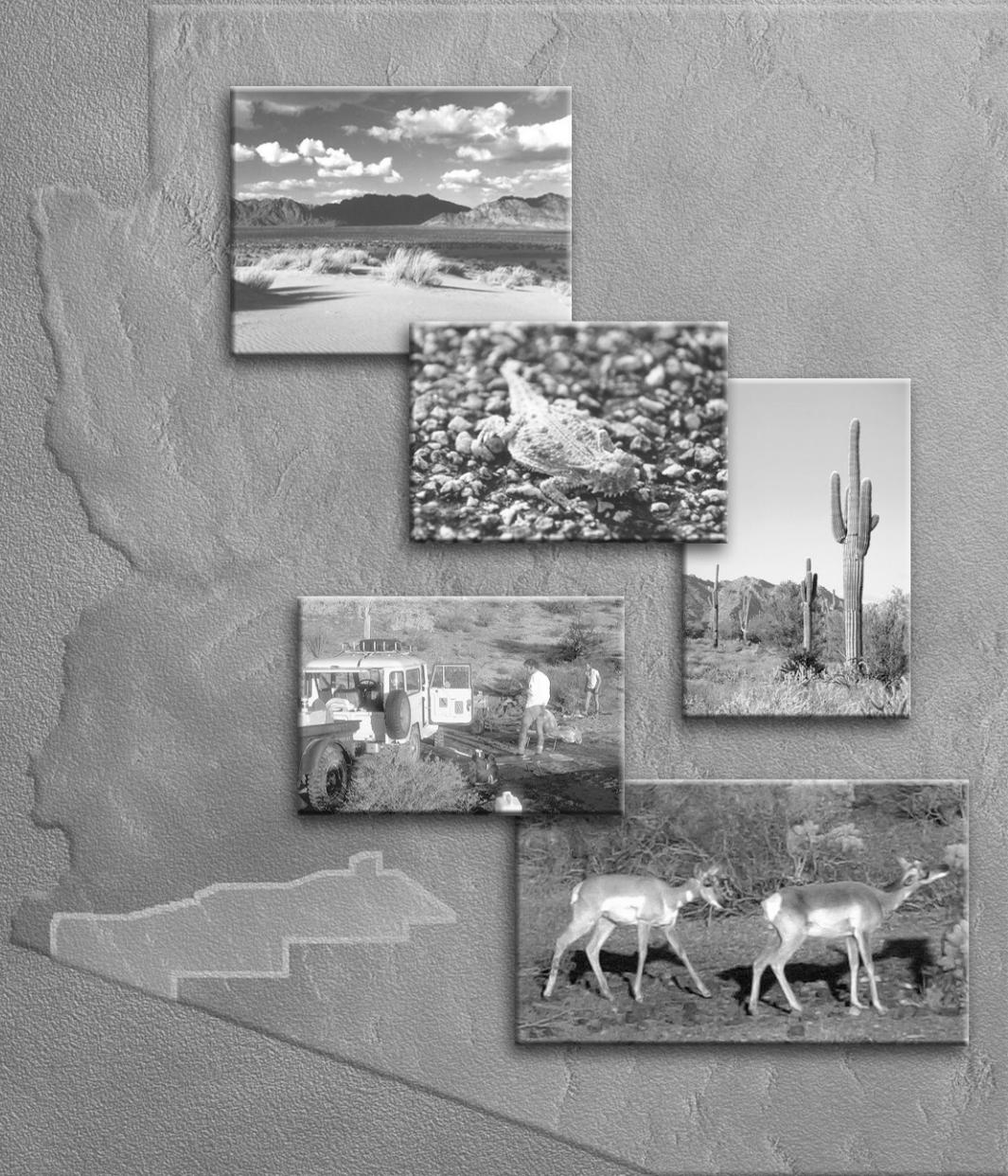


Draft Environmental Impact Statement - Volume 2

# Barry M. Goldwater Range

Proposed Integrated Natural Resources Management Plan



Lead Agencies:  
Departments of the Air Force, Navy, and Interior

Cooperating Agency:  
Arizona Game and Fish Department

FEBRUARY 2003

## **CHAPTER 5**

### **ENVIRONMENTAL CONSEQUENCES**

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#### **5.1 INTRODUCTION**

This chapter contains the potential environmental consequences of the proposed action, alternative actions, and no-action alternative and the scientific and analytical basis for the predicted impacts. Environmental impacts, or modifications to the environment that are brought about by an outside action, can be beneficial or adverse. Impacts can be described as direct (effects that are caused by the action or occur at the same time and place) or indirect (effects that are caused by the action and occur later in time or are farther removed in distance, but are still reasonably foreseeable). The significance of the impact is evaluated in consideration of both context and intensity as required by CEQ regulations (40 CFR 1508.27, see the glossary for a definition of significance).

The resources are addressed in the same order as they were presented in Chapter 4. For each resource, the potential impacts of the 17 resource management elements are first individually evaluated for the proposed action, alternative actions, and no-action alternative. The proposed action, alternative actions, and no-action alternative are described in Section 3.4, Description of the Proposed Action and Alternatives. Alternative Management Strategies A, B, C, and D, as presented in Table 3-3, represent the alternatives to the proposed action. The proposed action combines elements from each of the four strategies. Under the no-action alternative, the Air Force and Marine Corps would adopt the existing management provisions of the 1990 Goldwater Amendment, 1997 Lechuguilla-Mohawk HMP, 1999 Draft Barry M. Goldwater East HMP, 1997 Flat-tailed Horned Lizard Rangelwide Management Strategy, and various compliance decisions, as the INRMP for the BMGR. These provisions would be modified to comply with Sikes Act requirements, as outlined under Alternative Management Strategy A.

For most resources, the assessment is range-wide because the management strategy selected for the proposed action for that resource management element was range-wide. Where unit-specific selections were made from the alternative strategies for the proposed action (as with recreation services and use supervision; rockhounding; and wood cutting, gathering, and firewood use, and collection of native plants), the assessment of alternative actions is unit-specific for those resources where there is a potential effect.

The assessment of the 17 resource management elements is followed by an analysis of the aggregate effects wherein the environmental consequences of all the resource management elements combined are evaluated for each resource. Here, the aggregate impacts of the alternative actions are comparatively analyzed as a range-wide application of Management Strategy A (the no-action alternative), B, C, or D even when a unit-specific selection was made

for the proposed action. This provides for a comparative analysis of the proposed action against the full range of alternatives considered. The discussion of potential aggregate effects may be viewed as both a summary of impacts and an identification of the combined additive or interactive effects of the 17 resource management elements. When interactive, aggregate effects may be either countervailing—where the net aggregate effect is less than the sum of the individual effects—or synergistic—where the net aggregate effect is greater than the sum of the individual effects. Aggregate effects should not be confused with cumulative effects, which are evaluated separately in Chapter 6. Aggregate impacts pertain to the proposed action and alternative actions only, while cumulative impacts pertain to the additive or interactive effects that would result from the incremental impact of the proposed action and alternatives when added to other past, present, and reasonably foreseeable future actions.

## **5.2 EARTH RESOURCES**

### **5.2.1 Resource Inventory and Monitoring**

#### **5.2.1.1 Proposed Action (Strategy D)**

The proposed strategy for resource inventory and monitoring (Strategy D range-wide) would potentially lead to generally beneficial impacts to earth resources. Existing data about BMGR earth resources is particularly lacking in regard to the types and locations of soil series, quantitative data regarding the impacts of non-military use of the BMGR (i.e., recreation, Border Patrol, and UDA activities) on earth resources, and rockhounding activity (the extent of the resource base, current levels of activity, or existing or potential adverse impacts). While the soil and water resources element more directly addresses these data gaps (see Section 5.2.13), the additional resource inventory and monitoring called for in the proposed action, may also improve the identification and understanding of effects to earth resources. The proposed action for this resource element includes applying a limits of acceptable change system to monitor key indicators of environmental effects of ongoing military and civilian use of the BMGR and the use of the findings thereof to develop adaptive management responses to emerging resource conservation and protection problems within the context of monitoring and management activities elsewhere within the greater Sonoran Desert ecoregion. If actions that may cause damage to earth resources were identified through this proposed change in inventory and monitoring approach, and an adaptive management change is made that effectively eliminates or lessens the effect, beneficial effects to earth resources could result. The direct effects of monitoring efforts, however, could result in minor, localized impacts to soil resources (e.g., from physical disturbance associated with additional traffic, establishment of inventory/monitoring stations, and similar activities).

While DoD policy is to manage lands to control and prevent soil erosion and to preserve natural resources by conducting surveys and implementing soil conservation measures, inventory is limited to piecemeal data from site evaluations at proposed project sites, when such analysis is conducted. While erosion control measures may be implemented in concert with some projects, there are no requirements for monitoring their effectiveness. The proposed action calls for the development and implementation of systems to monitor the effectiveness of compliance actions and to detect trends within the BMGR ecosystem that would indicate overall biodiversity and health. Similarly, DoD policy is to restore/rehabilitate altered or degraded landscapes whenever practicable and the proposed action includes an objective for specific monitoring of ecological recovery and trends in locations where uses have been limited relative to locations where such activities continue.

Because the proposed action for resource inventory and monitoring is programmatic and applies to all resources, the level of impact of this element of the proposed action on earth resources is difficult to assess individually. Rather, the impact is better understood in combination with other aspects of the proposed action, particularly those that apply specifically to the soil resources, which are further discussed in Section 5.2.18.1, Aggregate Effects on Earth Resources.

#### **5.2.1.2 Alternative Actions (Strategy C and Strategy B)**

Alternative Management Strategy C for resource inventory and monitoring would have similar benefits for earth resources as discussed for the proposed action. The distinction between the two is that Strategy D includes a few additional objectives that include comparative monitoring of heavily used sites versus relatively unused sites and monitoring that considers the BMGR in the context of the greater ecoregion for which it is a part. The two objectives not included in Strategy C would provide additional benefits for understanding how to manage and/or determine the suitability of certain uses based on soil composition and other site characteristics.

Earth resources inventory and monitoring efforts under Strategy B would be much less extensive than that of the proposed action and, thus, potentially less beneficial for earth resources commensurate with the relative effectiveness of the inventory and monitoring approach. Strategy B includes one measure beyond current practice—the development and implementation of systems to monitor the effectiveness of compliance actions—and (unlike the proposed action) does not address existing earth resources data gaps. There are currently few compliance actions related to earth resources on the BMGR and some notable data gaps; thus this additional measure would provide little benefit for earth resources.

### **5.2.1.3 No-Action Alternative (Strategy A)**

The no-action alternative for this resource management element (Strategy A) would have less potential for benefits to earth resources than that assessed for the proposed action. Resource inventory and monitoring would include implementation of those activities established or planned under the Goldwater Amendment RMP, Lechuguilla-Mohawk HMP, and draft Barry M. Goldwater East HMP. Therein, earth resource inventory and monitoring would be limited to updating soils mapping as data are collected during site evaluations and assessing project site soils for their vulnerability to soil disruption and subsequent wind and water erosion. The difference between the benefits of the proposed action and no-action alternative would be commensurate with the extent that the Strategy D resource inventory and monitoring approach is more effective in its application than existing methods in terms of detecting activities that may be causing damage to earth resources and the relative effectiveness of management responses to minimize or eliminate the effects of those activities on earth resources.

## **5.2.2 Special Natural/Interest Areas**

### **5.2.2.1 Proposed Action (Strategy C)**

The proposed action for special natural/interest areas (Strategy C range-wide) would potentially result in both positive and negative indirect impacts on earth resources. Positive effects would result from the proposed redesignation of the expired ACECs and the Flat-tailed Horned Lizard HMA as special natural/interest areas. These effects are difficult to quantify or qualify; however, they are relative to the effectiveness and relevance of special management provisions in protecting earth resources. In the HMA, existing management provisions would be retained. Of indirect benefit to earth resources are the continuation of provisions to limit motorized access to relatively few designated roads and trails, for MCAS Yuma to locate military activities outside of the HMA where practicable, and to limit use in this area by non-military agencies. Similarly, by redesignating the ACECs as special/natural interest areas, it is expected that there would be less tolerance for deterioration or damage in these areas than in other locations and, presumably, the monitoring and adaptive management program would have increased attention focused on these areas that could be more effective in protecting earth resources than existing programs.. Although the major elements that address potential causes of disturbance are being addressed in the other management objectives included in this EIS, additional special management provisions could be prescribed for the ACECs that could further benefit earth resources. Likewise, if the ACECs and HMA converted to special natural/interest areas are altered or if new special natural/interest areas are established based on the proposed evaluation, earth resources could benefit, particularly if geological qualities or attributes are recognized in the designation of these areas and/or protective management provisions are more effective in protecting earth resources than current management practices.

Negative impacts could result from not redesignating the expired SRMAs and El Camino del Diablo Backcountry Byway as special natural/interest areas. For the SRMAs, this would represent the effective end to a legacy of recognition of the outstanding geology for which they were previously recognized through special management designation, first as part of the State Natural Area program and as carried forward in the Goldwater Amendment. The expired Sentinel Plain Lava Flow SRMA encompassed a relatively undisturbed portion of the Sentinel Plain Volcanic Field, the largest volcanic field in southern Arizona, and the expired Crater Range SRMA encompassed a scenic portion of this heavily eroded volcanic mountain range. The management provisions for these areas, however, as they relate to earth resources were largely limited to road and utility/transportation corridor management, which are addressed in this EIS as range-wide management objectives rather than objectives specific to the special natural/interest areas. This change in management could have a resultant minor and localized effects on earth resources; however, these effects (if any) cannot be reliably predicted.

However, by not redesignating the expired El Camino del Diablo Backcountry Byway as a special natural/interest area, increased disturbance along the corridor could potentially result. Management provisions that could benefit earth resources were included in the Goldwater Amendment RMP when the backcountry byway was designated. In particular, the plan prescribed that no new surface-disturbing activities would be allowed within ¼-mile of the road and that adjacent military use areas that were identified as non-essential to current or future military mission would be reclaimed. Under the proposed action, this corridor would be managed the same as all other roads on the BMGR. Nonetheless, independent of the Backcountry Byway designation, El Camino del Diablo would likely continue to receive some increased attention by BMGR managers and users (and perhaps protection through the adaptive management program), due to its historical significance and frequency of use.

While the proposed action would not single out special management provisions for the SRMAs or backcountry byway, new management objectives for the management units in which they are located will be determined through this EIS process. The proposed mix of resource management strategies for the subject areas would likely provide similar protection to the affected earth resources as provided under existing management provisions.

#### **5.2.2.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B differs from the proposed action in that, in addition to the expired SRMAs and Backcountry Byway, the expired ACECs would be managed without special provisions. The potential effects on earth resources from redesignating the ACECs, as assessed for the proposed action, would not occur. Rather than allowing for the development of special management provisions for these areas, these areas would be managed based on the unit-by-unit selection of

the other resource management elements that are being addressed in this EIS. Additionally, unlike the proposed action, Strategy B does not include the evaluation of altered or new special natural/interest areas, which could be established for having officially recognized special geological qualities or attributes. Thus, this strategy would not offer the potential benefits of the proposed action and have additional potential for negative impacts on earth resources.

The consequences on earth resources from Strategy D would differ slightly from the proposed action in that the expired SRMAs and backcountry byway would also be redesignated as special natural/interest areas and special management provisions would be developed as needed. Because both of the expired SRMAs are recognized for their outstanding geology, additional protection could be afforded to these areas rather than allowing them to expire as proposed. Special management provisions could be applied to the expired SRMAs and backcountry byway as necessary, but most items that would be addressed in such provisions may already be addressed in the other resource management elements under consideration in this EIS. Also, as with the proposed action, Strategy D calls for the evaluation of the potential for altering existing or establishing additional special natural/interest areas, including those in public use areas appropriate for or recognized as having special geologic qualities or attributes. Therefore, this strategy offers more potential benefits for earth resources than the proposed action.

### **5.2.2.3 No-Action Alternative (Strategy A)**

The no-action alternative differs from the proposed action in that the expired special management area designations (ACECs, SRMAs, backcountry byway) plus the HMA would be retained as special natural/interest areas along with any applicable special management provisions. The no-action alternative for special natural/interest areas could potentially offer greater benefits for earth resources than the proposed action. The greatest difference would be in the retention of the SRMAs and backcountry byway and associated special recognition and management of these areas. While most special management provisions for these areas proposed in the Goldwater Amendment RMP would not be applicable, a few potentially could be implemented. For the redesignated Crater Range SRMA, these would include the establishment of recreation facilities including a point-of-interest interpretive kiosk and picnic area and a few actions that relate to preservation of the scenic quality in the State Route 85 transportation and utility corridor portion of this SRMA. The kiosk and picnic area could potentially result in localized physical disturbance of earth resources at low to moderate levels; however, the transportation/utility corridor management provisions could be protective of the earth resources within the SRMA, particularly the rock faces that would be visible from the kiosk/picnic area and State Route 85.

Policies for El Camino del Diablo Backcountry Byway, established in the Goldwater Amendment RMP, that are of benefit to earth resources would probably remain in effect,

whereas with the proposed action no special management provisions would be prescribed for this area. These include prohibiting firewood collection within 150 feet of the corridor, allowing no new surface-disturbing activities within ¼-mile of the road, and reclaiming military use areas that are identified as non-essential to current or future military mission. Whereas with the proposed action, the road corridor would be managed as other BMGR roads, firewood collection would be managed on a unit-specific basis, and reclaiming military use would be addressed on a range-wide basis.

### **5.2.3 Motorized Access and Unroaded Area Management**

#### **5.2.3.1 Proposed Action (Strategy C)**

The proposed action for motorized access and unroaded areas, Strategy C range-wide, would have the effect of closing 658 miles of road, of which 352 miles (53 percent) are roads that are currently open to public access. While most roads on the BMGR are less than 30 feet wide, some roads may be this wide or wider. To estimate the area of the range that has been disturbed by roads, a road width of 30 feet was used to estimate the upper limit of disturbance associated with roads. Based on a conservative road width index of 30 feet, this translates into a potential upper estimate of 2,393 acres of aggregate area occupied by these roads and associated shoulder (see Table 3-6). Considering that the BMGR consists of 1,733,921 acres, the road network associated with the proposed action would cover less than 0.33 percent of the range. Roads that would be closed under the proposed action are roads that are not necessary for military mission or other specific agency requirements, are generally used on an infrequent basis, and include redundant roads in localized areas. Implementation of this element of the proposed action would have a beneficial impact on soil resources. The primary effects of roads on earth resources occur with their establishment when soils are initially disturbed, natural soil surface and structure is altered, and vegetative cover is removed (either mechanically or as a result of frequent use decreasing plant viability by compacting soils around rooting zones). Thereafter, the areas are subject to increased rates of erosion of varying degree. These roads were developed without engineering support including detailed consideration of soil types, erosion potentials, and drainage patterns. The level and types of effects to soils depend upon multiple factors including soil erosion hazards, slope and precipitation, and whether or not soil surfaces are protected by biological soil crusts or desert pavements. Disruption of soils with biological crusts have properties in their undisturbed states that make soils less susceptible to erosion, but these soils are also easily damaged and have low capability for recuperation. Disturbance to desert pavements and the associated fine-grained soil horizons beneath can alter the natural function of the surface, which inhibits water infiltration, reduces permeability, and promotes runoff. Desert pavements take many years to form and are equally slow to recover.

Most BMGR roads, and the vast majority of those roads that would be closed under the proposed action, are located within the broad alluvial valleys of the BMGR. The soils within these areas characteristically belong to the Torrfluvents, Tremont-Coolidge-Mohall, or Superstition-Rositas associations. These associations all have either slight or slight to moderate water erosion hazard potential or moderate to severe wind erosion hazard potential as determined by the NRCS for soil susceptibility to accelerated erosion when disturbed. Water erosion potential typically increases with greater slope while wind erosion potential is greatest where soils are fine-grained sands and silts.

Due to low annual rainfall amounts and the fact that most roads traverse valley areas of little slope but which sometimes have fine sandy and silty texture, wind erosion hazards are generally of more concern than water erosion hazards. In addition to the accelerated erosion from physical disturbance of roads themselves, wind erosion along roads is further accelerated by vehicle use because the passing of vehicles continues to break down soil structures and repeatedly removes surface soils as soil particles are suspended in the form of dust. Given appropriate slope and precipitation conditions, however, roads can accelerate water erosion by providing smooth, relatively impermeable channels for rainwater runoff. Nearly all BMGR roads have at-grade drainage crossings and are prone to flooding in response to rain. In some BMGR valleys, surface water runoff from rain has cut small channels into the soil in a process called rill erosion. Gullies have formed where these channels have enlarged and cut more deeply into the soil. This rill and gully erosion has effects on soils that extend well beyond initial, localized disruptions. This type of effect occurs in locations where road beds divert water from natural drainages of low slope within alluvial plains or where roads run parallel to steep slopes in upper bajadas and mountain foothill areas or at major wash crossings. The magnitude of increased wind and water erosion varies based on the intensity and frequency of use of roadways and the occurrence of soil types and their associated hazards for wind and water erosion.

Within Management Unit 1, the estimated 117 miles of road that would be closed under the proposed action are primarily located in two areas: the northwest corner of the BMGR and the area surrounding the Tinajas Altas (see Figure 3-2). With the conservative width index of 30 feet, the upper estimate of the acreage occupied by these roads and associated shoulders is 425 acres. Where roads would be closed within the northwest corner of the BMGR, soils have a slight water erosion hazard, but some areas have severe wind erosion hazards. In the vicinity of the Tinajas Altas, most roads that would be closed are generally located in one of three areas with the following erosion hazards (based on available data which are limited to the soil association rather than soil series):

- From points eastward of El Camino del Diablo south of the turnoff to Cipriano Pass and north of the turnoff to the Tinajas Altas and Tinajas Altas Pass, along the eastern flank of the Tinajas Altas Mountains (where most of the road mileage that would be closed in this management unit are located). Soils in these areas are mostly of an association that has a

slight water erosion hazard, but some erosion rates along roads in mountain slope areas are likely somewhat accelerated in some areas due to slope effects. However, there are soils at the northern portion of this area, within the Lechuguilla Desert and outside the former ACEC, that have a slight to moderate potential for water erosion and little slope.

- Redundant and spur roads located along Tinajas Altas Mountains foothills south of the Tinajas Altas and Tinajas Altas Pass to Mexico and east to the Cabeza Prieta NWR. The soils in this area are also characterized as having slight water erosion hazard and most are located in areas of increased slope.

Within Management Unit 2 about 237 miles of road (occupying an aggregate surface area of 862 acres based on the conservative width index of 30 feet) would be closed (see Figure 3-2) as follows:

- Redundant roads in the Gila Mountain foothills area near the northern BMGR boundary, many of which were created by unauthorized ORV travel. Soil associations in the area west of the Gila Mountains have slight water erosion hazards, whereas the area immediately east of the Gila Mountains has slight and slight to moderate water erosion hazards. However, as slope increases the tendency for increased water erosion from sheet wash/wash outs increases. Roads to be closed include some within soil associations with slight to moderate water erosion hazard and moderate to severe wind erosion hazard. These roads are located further eastward from the Gila Mountains in the vicinity of Fortuna and Coyote washes.
- Redundant roads east of the Gila Mountains and west of El Camino del Diablo near and west of the TACTS Range laser hazard area. Soils in this area have slight to moderate water erosion hazard and some roads have noted problems with erosion, particularly with increased slope.
- Redundant roads west of the Baker Peaks and Tanks. Soils in this area have slight to moderate water erosion hazard.
- Redundant roads and roads leading to various points at the base of the Copper Mountains. These roads are located in soil associations with a slight water erosion hazard and some accelerated erosion has occurred in areas of increased slope.

This mileage/acreage includes about 7 miles of road within Unit 2 for the Cabeza Prieta NWR bypass roads. Under this alternative, site-specific planning would be implemented for one east-west and one north-south oriented road, which would be located within soil associations with slight to moderate water erosion hazard, but no wind erosion hazard and slight slope. If implemented, minor impacts could occur from the initial disturbance of soils and the continued

use. The east-west segment would have a greater potential for increased water erosion, since it would generally be perpendicular to natural northerly runoff patterns in this area.

Within Management Unit 3, there would be about 21 miles of road closed under the proposed action (see Figure 3-2). The estimated aggregate area occupied by these roads, based on a conservative width index of 30 feet, is 76 acres. Roads that would be closed are primarily located in the vicinity of the Mohawk Mountains and Sand Dunes in areas with soil associations characterized as having slight to moderate water erosion hazards. The longest road segment to be closed is the northwesterly-southeasterly trending road that forks from the road that runs parallel to the Mohawk Dunes near Ground Support Area 67. This road has deteriorated over time from accelerated rates of wind and water erosion.

Within Management Unit 4, about 49 miles of road would be closed under the proposed action (see Figure 3-1). The estimated aggregate area occupied by these roads, based on a conservative width index of 30 feet, is 178 acres. Generally, rather than the shorter redundant roads typical of the roads that would be closed in Units 2 and 3, some of the roads that would be closed in this unit are relatively long, but also redundant. Most of the roads that would be closed are located along the eastern side of the Mohawk Mountains, within the now expired ACEC. Soil associations in this area have slight or slight to moderate water erosion hazard, with the exception of the soils in the San Cristobal Valley floodplain, which have slight to moderate water erosion and moderate to severe wind erosion hazard. Accelerated rates of wind and water erosion have been observed along these road segments to be closed.

Within Management Unit 5, about 164 miles of road would be closed under the proposed action. The estimated aggregate area occupied by these roads, based on a conservative width index of 30 feet, is 597 acres. These roads are widely dispersed, but are mostly located north of North TAC (see Figure 3-1). There is a concentrated network of roads north of Range 4 that would be closed. Most of the soil associations in the areas where roads would be closed in Childs Valley, Growler Valley, and north of the Crater Range have slight to moderate water erosion and moderate to severe wind erosion hazard. Some erosion has been observed along the roads to be closed in North and South TAC outside of the target arrays, particularly in the southernmost north-south road in south TAC, which is affected by Growler Wash, and the road north of Manned Range 2 that runs parallel to and west of State Route 85. Other areas, including the area north of Manned Range 4, have slight water erosion hazards.

Relatively few roads (an estimated 32 miles) would be closed within Management Unit 6 under the proposed action (see Figure 3-1). The estimated aggregate area occupied by these roads, based on a conservative width index of 30 feet, is 116 acres. Most roads to be closed are located slightly east of State Route 85 and include small areas with soil associations characterized as having slight to moderate water erosion and moderate to severe wind erosion hazard, but mostly are in areas with slight water erosion potential.

Within Management Unit 7, 38 miles of road would be closed under the proposed action (see Figure 3-1). The estimated aggregate area occupied by these roads, based on a conservative width index of 30 feet, is 138 acres. Most of these roads are located in the Saucedo Valley area, which is covered with soils within associations that are characterized as having slight water erosion hazard.

In total, the proposed closing of the total of about 658 miles of road as proposed would result in moderate to low beneficial impacts to soils within the localized areas affected by each closed road or road segment. The surface area occupied by the remaining active roads would be reduced by 30 percent to approximately 5,687 acres (based on a conservative road width index of 30 feet, which represents a potential limit of the aggregate area occupied by roads) (see Figures 3-3 and 3-4 and Table 3-6). The source of the physical disturbance in the affected roadway would be eliminated and, in most areas, natural vegetative recovery would be expected to occur and stabilize most soils, thereby reducing any increased rates of wind and water erosion that may currently occur due to these roads. Most closed roads would be expected to return to at least predominantly natural conditions over the long term.

A parallel benefit would result from the creation of more unroaded areas of substantive size on the BMGR and the management objective to conserve existing unroaded areas of 3,000 acres or more to the extent they are compatible with military or agency missions. Under the proposed action, the number of unroaded areas of 3,000 acres or less would be decreased by almost 67 percent from 526 to 171 (see Figure 3-5). The number of unroaded areas of 3,001 acres or more would decrease by 44 as a result of combining smaller areas into larger blocks of unroaded area. Of these, unroaded areas greater than 50,000 acres in size would increase from five to eight to include contiguous areas in the San Cristobal Valley-Gila Bend Plain-Crater Range-Midway Area, plus large disparate areas of the Lechuguilla Desert, Mohawk Valley and Sand Tank Mountains. Within these large unroaded areas, including those created by the proposed road closure and natural road recovery, wind and water erosion would not be accelerated the physical disturbance of roads.

### **5.2.3.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B is one alternative action for this resource element. Under Strategy B, no roads would be closed and new roads could potentially be created, including but not limited to the Cabeza Prieta NWR bypass roads. Retaining the estimated 2,222 miles of existing road network, plus the 7-mile Cabeza Prieta NWR bypass roads would have fewer benefits than the proposed action on soil resources. Comparing Strategy B range-wide to the proposed action, there would be 665 more miles of road than under the proposed action, including the Cabeza Prieta NWR bypass road. The unit-by-unit breakdown provided for the proposed action in terms of roads that would

be closed may be conversely viewed as roads that would remain open under this alternative: 117 more miles in Unit 1, 244 more miles in Unit 2, 21 more miles in Unit 3, 49 more miles in Unit 4, 164 more miles in Unit 5, 32 more miles in Unit 6, and 38 more miles in Unit 7. Using a conservative 30-foot width index for all roads, the roads would account for 8,105 acres, or less than 0.47 percent of the range. The benefits for soil resources that would result from the closing of these roads and creation/conservation of unroaded areas, as described for the proposed action, would not occur. Existing roads would continue to potentially cause accelerated erosion, particularly within areas of moderate to severe wind erosion hazards and increased slope. Examples of roads exhibiting increased rates of wind and water erosion that were noted as roads that would be closed under the proposed action, would remain open under Strategy B. The potential effects of the Cabeza Prieta NWR bypass road on soils would be the same as those of the proposed action.

The other alternative action for this resource element (Strategy D) would result in the closure of 107 more miles of road than would be closed with the proposed action. This difference is about five percent of all road mileage in the existing BMGR road network and constitutes 16 percent more miles of road than would be closed under the proposed action. The unit-by-unit breakdown of the additional miles of road that would be closed as compared to the proposed action is as follows: 24 more miles in Unit 1, 42 more miles in Unit 2, 23 more miles in Unit 3, 10 more miles in Unit 4, two more miles in Unit 5, two more miles in Unit 6, and four more miles in Unit 7. Assuming a conservative road width index of 30 feet to compare the surface area associated with the roads, Strategy D would result in 5,298 acres in road network (389 acres less than the proposed action), or less than 0.31 percent of the range surface area. This strategy could result in greater beneficial effects for soils in localized areas as compared to the proposed action, particularly where roads to be closed under this alternative, (but not the proposed action) are located in areas where soils have moderate to severe wind and/or water erosion hazards and/or in areas of increased slope.

The benefits to earth resources from unroaded area management would be similar as described for the proposed action. However, this strategy would reduce the number of unroaded areas in the BMGR of 3,000 acres or less by about 72 percent from 526 to 145 as compared to 67 percent from 526 to 171 under the proposed action (see Figure 3-5). As compared to the proposed action, there would be seven fewer unroaded areas of 3,001 to 10,000 acres and one additional unroaded area of 10,001 to 50,000 acres with Strategy D.

The longest roads that would be closed under this alternative management strategy, but that would not be closed under the proposed action, include the road along the western flank of the Gila Mountains, a road along the western flank of the Mohawk Mountains, and a route through Tinajas Altas Pass. All of these roads are alternative routes and roughly parallel to other roads. Upland soils in the vicinity of the subject Gila Mountains and Tinajas Altas Pass portions of the subject roads are characterized as having a slight water erosion hazard, while soils in the vicinity

of the subject Mohawk Mountains road are characterized as having slight to moderate water erosion hazard. All of these roads have been somewhat affected by slope. A relatively small amount, about two miles of road, are located in soils characterized as having slight to moderate water erosion hazard and moderate to severe wind erosion hazard. These roads are in the vicinity of Fortuna and Coyote washes and would be closed under this alternative, but would not be closed under the proposed action (see Figure 3-2). In addition, while the proposed action would retain the majority of existing motorized access and evaluate allowing public use of new roads developed for general agency purposes, Strategy D would limit motorized public access to those roads that are also necessary for military mission or other specific agency requirements and prohibit development of new public use roads. This strategy also includes an objective to restore closed roads where feasible and prudent to remediate a degraded ecological process and to implement increased public education and enforcement measures, including public education on the natural and cultural resource values of unroaded areas. Lastly, site specific planning for two bypass roads that would reroute vehicular traffic around rather than through the northwest corner of the Cabeza Prieta NWR is not called for in this strategy. Each of these would have additional beneficial impacts for soil resources over those of the proposed action, as they would minimize the creation of new roads and reduce traffic volumes on roads not necessary for military mission or other specific agency requirements.

### **5.2.3.3 No-Action Alternative (Strategy A)**

The long-term differences between the no-action alternative and the proposed action and their respective effects on soil resources are difficult to assess. A transportation plan would be developed, which would presumably similarly result in the closure of some redundant or unnecessary roads. In the short-term, however, the no-action alternative would result in the retention of the existing estimated 2,222-mile road network pending the completion and implementation of a transportation plan (see Table 3-6 and Figures 3-1 and 3-2). The results of the transportation plan cannot be predicted at this time; however, roads not meeting land management, public, or military needs could be closed. The road network would consist of the existing road network. Assuming a conservative road width index of 30 feet, the surface area associated with roads for the no-action alternative would be 8,080 acres or less than 0.47 percent of the range surface. Generally, resultant benefits for earth resources related to the road network would likely be similar to those of the proposed action, although they could differ in magnitude. In addition, unlike the proposed action, there would be no management objective for the conservation of unroaded areas greater than 3,000 acres (to the extent they are compatible with military or agency missions).

## **5.2.4 Camping and Visitor Stay Limits**

### **5.2.4.1 Proposed Action (Strategy C)**

Direct beneficial impacts for earth resources could result from the objectives of the proposed action for camping and visitor stay limits (Strategy C range-wide). The proposed action would continue to allow dispersed self-contained camping in all areas open to the public and vehicle-based camping within 50-feet of most roads designated as open to public use, but restrict camping along certain road segments for resource protection purposes. Dispersed disturbance from self-contained camping would remain at current miniscule levels. Disturbance from vehicle-based camping would continue to occur at a low level along most roadways that are generally accessible to the public. At current levels, roadside vehicle-base camping has low to negligible levels of impact in the form of soil disturbance and increased erosion. These effects are widely dispersed, but more effects are observed in popular camping areas such as the foot of the Tinajas Altas Mountains and Hat Mountain vicinity. In localized areas where camping has resulted in relatively high levels of physical disturbance and the removal and loss of the vegetative cover that protect soils from environmental influence, the effects of resultant accelerated erosion can extend well beyond the initial, localized area of disruption. Most of the reduction in available public use road mileage would occur in BMGR—West where almost 91 percent (or 349 miles) of the decrease would occur.

As previously stated, some soils are more susceptible to increased erosion when disturbed and have more limited capability to regain their former structure after a disturbance based on various factors including climate, microbial organisms, vegetation, topography, physical/chemical characteristics, and time for recovery. The slow-recovering desert pavements and rock varnishes are particularly fragile because of their susceptibility to impacts and slow recovery. Biological soil crusts in their undisturbed state have properties that make soils less susceptible to erosion, but these soils are also easily damaged and have low capability for recuperation. Under the proposed action, restrictions on camping could be implemented in areas with severe erosion hazards or desert pavement, rock varnish, and biological soil crusts to protect these resources. There are two ways in which this could be accomplished: (1) by restricting camping along certain road segments and (2) by designating areas where these soils occur as sensitive to impacts arising from human-induced disturbance and requiring that all campsites be located more than ¼-mile away from them.

The proposed action would include an assessment of the benefits and effects of establishing designated camping areas. If designated camping areas were established, physical disturbance from camping use could become concentrated in these localized areas. As the assessment would consider the suitability of the soils in designated camping areas for such use, impacts would be expected to be minimal. If the risk of increased erosion is of concern, best management practices

(including modifications and maintenance) could be implemented to minimize that potential as necessary.

By continuing the policy of limiting vehicle-based camping stays to 14 days within a 28-day period without a special use permit, long-term camping use on the BMGR would continue to be discouraged. The more consecutive days a campsite is used, the greater the potential for increased physical disturbance that could accelerate erosion, particularly as a result of compacting soils and disruption to vegetation.

The management objective to define and prescribe reasonable rules for the disposal of human sewage and solid waste in accordance with applicable federal, state, and local regulations could benefit earth resources not so much as it relates to waste from camping, but in how it relates to potential soil contamination from wildcat dumping. Having a protocol established for apprehending and prosecuting offenders would discourage this activity and the impacts to soils potentially resulting from improper disposal of wastes.

#### **5.2.4.2 Alternative Actions (Strategy B and Strategy D)**

The impacts to earth resources from the implementation of Strategy B for camping and visitor stay limits would be greater than those expected with the proposed action. Strategy B differs from the proposed action in that vehicle-based camping would be allowed within 100 feet of the road and there would be no restrictions on camping along certain road segments or within ¼-mile of designated areas for resource protection purposes. Whereas camping could be restricted from areas with soils that would be easily disturbed, highly susceptible to erosion, and slow to recuperate after disturbance with the proposed action, such restrictions are not provided for under this strategy. Further, the expansion of roadside vehicle based camping from 50-feet to 100-feet of the road could cause disturbance in areas that were previously undisturbed. As stated previously, the effects of the initial disturbance on some types of desert soils is much greater than the continued use of previously impacted soils. Unlike the proposed action, there would be no assessment of establishing designated camping areas under Strategy B. However, this strategy and impacts to earth resources would not differ from the proposed action with regard to visitor stay limits or the proposed rules for the disposal of human sewage and solid waste.

The only difference between Strategy C and Strategy D for this resource management element is the limits on consecutive days of vehicle-based camping stays within a 28-day period without a special use permit. With Strategy C, like the proposed action, the limitation is 14 consecutive days, whereas with Strategy D it is 7 consecutive days. There would potentially be minimal additional benefits for earth resources from decreased levels of physical disturbance with the maximum 7-day consecutive stay over the 14-day maximum consecutive stay; however, the

effects on soil resources are more closely correlated with the location of the disturbance rather than the duration of disturbance.

### **5.2.4.3 No-Action Alternative (Strategy A)**

The impacts of the no-action alternative for camping and visitor stay limits on earth resources would differ from those of the proposed action in the same manner as described for alternative Strategy B. There is one exception: the no-action alternative would also not include the potential beneficial effects of the rules for disposal of wastes as described for the proposed action.

## **5.2.5 Recreation Services and Use Supervision**

### **5.2.5.1 Proposed Action (Strategy C in Unit 2, Strategy D in All Other Units)**

The proposed action would benefit earth resources as some of the management objectives to control recreation use would minimize or prevent some types of physical disturbance. While some of these would be continuations of current policies, others would be variations thereof or new policy. The proposed action is a combination of two strategies (Strategy C in Unit 2 and Strategy D elsewhere) that are identical, with two minor exceptions: (1) the minimum number of vehicles in a single party for which a special use permit would be required (20 with Strategy C and 10 with Strategy D) and (2) the minimum number of law enforcement officers (which is irrelevant given that this management objective would be applied range-wide rather than on a unit-specific basis).

Many of these management objectives relate to recreational use of motorized vehicles. ORV travel and on- and off-road racing, which are both associated with relatively high rates of physical disturbance, would continue to be prohibited. While racing has not been an ongoing management issue on the BMGR, it has been proposed in the past. If it were to occur, there would be relatively severe localized surface disturbance associated with the activity. Illicit ORV travel, however, has been an ongoing management issue on the BMGR. This activity, although never permitted to occur on the BMGR for recreational purposes and expressly prohibited since at least the 1990 Goldwater Amendment, has occurred and affected soil resources in localized areas of the BMGR. An area that has been particularly affected is within Management Unit 2, south of the Foothills community and near Fortuna Mine. As noted by other agencies with ORV use management responsibility, law enforcement presence is an important and effective tool for ORV use management. However, other tools such as educating users by clarifying rules and promoting user etiquette and environmental ethics, erecting signs, and marking routes can assist law enforcement efforts (U.S. DOI, BLM 2001i, and Arizona State Parks 2000). The lack of available law enforcement officers, until recently, was a causal factor in that some illegal ORV

travel occurred unchecked. As detailed in Section 4.14.1, the transfer of the responsibility for management of non-military land uses from the BLM to the DoD with the MLWA of 1999 led to an increase in law enforcement/security officers (now seven range-wide). Because the proposed action for recreation services and use supervision includes the unprecedented management objective to retain a minimum number of law enforcement positions dedicated to the BMGR, beneficial impacts to earth resources in reducing illegal ORV travel would be expected to continue. The effects to BMGR soils in areas where unauthorized recreational ORV travel has occurred have not been assessed in detail. Some natural recovery would be expected to occur as a result of discontinued activity; but for affected desert soils with severe erosion hazards that are slow to recovery, the effects from past use could continue to persist or possibly compound even after use is discontinued.

The Goldwater Amendment established the BMGR as a limited ORV use area, with all vehicles restricted to designated or established roads classified as existing primary, secondary, tertiary, patrol, or unimproved roads. To the extent that designated or established roads entered and traversed washes, travel in washes was authorized under this management plan. Although unrestricted driving in washes large enough to accommodate a vehicle is traditional among some BMGR users, this activity has not been previously authorized under BLM, Air Force, or Marine Corps regulations and BLM law-enforcement officers have enforced restrictions on this activity in the past. The draft Barry M. Goldwater East HMP included a provision to permit driving in dry wash beds, but this document was never finalized or implemented. The proposed action in this EIS is consistent with the Goldwater Amendment and would restrict motorized public travel in all washes, except where the wash is a designated part of the road system open to the public and when the wash is dry.

The surface of wash beds is of gravelly and rocky material that is resistant to erosion, so there are generally no measurable impacts to soils that occur from driving in wash beds. If vehicles dig into the substrate and disturb the soil particles that are normally settled below the rocky surface to a large extent or disturb wash banks, however, wash banks and down gradient areas could be more vulnerable to accelerated wind and water erosion. With the proposed action, disturbance and accelerated erosion would continue to be limited to points of ingress and egress to washes where they are a designated part of the road system open to the public. Although well-developed biological soil crusts are purportedly present on banks outside the scour zone of some valley washes on the BMGR (Hall and others 2001), disturbance of such soils crusts would not be a concern because they would no longer be expected to occur where the wash has been previously disturbed as the subject washes are considered designated parts of existing roadways in the road system.

The proposed action would require a special use permit for single parties with more than 10 vehicles (or 20 for Units 2 and 3). Larger groups tend to correlate with higher intensity localized impacts, particularly where group activities are longer-term (e.g., vehicle-based camping rather

than a day hike). Because this requirement would discourage larger group sizes from using the range (a decrease from the current policy of allowing parties of up to 50 vehicles), a beneficial effect to soil resources would be expected.

Means of informing the public about visitor rules and regulations would also be improved with the proposed action, including efforts targeted at informing the public about road restrictions and resource sensitivities. The greater public understanding there is about previous and proposed BMGR use policies, road closures, and effects to resources from unauthorized uses such as ORV travel, the greater voluntary compliance with the rules and regulations. Therefore, the beneficial effects of the proposed road closures and other management objectives would be more likely to be realized. Similarly, erecting additional gates and fencing as needed to control entry would limit the number of people who could access the range without adhering to the recreation permitting process.

The development and implementation of a limits-of-acceptable change monitoring to guide recreation use management and protect natural and cultural resources could benefit earth resources by identifying where recreation use is potentially affecting soil or geological resources and using adaptive management techniques to address these effects.

Lastly, prohibiting entry to mines would prevent incidental damage or intentional vandalism that would harm the geological integrity of historic mines.

#### **5.2.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

As there are minimal differences between Strategy C and Strategy D for this resource category, there is no difference in consequences to earth resources with these strategies, regardless of management unit.

Strategy B would have some of the same benefits as the proposed action by prohibiting on- and off-road racing, establishing public education and recreation use information programs (although as compared to the proposed action, this strategy does not include the objective to assess requirements for signs or other measures to indicate road restrictions), and ensuring a minimum number of law enforcement positions (although the minimum number would be two rather than four or six).

However, as this strategy would allow motorized public travel in designated washes when dry, there could be greater increased erosion along wash banks than with the proposed action. Rather than erosion at points of ingress and egress crossing the wash, higher levels of accelerated erosion as compared to the proposed action would potentially occur along the wash banks

throughout the affected washes, particularly in narrow wash corridors where vehicles would be more likely to come in direct contact with the wash bank, and in down gradient areas. These impacts would be limited or minimized, however, as they would be considered in the selection of washes that would be designated as open to motorized public use.

This strategy includes an objective to evaluate the need for and effects of allowing public ORV travel in designated areas. If such a determination were made and implemented in the future, soil resources in the affected areas could be negatively affected by soil compaction and increased rates of erosion. Best management practices could minimize some of these effects, but localized deleterious effects would still be expected to occur. Presumably, site-specific impacts to resources would be considered prior to implementation and no action would be taken that would be contrary to the stated policy-based and resource-specific management goals for the INRMP.

Lastly, whereas all other strategies would prohibit public entry to mines, this strategy would potentially allow public entry to mines, which could lead to vandalism or otherwise negative impacts to the geological integrity of the historic mines. However, as with the potential of allowing ORV travel in designated areas, site-specific impacts to resources would be considered prior to implementation and no action would be taken that would be contrary to the INRMP management goals.

### **5.2.5.3 No-Action Alternative (Strategy A)**

Overall, the no-action alternative for this resource category would be less beneficial for earth resources than the proposed action. Differences in potential effects from the no-action alternative on earth resources would be similar to those as described for Strategy B; however, with the no-action alternative, public ORV travel in designated areas would not be considered. The Goldwater Amendment authorized motorized travel in washes to the extent that designated or established roads entered and traversed washes. While driving in washes large enough to accommodate a vehicle is traditional among some BMGR users, this activity has not been previously authorized under BLM, Air Force, or Marine Corps regulations and BLM law-enforcement officers have enforced restrictions on this activity in the past. However, under Strategy A, this activity could be sanctioned in BMGR—East if the draft Barry M. Goldwater East HMP were finalized, as required by the no action alternative, and a proposal in that draft HMP for public driving in washes were approved. As stated previously, driving in wash beds is generally regarded as having minimal impacts on soils resources; however, when the soils underlying the rocky wash bed or the wash banks are disturbed, accelerated soil erosion rates in localized and in down gradient areas could occur.

## **5.2.6 Rockhounding**

### **5.2.6.1 Proposed Action (Strategy C in Units 2 and 3, Strategy D in All Other Units)**

The proposed action would prohibit rockhounding within all units of the BMGR (where Strategy D would be applied) except for Units 2 and 3 (where Strategy C would be applied). Within Management Units 2 and 3, rockhounding would be restricted from special natural/interest and other designated natural and cultural resource areas that are sensitive to impacts arising from human-induced disturbance. Non-commercial rockhounding by hand picking is currently permitted on the BMGR and is a known recreational activity, although the extent of the resource base, current levels of use, or existing or potential adverse impacts of such activities are not known. The current limit on rockhounding is 24 pounds per day, plus one piece, with a total limit of 250 pounds per year. The proposed action would change “24 pounds plus one piece” to “not more than 25 pounds.” Rockhounding would continue to be limited to surface rock removal only (the use of motorized mechanical devices would continue to be restricted) and where the conditions under which the specimens would be collected caused no undue or unnecessary degradation.

Collection of rocks, particularly minerals and gemstones, affects BMGR geological resources by depleting the surface stock of specimens. Within the BMGR, rock dumps at old abandoned mine sites and areas that may contain rock and mineral specimens of volcanic origin are locations that rockhounds are particularly interested in. Within Units 2 and 3, there are several old mine sites, including the relatively large Fortuna Mine in the Gila Mountains and Betty Lee Mine in the Copper Mountains. Remains of smaller mining operations and prospects are also located in these management units, particularly within the Wellton Hills, Gila Mountains, Copper Mountains, and Mohawk Mountains (although rockhounding would be restricted within the Mohawk Mountains and the southernmost tip of the Gila Mountains if the former Mohawk Mountains and Sand Dunes and Tinajas Altas Mountains ACECs are redesignated as special natural/interest areas as proposed). Thus, with the proposed action, these areas would continue to be subject to depletion of the geologic resource base. For the remaining areas of the BMGR where rockhounding would be prohibited under the proposed action, the geologic resource base would no longer be subject to depletion. It is possible that there may be increased effects from rockhounding within the portions of Units 2 and 3 where the activity would still be permitted to occur due to the shifting and concentration of the activity from other areas of the BMGR. Overall, the effect of the proposed action is regarded as beneficial to geological resources, but further qualification of the effect is not possible given the lack of data about the occurrence of rockhounding on the BMGR.

### **5.2.6.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

In Units 2 and 3, the alternative strategies are Strategy B and Strategy D. The differences between the Strategy B and the proposed action in these units (Strategy C) are fairly minor. Both allow for limited non-commercial rockhounding to occur, but with the proposed action the activity would be prohibited from special natural/interest areas and other designated areas within these management units for resource protection, whereas with Strategy B such restrictions would be applied only if a compliance issue arises. Although rockhounding might be prohibited in fewer areas within these management units with Strategy B than with the proposed action, both similarly have the potential to prohibit rockhounding from select locations. Of note, whereas rockhounding would be prohibited in the Mohawk Mountains (proposed special natural-interest area) in Unit 2 under the proposed action, it would not necessarily be prohibited in this area under Strategy B. Overall, slightly greater impacts to geological resources would be expected if Strategy B were applied in Management Units 2 and 3 rather than Strategy C, as proposed.

The effect of implementing Strategy D in Units 2 and 3 would differ from the proposed action in that rockhounding would be prohibited in these areas. Impacts to geological resources from the continued depletion of the stock of rocks, gemstones, and minerals in these units would not occur.

In the remaining units, the alternative strategies are Strategy C and Strategy B. These two strategies differ from the proposed action for these units (Strategy D) because they would allow limited rockhounding to continue to occur, whereas the activity would be prohibited under the proposed action. As stated above, Strategies B and C similarly allow for continuation of limited non-commercial rockhounding, but Strategy C would restrict the activity in designated areas and Strategy B would only restrict the activity if a compliance issue arises. The effect of either strategy would differ from the proposed action in these units in that depletion of the geologic resource base would continue to occur, at least at some level.

As with the proposed action, prohibition or restriction of rockhounding in some areas generally open to the public while continuing to allow it occur in other areas generally open to the public could have the effect of shifting and/or concentrating impacts to geologic resources to the area where the rockhounding would be allowed to continue. There are, however, multiple ways in which a mix of the rockhounding strategies could be applied to the management strategies and a lack of data about the occurrence of rockhounding; thus, this effect cannot be further assessed.

### **5.2.6.3 No-Action Alternative (Strategy A)**

With the no-action alternative, rockhounding would be allowed to continue under existing management in all publicly accessible portions of the BMGR with no special provisions for excluding the activity from special natural/interest and other designated natural and cultural resource areas that are sensitive to impacts arising from human-induced disturbance. Thus, as compared with the proposed action, the no-action alternative would have a greater potential to affect geological resources through the depletion of the resource base.

## **5.2.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

### **5.2.7.1 Proposed Action (Strategy D in Unit 1, Strategy C in All Other Units)**

The proposed action would continue to allow the use of dead and downed wood for campfires, prohibit all other forms of wood cutting or wood collection, and prohibit the removal of wood from the range in all management units except for Unit 1 (Strategy C). In Unit 1, the proposed action would not allow wood cutting, wood gathering, or native wood campfires nor the removal of wood from the range (Strategy D). The management objective to prohibit the collection or salvage of native plants on the BMGR (including plant parts, seeds, or fruit) listed in the Arizona Native Plant Law except in cases where the plants are being salvaged prior to disturbance or for protected Native American purposes, and to conduct such salvage efforts in compliance with the Arizona Native Plant Law and with appropriate level of coordination with the Arizona Department of Agriculture, is the same for all strategies.

While collection of native plants in accordance with the Native Plant Law would not be expected to affect earth resources, a few minor effects are predicted from the proposed action for wood cutting, gathering, and firewood use. As noted in Section 3.4.2, wood cutting and gathering for firewood use is principally an issue in management units where public recreation is permissible. Strategy D was selected as the proposed action for the management of firewood use in Unit 1 because the portion of this unit that is open to public recreation is located within the Tinajas Altas Mountains ACEC where the collection of native wood for campfires has been prohibited under the Goldwater Amendment since 1990. Strategy C was selected as the proposed wood management action for all other units (Unit 2, nearly all of Units 3 and 6, and the small Bender Springs area located in the northeast portion of Unit 7 are open to public) because firewood use in these units has been traditional, no ongoing threats to native wood resources has been identified in these locations, and this strategy includes a monitoring component to protect against an unsustainable increase in firewood collection.

Overall, a beneficial effect to soil resources would likely result from the continuation of management measures to prevent high levels of use of native wood resources and associated

physical disturbance throughout the BMGR, particularly in that native wood supplies would be monitored in high-use areas and restricted as resource conditions dictate. There are little data available regarding current wood cutting, gathering, and firewood use on the range. Generally, these activities are regarded as having little to no measurable impact on soil resources; however, if larger pieces of wood are dragged rather than carried from the point of origin to the campsite, low levels of localized physical disturbance to soils occur in localized areas from minor impacts to soils, particularly if soil crust or desert pavements are affected (as purported in the scoping comments for this EIS, wood has been observed being dragged by vehicles in portions of the BMGR). The Unit 1 area, wherein wood gathering would be prohibited, covers a greater area than that of the former Tinajas Altas Mountains ACEC, where collection of dead and downed wood was prohibited under the Goldwater Amendment. However, within the former Mohawk Mountains and Sand Dunes ACEC and the Unit 2 portion of the former Tinajas Altas Mountains ACEC (the small portion of the former ACEC located north of Cipriano Pass), collection of dead and downed wood for campfires would be allowed, instead of prohibited (as it is currently). Effects to earth resources in these areas, if any, would likely be small.

During scoping for this EIS, some concerns were raised about the effects of campfires; however, allowing campfires on the BMGR would be allowed under any of the alternative management strategies analyzed in this EIS. By continuing to allow campfires, whether or not they are created from native wood, minor localized impacts to earth resources would continue as campfires can (1) alter the organic content of native soils as the heat of the fire and the charcoal that remains is chemically and physically different, altering the natural nutrient cycle, (2) blacken rocks and damage rock varnish if built close to a boulder or ledge, and (3) cause minor physical disturbance associated with the collection of larger rocks to create campfire rings. Although no data have been compiled regarding campfire use on the BMGR, overall such impacts on the range are regarded as minor and localized, and have not emerged as a management concern.

#### **5.2.7.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

Under Strategy B, an alternative regardless of management unit, wood use would be maintained at a sustainable rate and in compliance with regulatory measures. In comparison to the proposed action, disturbance to soils related to wood cutting and gathering would potentially be greater than the impacts from the existing condition or proposed action, particularly within high-use areas of the range that are open to general public access.

The impacts that would result from Strategy C in Unit 1 as opposed to Strategy D, would be minimal. Strategy C would have fewer benefits than Strategy D in that dead and downed could be collected for native wood campfires. Within the Tinajas Altas/Davis Plain area of Unit 1, depletion of native wood supplies and associated disturbance has historically been a management

issue (U.S. Department of Interior, BLM 1990). Collection of dead and downed wood is currently prohibited within the former ACEC area, but under this strategy would not continue to be unless special management provisions are implemented; thus, under this strategy this area may be particularly susceptible to any impacts to soils that could result from the collection of dead and downed wood.

The alternative of implementing Strategy D in Units 2, 3, 4, 5, 6 and/or 7 would potentially have greater benefits for soils. Units 2, 3, and 6 are largely open to general public access and, thus, presumably have higher rates of wood consumption and associated physical disturbance than other areas of the BMGR. Those areas of the ACECs mentioned above for the proposed action would not become areas where collection of downed and dead wood would be allowed rather than prohibited, as is currently the case.

### **5.2.7.3 No-Action Alternative (Strategy A)**

The effects of the no-action alternative would be similar to the proposed action except that the use of native wood for campfires would not be prohibited anywhere and the collection of downed and dead wood would be prohibited within the former ACECs rather than within Unit 1. The differing consequences for soil resources as compared to the proposed action would be similar, however, (unlike the no-action alternative) the proposed action would monitor native wood supplies in high-use areas and further restrict wood collection as resource conditions dictate. Thus, to the extent that the differing management approaches correlate to physical disturbance, this alternative may be slightly less beneficial for soil resources than the proposed action.

### **5.2.8 Hunting**

The alternative management strategy objectives for the proposed action (Strategy B range-wide), alternative actions (Strategy C or D range-wide), and no-action alternative (Strategy A range-wide) for hunting, as described in Table 3-3, would not have a direct or indirect effect on earth resources.

### **5.2.9 Recreational Shooting**

#### **5.2.9.1 Proposed Action (Strategy C)**

Although not identified as a current management issue in terms of earth resources, recreational shooting can affect earth resources through the incidental physical disturbance of soils from

human activity and spent bullets. Spent bullets also have the potential to contaminate soils, particularly when the bullets contain lead. In outdoor shooting ranges not located in the BMGR but in similar environmental conditions, lead levels have exceeded regulatory guidelines and caused potential impacts to humans and wildlife. However, at shooting ranges the activity is much more frequent, long-term, and concentrated than it is on the BMGR, where it occurs in widely dispersed and relatively infrequent basis throughout publicly accessible portions of the range. The proposed action for recreational shooting (Strategy C range-wide) would continue to allow recreational shooting to occur under existing regulations as long as it is compatible with military use, public safety, and no significant resource issues are identified. It also would require a special use permit for shooting at night or with an automatic weapon and calls for an assessment of the importance and character of recreational shooting as an activity/issue to determine the appropriateness of this activity on the BMGR and implement a decision based on the findings, including consideration of designating specific shooting area(s).

Under the proposed action, existing effects on soil resources from recreational shooting would continue, with the exception of those related to automatic weapons use (see Section 5.12.9.1 for more detail). Based on current understanding, these effects are expected to primarily be limited to low levels of dispersed physical disturbance. Although no data are available to indicate the occurrence of this activity on the BMGR and where accumulation of waste may be problematic, there are no known popular shooting areas within the BMGR where recreational shooting has occurred at a level equivalent to a defacto outdoor shooting range. The proposed assessment of recreational shooting could further address any potential effects to soils resulting from the activity and the potential effects of designating a specific shooting area or areas rather than allowing the activity to continue in a dispersed fashion. At the programmatic level of this assessment, it suffices to state that while designated shooting areas would potentially result in the discontinuation of dispersed impacts to soil resources from this activity, they would result in greater impacts to soil resources within localized areas from physical disturbance and potential lead contamination. Although within these localized areas the impacts to soils would be intensified, best management practices could be used to address these potential effects (e.g., erosion control measures and containment and recycling of lead bullets).

### **5.2.9.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would allow recreational shooting to continue to occur unless significant resource issues are identified, which is less protective of soil resources than the proposed action. This strategy would not provide the advantages stated above for assessing the impacts of recreational shooting and further decision-making.

Strategy D would prohibit recreational shooting in the short term until the appropriateness of allowing the activity and the value of establishing designated shooting areas could be assessed.

This strategy would have greater potential benefits than the proposed action, as any impacts to soil resources from dispersed recreational shooting would no longer occur. As with the proposed action, if a decision is made to allow recreational shooting to occur in designated areas, best management practices could be applied to minimize erosion and lead contamination.

### **5.2.9.3 No-Action Alternative (Strategy A)**

The no-action alternative would potentially have greater adverse impacts on soil resources than the proposed action. Under this alternative, recreational shooting would be allowed to continue in a dispersed fashion as long as it is compatible with military use and public safety. Based on current understanding, the activity is relatively infrequent and of low intensity, so impacts to soils would continue to be low. The no-action alternative would not include the proposed assessment of recreational shooting and the benefit of understanding its occurrence and effects. The designation of recreational shooting area(s) would not be considered.

## **5.2.10 Utility/Transportation Corridors**

### **5.2.10.1 Proposed Action (Strategy C)**

The proposed action for utility/transportation corridors is generally protective of BMGR earth resources in that it limits impacts to certain types of development along existing corridors and what has been proposed for the Yuma ASH. The principal effects to earth resources from existing non-military corridors within the BMGR (State Route 85, Gila Bend to Ajo transmission line, and Tucson Cornelia and Gila Bend Railroad—which are essentially parallel to each other) resulted from the intense earth moving and construction impacts associated with the initial development of the corridors, although effects from accelerated rates of wind and water erosion and ongoing low-levels of disturbance persist. Similar initial and ongoing effects would be expected with the construction of the Yuma ASH in the northwestern corner of the BMGR, although these effects are being addressed in detail in separate NEPA documentation (see also Section 6.0 on Cumulative Effects).

With the proposed action, non-military overhead transmission lines would continue to be restricted to alignments immediately parallel to the existing Gila Bend to Ajo transmission line and non-military underground facilities would continue to be restricted to the west side of and parallel to the Tucson Cornelia and Gila Bend Railroad. Further development as planned, such as the planned widening of State Route 85 and the proposed (but stalled) Gila Bend to Ajo 230 kV transmission line, would have local impacts to earth resources of relatively high intensity from earth moving and soils engineering. Although none have been planned or proposed, the

development of underground facilities could have the greatest potential for initial impacts to earth resources because of the extent of earth moving that would be involved.

### **5.2.10.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would have potentially greater consequences on earth resources than the proposed action in that proposals to develop additional transportation/utility corridors would be evaluated. Although any additional non-military corridor development is expected to be rather limited based on the requirements to be compatible with the military mission, new corridor development would have further impacts on earth resources from earth moving and soils engineering.

Strategy D would be more beneficial to earth resources than the proposed action in that it would preclude the development of the Yuma ASH. The State Route 85 transportation/utility corridor would continue to be the only transportation/utility corridor bisecting the BMGR. Future development thereof would continue to be in accordance with existing and proposed policy, thus the potential effects to earth resources from the use and further development of this corridor would be the same as described for the proposed action.

### **5.2.10.3 No-Action Alternative (Strategy A)**

The effects to earth resources from the no-action alternative would be similar to those of the proposed action in terms of managing the existing corridors and allowing for the development of the Yuma ASH. However, like Strategy B, the no-action alternative would allow for new corridor proposals to be examined, which could result in additional transportation/utility corridors and associated impacts to earth resources.

## **5.2.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

### **5.2.11.1 Proposed Action (Strategy C)**

Several management objectives for the proposed action for general vegetation, wildlife, wildlife habitat, and wildlife waters (Strategy C range-wide) could potentially impact earth resources directly and indirectly as follows:

- The proposed evaluation of the cumulative impacts of land disturbance, while focused on wildlife habitat, could provide more complete information about the extent of physical disturbance to earth resources. Although the LEIS for the BMGR land withdrawal contained a fairly complete assessment of surface impacts from past and ongoing military

activities, the cumulative effects of recreation, Border Patrol, UDAs, etc. is not known. Data collected under this management objective could be used in soil resources management.

- The continued efforts to develop procedures to control all trespass grazing by livestock and feral burros continue to benefit earth resources by not allowing this form of physical disturbance, which is known to result in accelerated erosion.
- The development of coordinated strategies to locally eradicate and/or control the spread of invasive species would benefit soil resources because the natural range of soil stability in a system is maintained by the characteristic vegetation composition and structure for that community (including, but not limited to biological soil crusts). A change in the natural composition of vegetation in a system, such as may occur by the introduction of an invasive plant into a community, can result in an alteration of subsurface root biomass and structure that leads to soil destabilization (Hall and others 2001).
- The proposed restriction of activities in key areas for the protection and conservation of habitat, ecosystems, and biodiversity could indirectly benefit earth resources by preventing physical disturbance within those areas.
- Implementing vegetation and wildlife habitat restoration for areas that have been damaged by discontinued use could benefit soil resources by stabilizing affected areas and preventing further unnatural rates of wind or water erosion.
- The development of up to six high priority wildlife water developments projects prescribed by the Lechuguilla-Mohawk and Draft Barry M. Goldwater East HMPs during the first five years of the proposed INRMP could have minor localized impacts to earth resources from the initial disturbance and (depending on type of water development) minor ongoing alteration of natural rates of water erosion within the affected area. These potential effects would be further assessed and mitigated, as appropriate, on a site-specific basis.
- Developing, maintaining, or removing wildlife water developments after the first five years of the INRMP may have additional minor effects on earth resources in localized areas, but these impacts cannot be predicted at this time because such actions are to be based on the prescribed review of literature and studies to determine benefits and adverse effects of wildlife waters.

### **5.2.11.2 Alternative Actions (Strategy B and Strategy D)**

There would be minimal differences between the alternative strategies for this resource category and impacts to earth resources. With Strategy B, there would be no indirect benefits from restrictions on activities in key areas identified for the protection and conservation of habitat, ecosystems, and biodiversity. In addition, there would be little predictable difference in the impacts to earth resources from the management objectives regarding wildlife water development policy. Although, under Strategy B, the development of the 17 remaining wildlife water developments prescribed by the Lechuguilla-Mohawk and Draft Barry M. Goldwater East HMPs would be approved and additional wildlife water developments considered, it is unlikely that there would be more than six waters developed during the first five years of the INRMP (which is the same as the number that would be developed during the first five years of the INRMP under the proposed action). Because developing, maintaining, or removing wildlife water developments after the first five years of the INRMP under the proposed action is dependent upon the findings of the prescribed studies, it is impossible to comparatively assess the potential disturbance to earth resources at the water development sites beyond the first five years of the INRMP.

Strategy D for this resource element would have the same beneficial effects as the proposed action, plus it would not allow the construction of any wildlife waters during the first five years of the INRMP. Thus, the localized impacts that could affect earth resources at the selected wildlife water development sites would not occur during the first five years of this INRMP. Like the proposed action, studies would be initiated on which to base determinations for maintaining, developing, or removing wildlife water development beyond the first five years of the INRMP. Any resultant impact to earth resources beyond the first five years of the INRMP cannot be assessed at this time, but the impact would presumably be similar to that of the proposed action since both are dependent on the prescribed literature review and studies.

### **5.2.11.3 No-Action Alternative (Strategy A)**

The no-action alternative would have the same impacts on earth resources with regard to wildlife water developments as described for Strategy B. It would not, however, include the management objectives for the development of coordinated strategies to locally eradicate and/or control the spread of invasive species; restricting activities in key areas as needed to protect and conserve habitat, ecosystems, and biodiversity; and implementing vegetation and wildlife habitat restoration for areas that have been damaged but are no longer used. Thus, in comparison to the proposed action for this resource management element, there would be fewer benefits for soil resources from this alternative than with the proposed action.

### **5.2.12 Special Status Species**

No impacts to earth resources are expected as a result of the proposed (Strategy C), alternative (Strategy B or Strategy D), or no-action alternative (Strategy A) special status species management objectives. Some special status species management programs could have impacts on earth resources such as physical disturbance resulting from habitat improvements; however, such impacts are likely to occur independent of the proposed INRMP as they are more closely related to compliance requirements and other recovery programs than to the proposed INRMP.

### **5.2.13 Soil and Water Resources**

#### **5.2.13.1 Proposed Action (Strategy D)**

The effects of the proposed action in this resource management element (Strategy D) are the most direct and applicable to earth resources. Most of these objectives would benefit earth resources by preventing or minimizing surface disturbing activities. Some of these management objectives are continuation of existing policy: restricting the operation of motorized vehicles and heavy equipment to established roads and previously impacted areas, except when it relates to a specific permitted project; taking measures to minimize soil disturbances; and using specific techniques to minimize soil disturbance on previously unimpacted soils. New policies that would similarly limit physical disturbance include the management objectives to restrict or modify activities as necessary to comply with statutory requirements for soil and water resources and to prevent erosion in areas of cultural resource sensitivity; take measures to minimize soil/water contamination or erosion resulting from vehicle use or other activities; temporarily restrict vehicular and construction activities when soils are susceptible to a heightened risk of erosion, such as following heavy rain; and restore areas where vehicle use has caused excessive surface damage, temporarily closing roads if necessary.

In addition, there are management objectives that would provide better information to be used in soil resources management. Continued policies would be to update soils map as data are collected during site evaluations; assess project site soils for their vulnerability to soil disruption and subsequent wind and water erosion; and keep groundwater development and exploration to a minimum in environmentally sensitive areas. New benefits would result from the proposed range-wide soil survey using NRCS standards to provide baseline information on the soil types, erosion risks, and suitability for various activities. This would provide much more comprehensive information on which to base land management activities than the existing policy to assess site soils on a project-by-project basis.

### **5.2.13.2 Alternative Actions (Strategy B and Strategy C)**

The alternative strategies (Strategy B and Strategy C) for soil and water resources would provide some, but not all of the benefits to earth resources as the proposed action. The primary difference between these two strategies and the proposed action is in how they would address surface disturbing activity. Neither strategy would include measures to temporarily restrict vehicular and construction activities when soils are susceptible to a heightened risk of erosion or to restore areas where vehicle use has caused excessive surface damage. While Strategy C includes a general measure for the minimization of soil contamination or erosion resulting from vehicle use or other activities, such restrictions would be limited to that necessary to comply with statutory requirements under Strategy B. In addition, the proposed range-wide soil survey would not be conducted under either of these alternative strategies.

### **5.2.13.3 No-Action Alternative (Strategy A)**

The no-action alternative would continue the existing policies that limit surface disturbing activities for the benefit of soil resources. However, this alternative would be less beneficial than the proposed action as it would not include any of the expanded management objectives considered in Management Strategies B and C and the proposed action.

## **5.2.14 Air Resources**

### **5.2.14.1 Proposed Action (Strategy A)**

The proposed action for air resources includes continuation of existing objectives, which would have minimal beneficial effects on earth resources because it calls for the control of fugitive dust at permitted construction sites and recreation activity areas. Generally, control of fugitive dust is accomplished by applying water to the affected area to keep particulate matter from becoming suspended in the air when disturbed. Reducing the suspension of dust particles decreases rates of accelerated wind and water erosion, thereby benefiting earth resources.

### **5.2.14.2 Alternative Actions (Strategy B, Strategy C, and Strategy D)**

With Strategy B, there would not necessarily be the continued control of fugitive emissions and, thereby, potentially greater rates of erosion. With both Strategy C and Strategy D, there could potentially be greater, but minor, indirect benefits to earth resources as dust palliatives would be used in some areas to further reduce the suspension of dust particles and thereby erosion.

### **5.2.14.3 No-Action Alternative (Strategy A)**

Because with this resource management element the proposed action is the no-action alternative, the effects of the no-action alternative on earth resources are the same as described for the proposed action.

### **5.2.15 Visual Resources**

For the most part, the management objectives for visual resources would not have an effect on earth resources regardless of the proposed action (Strategy B), alternative actions (Strategies C and D), or no-action alternative (Strategy A). However, the objective to use already disturbed and impacted land areas, which is a continuation of an objective from the Goldwater Amendment and is included in the proposed action and all alternative strategies, could have indirect beneficial effects by minimizing the disruption of natural surface waters in previously undisturbed areas. One objective included in Strategy D (restoration of visual resource impacts in unroaded areas), would have greater potential beneficial effects on soils than the proposed action in that restoration of natural conditions would limit further erosion and promote recovery within the affected area.

### **5.2.16 Wildfire Management**

#### **5.2.16.1 Proposed Action (Strategy B)**

The proposed action for wildfire management (Strategy B) could benefit soil resources in that the fire management plan—addressing fire prevention, suppression, recovery, mapping, monitoring, and possible mitigation protocols for both human and non-human caused fires in accordance with the threat to human life, property, and natural and cultural resources—could consider how soil resources may be affected. As fire can increase natural rates of erosion and affect the chemical properties of soils, this proactive approach would provide for the best management option for managing wildfires based on the best known science and management practices.

#### **5.2.16.2 Alternative Actions (Strategy C and Strategy D)**

Alternative Strategies C and D are the same as the proposed action for this resource element; thus, the potential effects on earth resources are the same as those described for the proposed action.

### **5.2.16.3 No-action Alternative (Strategy A)**

The no-action alternative would not provide the same level of protection of soil resources as the proposed and alternative actions for this resource element in that it would not provide for the development of the fire management plan and the review of the best available science and effects to natural resources.

## **5.2.17 Perimeter Land Use, Encroachment, and Regional Planning**

### **5.2.17.1 Proposed Action (Strategy D)**

The proposed action for perimeter land use, encroachment, and regional planning would have the potential to indirectly benefit earth resources. Geological systems and processes, like all ecosystem elements, function across administrative boundaries at both micro and macro scales. Better coordination, interaction, monitoring, and participation with off-range land owners and/or managers could, for example, provide better information on how invasive species are affecting natural rates of erosion in the Sonoran Desert or how adjacent agricultural use might be affecting rates of wind or water erosion or soil quality on the BMGR.

### **5.2.17.2 Alternative Actions (Strategy B and Strategy C)**

Strategy B and Strategy C for this resource element would have similar beneficial impacts on earth resources, but Strategy C objectives are somewhat less comprehensive than Strategy D objectives and Strategy B objectives are somewhat less comprehensive than Strategy C objectives. Thus, each alternative strategy would be respectively less beneficial on earth resources than the proposed action, as represented by the scope and extent of management objectives proposed under each.

### **5.2.17.3 No-action Alternative (Strategy A)**

The no-action alternative would not include a management objective for perimeter land use, encroachment, and regional planning and therefore would not have the benefits of the proposed or alternative actions for this resource category.

## 5.2.18 Aggregate Effects on Earth Resources

### 5.2.18.1 Proposed Action

The proposed management objectives, when considered in aggregate, could have additive beneficial effects on earth resources. These synergistic and additive effects may be viewed under two general types of impacts: (1) those actions that would reduce or limit activities that cause physical disturbance and (2) continuation or changes in management that would benefit earth resources through improved inventory, monitoring, and/or adaptive management. The discussion that follows is not intended to be an exhaustive listing of potential aggregate impacts on earth resources resulting from the proposed action, but rather an identification of the major types of aggregate impacts and examples thereof.

- **Effects of Physical Disturbance.** Elements of the proposed action that would reduce or limit activities that cause physical disturbance are numerous and include a host of management objectives that fall within the categories of motorized access and unroaded area management; camping and visitor stay limits; recreation services and use supervision; rockhounding; wood cutting, gathering, and firewood use, and collection of native plants; recreational shooting; utility/transportation corridors; general vegetation, wildlife, wildlife habitat, and wildlife waters; soil and water resources; and visual resources. For the most part, the benefits of these management objectives relate to the potential for physical impact to soils and related accelerated soil erosion that would be avoided or reduced. The proposed management objectives for soil and water resources, which are the most directly applicable, include continuation of existing policy plus new policies and have a combined effect with other management objectives that limit physical disturbance through the proposed road closures, continuation of ORV travel prohibitions, temporarily restricting vehicle and construction activities when soils are susceptible to a heightened risk of erosion, limitations on utility/transportation corridor development, etc., as detailed in Sections 5.2.1 through 5.2.17.

Taken in combination, there would be greater benefits for soil resources from this decreased physical disturbance. As compared to existing levels of physical disturbance, the aggregate level of beneficial effect on earth resources is expected to be low on a range-wide basis, with moderate benefits occurring in localized areas. The foreseeable effect is that, while the patterns and levels of surface disturbance from these activities would generally continue within the same use areas, there would be localized areas where the source of physical disturbance would be reduced or eliminated. For example, in those areas where roads would be closed, there would not only be benefits from the discontinued use and recovery (natural or augmented) of the estimated 658 miles of road to be closed (or 2,393 acres, based on the 30-foot conservative width index that represents a potential upper estimate of the aggregate area occupied by roads and

associated shoulders), but also the additional physical disturbance that may have occurred in association with the road, such as vehicle-based camping and wood gathering. This additive effect would be expected in association with public use roads. Miles of road open to public access (currently estimated at 973 miles) would be reduced by about 36 percent (352 miles), and a total of 621 miles of public use roads would be retained (see Table 3-6). The surface area occupied by all remaining active roads would be reduced by about 30 percent to approximately 5,687 acres (based on the same conservative width index of 30 feet). In range-wide terms, the estimated acreage occupied by roads would be reduced from 0.47 percent to 0.33 percent of the total 1,733,921 acres within the range.

Nearly all of these public use roads to be closed and associated uses occur in areas located within the broad alluvial valleys of the BMGR where soils characteristically belong to the Torrifluvents, Tremont-Coolidge-Mohall, or Superstition-Rositas associations. As determined by the NRCS, these associations all have slight to moderate water erosion hazard potential or moderate to severe wind erosion hazard potential with regard to the soil's susceptibility to accelerated erosion when disturbed. Due to low annual rainfall amounts and the fact that most roads traverse valley areas of little slope but where soils sometimes have fine sandy and silty texture, wind erosion hazards are generally of more concern than water erosion hazards. Nonetheless, the effects of erosion have been observed along some of these road segments. In addition, erosional downcutting and sheet wash effects have been noted along some road segments that would be closed in mountain foothill areas with the proposed action, although soil types in these areas generally have no wind erosion hazard and slight water erosion hazards. Another additive benefit could result in site-specific locations throughout the range, but particularly in areas generally open to public access, as additional special provisions could be implemented to protect areas with easily damaged and slow-recovering desert pavements, rock varnishes, and biological soil crusts (e.g., restricting camping within ¼-mile of these areas or along road segments that are adjacent to these resources).

On the other hand, a change in the types and extent of impacts to earth resources could also occur if activities become more compounded in localized areas if some activities that are currently dispersed become more concentrated as a result of the proposed management objectives. This additive effect could occur as the result of displacement of activities from areas where they would be prohibited to areas where they would be allowed (e.g., rockhounding, recreational driving, vehicle-based camping in areas that would remain available for such use). That is, instead of these activities generally occurring along the current estimated 973 miles open to public access, they would be more concentrated along the 621 miles of road that would generally remain open to public access (but not along certain designated road segments or within ¼-mile of certain sensitive resources). Additive effects could also occur from the potential establishment of designated areas for camping and recreational shooting (following the proposed

evaluation of these activities). Similarly, the potential for soil contamination to occur from chemicals used in vehicles, improper waste disposal, or lead shot would also be more likely to occur within concentrated use settings, rather than in dispersed areas, which offers some advantages in terms of management and clean-up (if necessary).

Another additive and perhaps countervailing impact would potentially result from the combined effect of the requirement for a special use permit for single parties with more than 20 or 10 vehicles in combination with visitor stay limits, which would reduce large-scale and long-term recreational uses that can cause greater levels of localized disturbance. The proposed definition and prescription of rules for waste disposal together with various recreation services and use supervision objectives (e.g., the expansion of public education and recreation use information programs and minimum numbers of law enforcement personnel) would have greater combined potential for achieving compliance and reducing potential impacts of illicit activities on earth resources. In the case of rockhounding and continuing to prohibit entry to mines, the management objectives also protect geological resources, in addition to restricting activities that could result in increased rates of soil erosion.

- **Effects of Resource Inventory and Monitoring, Resource Management, and Coordinated Regional Planning.** Those management objectives of the proposed action that have the greatest potential for direct impacts on earth resources management are those objectives within the soil and water resources category, which essentially define the resource management goals for earth resources. In addition to policies related to physical disturbance (as discussed in the preceding paragraphs), the proposed management objectives would continue existing earth resources management objectives, plus implement new management objectives that would provide better information to be used in management—including a range-wide soil survey using NRCS standards to provide baseline information on the soil types, erosion risks, and suitability for various activities. These management objectives have a combined effect with other resource management objectives such as the redesignation of the expired ACECs and the HMA as special natural/interest areas and the proposed conservation of existing unroaded areas of 3,000 acres or more to the extent they are compatible with military or agency requirements. The proposed dosing of a total of about 658 miles of road, including those within the special/natural interest areas, would decrease the number of unroaded areas of 3,000 acres or less by almost 67 percent from 526 to 171 areas and decrease the number of unroaded areas greater than 3,000 acres in size by 44. By combining smaller blocks of unroaded areas into larger blocks, the number of unroaded areas greater than 50,000 acres in size would increase from five to eight areas. Conservation of these areas would benefit earth resources because most closed roads would be expected to return to at least predominantly natural condition over the long term and function under mostly natural conditions, where wind and water erosion is not accelerated by the physical disturbance

of roads and associated activities. A combined effect could result from the objectives for perimeter land use, encroachment, and regional planning as they relate to the management in concert with adjacent lands with similar unroaded attributes and contiguous unroaded areas, such as the Cabeza Prieta NWR and the Area A portion of Sonoran Desert NM.

Recreation services and use supervision is a resource category that is vital to nearly all other potential beneficial effects identified under the 16 other resource management elements considered. The benefits of use restrictions or limitations would not be realized without also implementing means to control illicit use from occurring. Potential aggregate impacts are numerous, and include management objectives related to vehicle use, vehicle-based camping, rockhounding, improper waste disposal, and the objectives for soil and water resources.

There is also an intersection between elements of the proposed action that relate to resource inventory and monitoring and those that relate to resource management. For example, the inventory of soils using NRCS standards to provide baseline information on soil types, erosion risks, and suitability for various activities (resource management objective) provides better data to be applied together with the objectives managing use (e.g., management objectives to restrict camping along certain roadways, or to prohibit rockhounding in certain areas, or to determine prudent locations for designated areas for camping or recreational shooting, if a decision is made in favor of their establishment). This, in turn, ties in with the proposed limits of acceptable change monitoring system for recreation use, which for example, could limit/reduce recreation use in localized areas based on information about soils that are at increased risk for erosion when disturbed, such as those with biological soil crusts, desert pavements, and characterized as having moderate/severe hazards for wind or water erosion (e.g., restricting camping within ¼ mile of these areas or along road segments that are adjacent to these resources).

### **5.2.18.2 Alternative Actions**

#### **Management Strategy B**

Management Strategy B would be less beneficial for earth resources, in aggregate, than the proposed action. Although some of the impacts on earth resources would be the same as those of the proposed action, general differences between this strategy and the proposed action are that it would allow for increased public access and use opportunities and would continue most existing conservation management practices rather than the more protective resource management strategy objectives that were selected for the proposed action. Strategy B was selected for the proposed action in only three cases: hunting, visual resources, and wildfire management and, for both hunting and wildfire management, Strategy C is the same as Strategy B. The following key

differences between the consequences to earth resources from Strategy B and from the proposed action have been identified:

- **Effects of Physical Disturbance.** Strategy B could result in greater levels of physical disturbance than the proposed action. The greatest single difference regards the lack of road closures and potential for additional roads and road use in this strategy. There would be at least an estimated 2,229 miles of roads covering an estimated 8,105 acres with this strategy, which is about 60 percent more than what would remain after the proposed road closures associated with the proposed action and about 0.3 percent more than the no-action alternative (see Table 3-6). Range-wide, the aggregate acreage occupied by roads, based on the conservative width index of 30 feet and including the Cabeza Prieta NWR bypass roads, would comprise about 0.47 percent of the total range acreage (8,105 of 1,733,921 acres). Roads open to general public access would remain unchanged. Unlike the proposed action, there would be no creation of additional unroaded areas or provision for the conservation of unroaded areas greater than 3,000 acres in size. Associated disturbance, including camping and wood gathering, would be expected in excess of current levels, particularly in that vehicle-based camping would be allowed within 100 feet rather than 50 feet of roads. Unlike the proposed action, there would be no restrictions on camping along certain road segments or in certain areas for resource protection purposes other than within ¼-mile of a wildlife waters, and fewer restrictions on wood cutting, gathering, and use. As a result, there would not be the potential for physical disturbance from recreational shooting and camping to be shifted from widely dispersed to localized areas as there would be with the proposed action.

In addition, this strategy would allow for the travel in designated washes when dry, potentially allow for ORV travel to be permitted in certain areas (following evaluation thereof), only restrict or prohibit recreational shooting and rockhounding if a compliance or incompatibility issue arises, and would allow consideration of additional utility/transportation corridors as compatible with the military mission. Rather than expanding management objectives for soil and water resources as proposed (including provisions to minimize erosion), this strategy would add to the existing management provisions only as needed to comply with statutory requirements and to prevent erosion in areas of cultural resource sensitivity. Each of these effects must also be considered in terms of the fact that the minimum number of law enforcement officers (two) would not provide the higher degree of protection as would the proposed action as a greater law enforcement presence would correspond to more effective implementation of management measures.

- **Effects of Resource Inventory and Monitoring, Resource Management, and Coordinated Regional Planning.** Rather than expanding management objectives for soil and water resources as proposed, this strategy would add to the existing management

provisions only as needed to comply with statutory requirements and to prevent erosion in areas of cultural resource sensitivity. There would not be the range-wide soil survey using NRCS standards and there would also be less inventory and monitoring and fewer regional and ecosystem management objectives for perimeter land use, encroachment, and regional planning than with the proposed action. As compared to the proposed action, there would be fewer aggregate beneficial impacts to earth resources from continuation or changes in management through improved inventory, monitoring, and/or adaptive management.

### Management Strategy C

There would be few differences between the potential aggregate effects to earth resources from the implementation of Management Strategy C and the proposed action. Strategy C was incorporated, at least in part, in all resource categories except for air resources and visual resources, although additional objectives were proposed for resource inventory and monitoring of soil and water resources beyond what would be implemented in Strategy C. Key differences, in aggregate, between the consequences of Strategy C on earth resources versus those of the proposed action are as follows:

- **Effects of Physical Disturbance.** Differences in aggregate from the proposed action in terms of physical disturbance would be expected to be minimal and difficult to predict in any quantitative sense. There are a few management objectives that could result in greater physical disturbance, as compared to the proposed action, and these would be minor even in aggregate. These include the potential for greater physical disturbance from larger group sizes as a special use permit would be required for any single party with more than 20 vehicles rather than for more than 10 vehicles (except for in Management Unit 2) as proposed and the effects of rockhounding, which would be allowed to occur outside of special natural/interest areas and other designated areas within all units (rather than just Units 2 and 3 as proposed).
- **Effects of Resource Inventory and Monitoring, Resource Management, and Coordinated Regional Planning.** Resource inventory and monitoring and perimeter land use and regional planning objectives would be somewhat less comprehensive, and therefore, less beneficial under Strategy C than the proposed action in that the ecosystem-wide efforts would not be prescribed. In addition, there would be less protective objectives with regard to soil and water resources management, including that there would be no prescribed range-wide soil survey using NRCS standards. Similarly, Strategy C would not include coordination on issues such as pesticide drift and groundwater management.

### Management Strategy D

The consequences on earth resources from this strategy would differ from the proposed action mainly in that there would be less physical surface disturbance expected under Strategy D. Strategy D was selected for the proposed action range-wide in the resource inventory and monitoring; soil and water resources; and perimeter land use, encroachment, and regional planning resource management elements. With the exception of wood cutting, gathering, and firewood use, and collection of native plants, Strategy D was also applied to most units in those resource management elements where unit-specific selections were made (recreation services and use supervision and rockhounding). The difference between the proposed action and Strategy D for special status species and wildfire management is nonexistent and it is minor for camping and visitor stay limits and hunting. The following key differences summarize the main differences, in aggregate, between the consequences of Strategy D on earth resources versus those of the proposed action:

- **Effects of Physical Disturbance.** The benefits to earth resources as compared to the proposed action would be commensurate with the additional combined potential reduction in surface disturbance that would result from implementing Strategy D range-wide. As with the other strategies, the key difference in terms of physical disturbance is in the reduction of roads. Applying Strategy D for motorized access and unroaded areas would result in about 107 additional miles of road closures, which (based on the conservative width estimate of 30 feet) occupy an estimated upper estimate of 389 acres in the roads and associated shoulders. Range-wide, roads would occupy an aggregate area of 5,298 acres, or 0.31 percent of the range, as compared to 5,687 acres or 0.33 percent of the range under the proposed action. These roadways would be restored (by natural or potentially augmented means) and create additional or larger unroaded areas as compared to the proposed action. By consolidating small blocks into larger blocks, there would be seven fewer unroaded areas greater than 3,000, eliminating one unroaded area falling in the 10,001 to 50,000-acre category. Other potentially disruptive activities that would continue to be allowed on a limited basis with the proposed action (including rockhounding, recreational shooting, and non-game species collection) would be prohibited under this strategy (although the appropriateness of allowing recreational shooting to occur in designated areas would be assessed and the Arizona Game and Fish Commission would need to approve a petition to close the BMGR to non-game species collection). As compared to the proposed action, 67 more miles of road generally open to public access would be closed, or 43 percent of those roads currently open to public access would be closed (as compared to 36 percent with the proposed action). In addition, a special use permit would be required for any single party with more than 10 vehicles in all areas of the range. The aggregate effects of these objectives on earth resources as

compared to the proposed action would be less widespread physical disturbance, correlating to lower intensity effects on soil resources.

- **Effects of Resource Inventory and Monitoring, Resource Management, and Coordinated Regional Planning.** Higher management standards for air resources and visual resources could have minimal indirect effects benefiting earth resources. These include designating former SRMAs and El Camino del Diablo Backcountry Byway as special natural/interest areas, reducing erosion via restoring and remediating closed roads where feasible, the use of dust palliatives on heavily traveled routes, restricting non-military activities that would further deteriorate visual resource qualities within or visible from unroaded areas, and restoring the effects of visual disturbances to the extent compatible with the military mission.

### 5.2.18.3 No-Action Alternative

The consequences on earth resources from selection and implementation of the no-action alternative rather than the proposed action are that resource management would continue under applicable provisions the Goldwater Amendment, HMPs, and various compliance decisions. The no-action alternative was only selected as the proposed action in one instance—for air resources. Although the proposed action differs from Strategy A in all other 16 resource management elements, the key differences between the no-action and proposed action in terms of consequences on earth resources, in aggregate, are summarized as follows:

- **Effects of Physical Disturbance.** In the short-term, this strategy would not have any of the potential benefits of the proposed action in terms of road closures and restoration. As the transportation plan is eventually developed and implemented, however, roads would more likely be reduced than increased (as could potentially occur with Strategy B). Rather than further restricting/limiting other types of public use that cause physical disturbance (e.g., vehicle-based camping, rockhounding, and recreational shooting), existing limitations/restrictions would be retained. Recreation services and use supervision would not be expanded as proposed and there would be no minimum number of law enforcement positions required, making the effective implementation of management objectives via enforcement less likely than with the proposed action. Public travel may be allowed in dry streambeds and wash bottoms in accordance with the finalization of the draft Barry M. Goldwater East HMP. There would not be the potential for physical disturbance from recreational shooting and camping to be shifted from widely dispersed to localized areas as there would be with the proposed action. Consequently, cumulative surface disturbance under this alternative would be potentially greater than under the proposed action.

- **Effects of Resource Inventory and Monitoring, Resource Management, and Coordinated Regional Planning.** Continued management under existing guidance would have fewer beneficial effects in terms of resource inventory and monitoring and management of visual resources and wildfire. There would not be the additional objectives for soil and water resources that could provide for additional reduction of erosion and would include a range-wide soil survey using NRCS standards. Objectives for unroaded area conservation and perimeter land use, encroachment, and regional planning would be nonexistent.

The difference, in aggregate, in magnitude in effects of the no-action alternative versus the proposed action to earth resources is difficult to assess given the unknowns regarding the eventual road closures under the transportation plan.

## **5.3 WATER RESOURCES**

The analysis of potential environmental effects to BMGR water resources includes not just the few permanent surface waters, intermittent surface waters associated with rainfall, and groundwater, but also the watersheds and major drainages that are integral components of BMGR water resources, even when they are dry. Also considered, are hydrological regimes as they relate to natural communities, as discussed in Section 4.3.

### **5.3.1 Resource Inventory and Monitoring**

#### **5.3.1.1 Proposed Action (Strategy D)**

The proposed action (Strategy D range-wide) would have a beneficial effect on water resources. This is because inventory and monitoring of BMGR water resources is principally limited to regulatory requirements, such as the operation of the wastewater treatment area at Gila Bend AFAP and the inventory of BMGR wells and wetlands for the renewal of the land withdrawal. Although best management practices such as berms to control storm-water runoff are implemented with military activities, where appropriate, there are no requirements for monitoring their effectiveness. Regardless of management strategy selected, the DoD would continue to be responsible for ensuring that all activities (individually and cumulatively) on the BMGR comply with state water quality standards per the Clean Water Act and its provisions. However, the proposed management objectives for resource inventory and monitoring could lead to additional monitoring of water resources (e.g., water quality in surface waters or the conditions of major drainages) and the development of adaptive management responses as needed. Although the proposed action as it relates to resource monitoring does not pertain

specifically to water resources, management objectives included for this element of the proposed action that could benefit water resources include the following:

- development and implementation of systems to monitor the effectiveness of compliance actions
- use of limits of acceptable change system to monitor key indicators of environmental effects of ongoing military and civilian use of the BMGR
- use of the findings of monitoring to develop adaptive management responses to emerging resource conservation and protection problems
- expansion of the monitoring system to detect trends within the BMGR ecosystem that would indicate overall biodiversity and health
- specific monitoring of ecological recovery and trends in locations where uses have been limited relative to locations where such activities continue
- development of the ecosystem monitoring system for the BMGR within the context of monitoring and management activities elsewhere within the greater Sonoran Desert Ecoregion

Because these objectives are programmatic in nature, the level of beneficial effect to water resources cannot be reliably assessed; but, in context of the full range of alternatives analyzed, the proposed resource inventory and monitoring approach offers the most potential for beneficial impacts on water resources. More definitive impacts can be predicted with regard to the aggregate effects on water resources from this element of the proposed action in combination with other components of the proposed action (see Section 5.3.18.1).

### **5.3.1.2 Alternative Actions (Strategy B and Strategy C)**

Regardless of management unit, implementing Strategy B for this resource category would have fewer benefits for water resources than the resource monitoring programs established under the proposed action. This is because the inventory and monitoring program would be less comprehensive as compared to the proposed action. Presumably, the more comprehensive the inventory and monitoring program, the greater the potential for identifying and addressing water resource management concerns. However, this strategy would have greater potential benefits than the existing condition because, in addition to those objectives that have been established in prior planning efforts, Strategy B includes the development and implementation of systems to monitor the effectiveness of compliance actions. Like the proposed action, the level of associated effect is more definable in context of the aggregate impacts of this strategy (see Section 5.3.18.2)

Strategy C would further the benefits of Strategy B by establishing a limits of acceptable change system and using findings from monitoring key indicators of environmental effects to determine an appropriate management response for ongoing military and civilian use of the BMGR and to detect trends within the BMGR ecosystem that would indicate overall biodiversity and health. It would have most of the potential benefits of the proposed action for water resources, but not include a few additional objectives that include monitoring the recovery of heavily used sites compared to relatively unused sites and developing a monitoring system that considers the BMGR in the context of the greater ecoregion for which it is a part. Thus, the benefits of this strategy for this resource element would probably be somewhat less than those of the proposed action.

### **5.3.1.3 No-Action Alternative (Strategy A)**

The no-action alternative (Strategy A) would have considerably less potential benefit for water resources than the proposed action. This is based on the presumption that the more comprehensive the inventory and monitoring program, the greater the potential for identifying and addressing water resource management concerns. Resource inventory and monitoring under this strategy would include implementation of those activities established or planned under the Goldwater Amendment RMP, Lechuguilla Mohawk HMP, and Draft Barry M. Goldwater East HMP. Water resource monitoring called for in the Goldwater Amendment was limited to monitoring water table levels and assessing erosion potential at project sites. The HMPs were focused primarily on management specific to game or special status species and did not include any inventory and monitoring objectives parallel to those management objectives listed for the proposed action in Section 5.3.1.1.

### **5.3.2 Special Natural/Interest Areas**

This resource category has little correlation with BMGR water resources and therefore there is little difference in foreseeable environmental consequences with the proposed action, alternative actions, or no-action alternative. There are two notable exceptions. The first regards any alternative action that would apply Strategy B, which allows for the ACECs to expire and be managed without special provisions. The Tinajas Altas Mountains ACEC was established in large part for the protection of the natural deep-water tinajas, or slick rock water tanks, for which the ACEC was named. It is not the expiration of the ACEC, as such, that would have the potential for negative impact on the tinajas, but rather the discontinuation of special management provisions for this area, which is a relatively popular visitor use site. However, this effect would probably be minimal as resource management provisions as they relate to water resources are being otherwise addressed in management objectives for other resource elements (e.g., campsite

restrictions within ¼ mile of water resources, motorized public access, and soil and water resource management).

The second regards the component of Strategy C (selected for the proposed action) and Strategy D (an alternative) to evaluate the potential for altering existing or establishing additional special natural/interest areas based at least in part on the natural communities and species conservation elements or to better manage special geologic, scenic, cultural, or other resource areas. This objective could potentially have beneficial effects to water resources, particularly if special/natural area designations were altered or established in recognition of the Valley Bottom Floodplain Complex, Valley Xeroriparian Scrub, and Mountain Xeroriparian Scrub, and/or Desert Playa and Desert Tinaja/Spring natural community conservation elements, which are all largely characterized by their hydrologic components.

### **5.3.3 Motorized Access and Unroaded Area Management**

Roads can affect the hydrological regimes of natural drainage flows and systems and natural communities. As explained in Section 5.2.3, depending on soil conditions, slope, and rainfall, roads can cause accelerated rates of erosion, potentially exacerbating the effects well beyond the road itself and increasing sedimentation in rainwater runoff. Accelerated erosion has occurred in association with some roads on the range. This localized phenomenon occurs most often in locations where road beds divert water from natural drainages of low slope within alluvial plains or where roads run parallel to steep slopes in upper bajadas and mountain foothill areas or at major wash crossings. Most roads on the BMGR were developed without engineering support, including consideration of drainage patterns or erosion potentials. Nearly all roads have at-grade drainage crossings and are prone to flooding in response to rain. Given appropriate slope and precipitation conditions, these roads can accelerate soil erosion by providing smooth, relatively impermeable channels for rainwater runoff. Infrequent rainfall and the fact that most roads traverse areas of little slope, however, are factors that have minimized road-induced erosion on the range.

Unpaved roads, which comprise the vast majority of BMGR roads are more susceptible to erosion, particularly those that are wider, more heavily used, and regularly maintained such as U.S. Border Patrol drag roads. Once in suspension, sediment can degrade the physical, chemical, or biological quality of surface water. Most frequently used unpaved roads require periodic maintenance to correct ruts and maintain road grade and ditches for surface water runoff. Over the years of use, these roads can become eroded downward and entrenched and further impede or divert runoff. In valleys, roads can accelerate rill and gully erosion. (Rills are smaller channels that form to carry surface water runoff; these can widen into larger gullies that cut more deeply into the soil.) Most BMGR roads that are used by agencies are regularly maintained. BMGR roads that serve no agency purpose and those agency-use roads that are infrequently used,

however, are not regularly maintained and are generally less disruptive to natural surface water drainage patterns.

### 5.3.3.1 Proposed Action (Strategy C)

The proposed action would have the effect of closing an estimated 658 miles of road. The estimated cumulative 1,564-mile road network that would remain represents a 30 percent decrease from the existing BMGR road network. The upper estimate of the aggregate area occupied by roads (based on the conservative road width index of 30 feet, which includes road shoulders) would constitute 0.33 percent of the range rather than the existing 0.47 percent of the 1,733,921-acre range. Assuming that these closed roads return to a natural condition over the long term, the proposed action would reduce the number of unroaded areas in the BMGR of 3,000 acres or less by 67 percent from 526 to 171 and a total of 77 unroaded areas of 3,000 acres or more would be conserved. Of these 77 unroaded areas, eight unroaded areas would be larger than 50,000 acres. The largest unroaded area would be increased from about 95,000 acres to slightly more than 102,000 acres (see Figures 3-3, 3-4, and 3-5). These large unroaded areas provide a greater degree of conservation in the context of watershed protection and conservation.

In general, the roads that would be closed are roads that are used on a relatively infrequent basis and are not regularly maintained. Nonetheless, eroded conditions have been observed along some of these road segments resulting in localized impacts to individual, minor drainages. New roads would not be precluded, but the development of additional roads would be evaluated for their foreseeable need and for their generalized effect. If needed, proposals for construction of new roads would be reviewed in accordance with NEPA and other regulatory requirements on a case-by-case and site-specific basis. Site-specific planning is proposed for two bypass roads, totaling approximately 7 miles, which would reroute vehicular traffic around rather than through the northwest corner of the Cabeza Prieta NWR.

The proposed reduction of roads is of benefit to surface water resources. Although at a watershed scale the subject roads are not having deleterious effects (erosion rates are relatively stable and water and nutrients are distributed from the upper to the lower watershed at rates to which community components are adapted), localized effects are nonetheless occurring due to roads. Changes in watershed condition at any particular location can have effects on downstream and/or upstream conditions, as disturbances downstream may influence upstream ecological processes. Effects are more pronounced where hydrological regimes serve an important function in the natural community. Those natural communities more vulnerable to the effects from hydrological regimes altered by roads that would particularly benefit from the reduction of roads are as follows:

- **Valley Bottom Floodplain Complex.** This natural community occurs in the San Cristobal and Growler valleys (in Management Units 4 and 5, respectively). Because of

the topography and relatively thick vegetation within the community, roads within the floodplain are minimal. With the proposed action, about 10 miles of road would be closed within this natural community. Although this is comparatively less than the road closures that are proposed in other natural communities and a small effect on a range-wide basis as the surface area occupied by these roads is little relative to the range size, the benefit is notable because this natural community is more fragile than most other natural community types as associated soils tend to be erodible. Furthermore, this community is relatively uncommon (it is estimated to cover 29,000 acres or 1.7 percent of the range) and the roads to be closed constitute slightly less than one half of all BMGR roads currently occurring within this natural community. Within the ecosystem, the best remaining examples of this natural community occur in the San Cristobal and Growler valleys on the BMGR and Cabeza Prieta NWR. Sheet flow is the dominant hydrological regime and roads that cross more or less perpendicular to the flow gradient may capture and reduce/eliminate sheet flow, particularly where erosional downcutting occurs. Roads causing soil compaction that negatively impacts water infiltration rates are considered by some experts to be a potential source of stress to this natural community (Hall and others 2001).

- **Paloverde-Mixed Cacti-Mixed Scrub on Bajadas.** Within this natural community, which is best represented in the Saucedo Mountains, about 20 miles of road would be closed. The surface area occupied by these roads is little relative to the range size and the estimated 210,000 acres of this natural community on the BMGR. However, the road closures would represent an estimated 9 percent decrease in roads in this natural community on the BMGR, which is considered an important community for healthy functioning watersheds. The observed condition of some of the roads is eroded, with washouts along some roads, such as the road along the southeastern edge of the Mohawk Mountains. Most of the roads to be closed are within the Saucedo Mountains area, which is one of the few remaining unfragmented representations of the entire paloverde-mixed cacti ecological system, extending from the upper mountain slopes to lower bajadas, in the entire ecoregion (Hall and others 2001).
- **Valley Xeroriparian Scrub.** For this linear natural community, it is the closure of roads that intersect with this natural community rather than miles of roads that is relevant. Although this community occurs throughout the matrix of communities in the ecoregion, past and current road development has directly altered the flow regime, composition, and structure of many examples outside of the BMGR (e.g., throughout the border area of Arizona-Mexico and extending a relatively short distance to the north, especially along the Gila River). Channel-constricted flow is the dominant ecological process in this community and roads can disrupt this flow and disrupt the rate of distribution of water and nutrients from the upper to the lower watershed (Hall and others 2001). Currently, it is estimated that points of intersection between roads and this natural community total about 28 miles or about 1.2 percent of the estimated 2,325 linear miles of this natural

community of the BMGR. With the proposed action, it is estimated that this would be reduced by about 8 miles (or about 29 percent) from the proposed closure of roads that intersect with this natural community, reducing the miles of road intersecting this linear community range-wide from an estimated 1.2 percent to 0.8 percent.

- **Desert Playa.** There are very few playas and roads potentially affecting playas on the BMGR. There is about a 5-mile road to Mohawk Playa within an area that is generally accessible to the public, but this road is and would continue to be restricted to government use only. In addition, there are two roads leading to Aguila Playa, located in the southwestern corner of North TAC in an area closed to the public, one of which bisects the playa for about 1 mile. With the proposed action, these two roads would be closed (although they could be used by agencies, if determined appropriate for resource protection). Limiting the road-related disturbance in and around playas may be of benefit to these intermittent waters in that it would minimize any disruption of their natural hydrological function. Little is known about the hydrology of the desert playas within and near the BMGR because extremely few playas are found in the Sonoran Desert. Of the 1,733,921 acres of the BMGR, just 170 acres are estimated to be within this natural community. Thus, even though these changes would be small, they may be important. .

The act of closing the subject roads would eliminate some of the effects that roads currently have on water resources. It is expected that most benefits to water resources would occur only over time as these roads begin to naturally recover rather than continue to erode from ongoing use. Natural recovery would include revegetation, which would add stability to the roadway surface and lessen the effects of runoff on watercourses. The majority of the types of roads that are proposed for closure (i.e., infrequently used roads that are not currently maintained) generally have fewer of the kinds of effects on water resources that might warrant restoration (e.g., entrenched roads and areas with accelerated rill and gully erosion) than other areas of the range that support more intensive uses, such as the tactical ranges.

The potential establishment of the bypass roads to reroute vehicular traffic around rather than through the northwest corner of the Cabeza Prieta NWR would potentially cause minor increases in sediment suspended in storm water drainage due to erosion and minor disruption of drainage northward to the Mohawk and Coyote washes due to soil entrenchment and compaction. These effects would be more pronounced than those with other range roads because the roads would be used on a relatively frequent basis and regularly maintained (as they would be used by the Border Patrol during periodic ground surveillance). These bypass roads would be more or less perpendicular to the natural flow gradient, and could capture and disrupt natural flow patterns. The affected area is within the Gunsight-Rillito-Pinal Soil Association, which has a slight water erosion hazard (U.S. Air Force 1986), and has little slope or annual rainfall, so such effects are expected to be minimal. Erosion rates would be expected to remain relatively stable and the distribution of water and nutrients from the upper to the lower watershed would not be affected. These effects are balanced with those related to the discontinued use of the roads within the

Cabeza Prieta NWR wilderness. Further analysis and determinations with regard to level of effect and mitigation, as necessary, would occur with the site-specific planning for these roads.

In summary, there would be a low level of beneficial effect expected for water resources from the proposed action for motorized access and unroaded area management. Within localized areas, however, benefits may be moderately to greatly beneficial, depending on the effects roads have on water resources (including drainage patterns and hydrological regimes) within the natural community and the relative significance of the natural community in the context of the greater ecosystem.

### 5.3.3.2 Alternative Actions (Strategy B and Strategy D)

With alternative Strategy B for this resource category, the existing road network and unroaded areas would remain unchanged and there would be no provision for the conservation of unroaded areas greater than 3,000 acres. There would not be the benefits for water resources with the reduction of roads as discussed for the proposed action. The differences between the proposed action and this alternative action within those natural communities more vulnerable to the hydrological effects of roads are as follows:

- **Valley Bottom Floodplain Complex.** Within this natural community, the approximately 21 miles of roads that traverse this community would remain open. Whereas under the proposed action 10 miles, or almost half of these roads, would be closed.
- **Paloverde-Mixed Cacti-Mixed Scrub on Bajadas.** Within this natural community, no roads would be closed and this community would continue to be bisected by an estimated 215 miles of roads; whereas, under the proposed action about 20 miles or 9 percent of these roads would be closed.
- **Valley Xeroriparian Scrub.** An estimated 28 miles of road would continue to intersect with this natural community, whereas with the proposed action roads intersecting with this natural community would be reduced by an estimated 8 miles or about 29 percent.
- **Desert Playa.** Two roads leading to Aguila Playa, one of which bisects about 1 mile of the playa, would not be closed. The disruption to this natural community as a result of the existing roads and associated use is unknown, but of concern because of the rarity of playas and their biological importance and potential hydrological importance. The road to the Mohawk Playa would continue to be restricted to government use only.

In summary, the application of Strategy B would not have the beneficial effects of the proposed action and could eventually have negative impacts, which can only be assessed at the programmatic level herein. As with the proposed action, site-specific planning for the seven miles of road to bypass the northwest corner of Cabeza Prieta NWR would be implemented.

Similarly, additional roads for motorized public or agency use would be evaluated and negative effects to water resources could occur, but the level of effect would be determined in future analysis.

With the implementation of Strategy D, there would be slightly more benefit for water resources than with the proposed action. The difference between implementing the proposed action and Strategy D within those natural communities more vulnerable to the hydrological effects of roads, as further described for the proposed action, are as follows:

- **Valley Bottom Floodplain Complex.** There is no difference between the roads that would be closed within this natural community under Strategy D versus the proposed action.
- **Paloverde-Mixed Cacti-Mixed Scrub on Bajadas.** Within this natural community, a few additional roads would be closed (about 3 miles) in addition to the road closures that would occur under the proposed action.
- **Valley Xeroriparian Scrub.** An additional 9 miles of roads that intersect with this natural community would be closed, representing a total estimated 61 percent decrease in existing roads intersecting with this natural community. This is approximately 29 percent fewer road intersections with this natural community as compared to the proposed action.
- **Desert Playa.** The effects to this natural community would be the same as those of the proposed action.

The benefits to water resources from unroaded area management would be similar as described for the proposed action. However, this strategy would reduce the number of unroaded areas in the BMGR of 3,000 acres or less by about 72 percent from 526 to 145 as compared to 67 percent from 526 to 171 under the proposed action. There would be seven fewer unroaded areas of 3,001 to 10,000 acres and one additional unroaded area of 10,001 to 50,000 acres. Like the proposed action, the largest unroaded area would be slightly more than 102,000 acres located in BMGR—East to the west of North and South tactical ranges (see Figures 3-3, 3-4, and 3-5).

Under Strategy D the development of new public roads would be prohibited and closed roads would be restored where feasible and prudent to remediate a degraded ecological process or enhance wildlife usage. As discussed for the proposed action, most roads to be closed would probably not warrant remediation and benefits to water resources would be realized through natural recovery. However, additional benefit could be realized through restoration because effects to altered drainage patterns could be mitigated in the affected areas.

Site-specific planning for the bypass roads to reroute vehicular traffic around rather than through the northwest corner of the Cabeza Prieta NWR would not be implemented and the potential

effects of such roads, assessed at a programmatic level for the proposed action, would not occur. Agency (Border Patrol) and illegal use of the roads within the northeast corner of the Cabeza Prieta NWR Wilderness would continue.

### **5.3.3.3 No-Action Alternative (Strategy A)**

- The no-action alternative, which employs Strategy A range-wide, would have considerably less benefit for water resources than the proposed action. The 2,222 miles of roads in the current inventory would be retained and there would be no provision for the conservation of unroaded areas greater than 3,000 acres as with the proposed action. The difference between the proposed action and this alternative action within those natural communities would be similar to that described for Strategy B, at least in the short-term. Implementation of the proposed transportation plan to close roads not meeting land management, public, or military needs may eventually have similar benefits to those described for the proposed action.

This alternative does not include site-specific planning for bypass roads to reroute vehicular traffic around rather than through the northwest corner of the Cabeza Prieta NWR. However, such road development would not be precluded under this strategy and the transportation plan may or may not consider such an action in a similar manner to that of the proposed action.

## **5.3.4 Camping and Visitor Stay Limits**

### **5.3.4.1 Proposed Action (Strategy C)**

Potential impacts of the proposed action for camping and visitor stay limits (Strategy C range-wide) on water resources could result from each objective of this strategy. Direct beneficial effects could result from the objectives to define and prescribe reasonable rules for the disposal of human sewage and solid waste in accordance with applicable federal, state, and local regulations and the continuing requirement for all campsites to be more than ¼-mile away from water sources. Both would minimize the potential for degradation of surface water quality that could result from these activities. At one site in particular, the Baker Tanks, there have been problems with users of the picnic facilities leaving litter behind that may have impacts on the quality of the surface water in the tanks.

The other objectives, related to where and how vehicle-based camping can occur, could have indirect impacts on water resources. Potential impacts to water resources from camping result from the potential for surface disturbing activities to change natural rates of suspended sediment in storm water runoff and increase natural rates of erosion and/or natural drainage patterns. These effects are much more likely to occur with vehicle-based camping than self-contained

camping. The proposed action would continue to allow vehicle-based camping within 50-feet of most roads designated as open to public use. Dispersed disturbance from this activity would continue to occur at a low level along most roadways throughout the areas of the range that are generally accessible to the public. Currently, there is an estimated 973 miles of roads that are open to public access, but the proposed action would reduce this by 36 percent, to 621 miles (see Table 3-6). Because hydrological regimes are first and more dramatically altered by the roads themselves, it is difficult to discern the effects from the vehicle-based camping from the effects of the roads. However, the effects on water resources from camping are currently low to negligible and widely dispersed, with more effects observed in popular camping areas such as the foot of the Tinajas Altas Mountains. If camping activity occurs within areas having soils with severe potential for water erosion, there may be more of an effect on down gradient surface water resources; however, no such areas have been identified on the BMGR and this potential is minimized by the requirement that all campsites be located at least ¼ mile from water sources and other designated natural and cultural resources. Similarly, by continuing the policy of limiting vehicle-based camping stays to 14 days within a 28-day period without a special use permit, long-term camping use on the BMGR would continue to be discouraged. The more consecutive days a camp site is used, the greater potential there is for soil compaction and soil disturbing activities that could affect natural water infiltration and runoff patterns and increase sediment in runoff in these highly localized areas.

Lastly, designated camping areas could eventually be established as a result of the proposed assessment of the benefits and effects of such an action. Lacking the proposed assessment, the effect of establishing designated campsites can only be evaluated at a programmatic level at this time. Designated camping areas would have the effect of concentrating camping activity and associated disturbance in localized areas. Thus, there could potentially be slightly greater effects to water resources within these localized areas and equally lesser effects dispersed along roadways. The proposed assessment would consider the soil composition and water resources within the areas for the establishment of designated camping areas as well as their suitability for such use, and would recommend any measures to control storm-water runoff, if necessary. At a minimum, the proposed management measures for soil and water resources (Strategy D) would need to be met.

#### **5.3.4.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B differs from the proposed action in that vehicle-based camping would be allowed within 100 feet of the road, there would be no restrictions on camping along certain road segments for resource protection purposes, and there would be no assessment of establishing designated camping areas. Together, these would result in more widely distributed impacts of vehicle-based camping described above to include new disturbance within the area beyond the current 50-foot limit. The level of impact to water resources would likely be slightly greater than that expected with the proposed action. The benefits from the proposed rules for the disposal of

human sewage and solid waste, the requirement for all campsites to be more than ¼-mile away from water sources (but not other designated natural and cultural resources), and the stay limits described for the proposed action would also occur under this strategy.

The only difference between Strategy C and Strategy D in this resource category is the limits on consecutive days of vehicle-based camping stays within a 28-day period without a special use permit. With Strategy C, like the proposed action, the limitation is 14 consecutive days, whereas with Strategy D it is seven consecutive days. While the benefit of limitations on long-term camping stays on water resources is noted for the proposed action, there would be no measurable difference in consequences to water resources if the limitation were to be seven days rather than 14 days.

#### **5.3.4.3 No-Action Alternative (Strategy A)**

The no-action alternative does not include the proposed prescription of rules for human sewage/solid waste disposal, the requirement that all campsites be more than ¼ mile away from designated natural or cultural resources, or the assessment of the benefits and effects of establishing designated camping areas. Nonetheless, some rules for waste disposal would remain in the range rules provided in the permit application, visitor stay limits would remain the same (as proposed), and camping within ¼ mile of water sources would continue to be prohibited under state law. Thus, other than the potential effects related to the establishment of designated campgrounds discussed for the proposed action, there would be little difference between the level of effect of the no-action alternative and the proposed action for camping and visitor stay limits on water resources.

### **5.3.5 Recreation Services and Use Supervision**

#### **5.3.5.1 Proposed Action (Strategy C in Unit 2, Strategy D in All Other Units)**

The benefits of the proposed action for this resource category relate to the restriction or prohibition of activities that could result in physical surface disturbance and resultant degradation of surface waters. The proposed action would continue the benefit of existing management objectives to prohibit on- and off-road racing and public ORV travel and require compliance with general vehicle operating rules. It would restrict driving in washes except where the wash is a designated part of the road system open to the public and is dry and require a special use permit for a single party with 10 or more vehicles (for all units except for Unit 2, where the threshold would be 20 or more vehicles). The proposed expansion of public education and recreation use information programs, to include information about road restrictions and resource sensitivities and requiring a minimum number of law enforcement officers, increases the chances that these beneficial effects would be realized through effective implementation of

policy. As noted by other agencies with ORV use management responsibility, law enforcement presence, user education clarifying rules and promoting user etiquette and environmental ethics, signs identifying rules, and route marking can assist in compliance with established policy (U.S. DOI, BLM 2001i and Arizona State Parks 2000). In addition, the development and implementation of a limits-of-acceptable change monitoring to guide recreation use management and protect natural and cultural resources could benefit water resources by identifying where recreation use is potentially affecting water resources and using adaptive management techniques to address these effects. The application of Strategy C to Unit 2 and Strategy D to all other resource units would not have differing consequences for water resources. The overall level of beneficial effect, as far as it can be assessed at this programmatic level, is expected to be low in most areas of the BMGR, but comparatively moderate to high in localized areas frequently used for recreation.

#### **5.3.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

Regardless of management unit, there would be no measurable difference in potential water resource effects for Strategy C and Strategy D for this resource category. The only differences between the two is the requirement for a special use permit for a single party with 20 or more vehicles under Strategy C and 10 or more vehicles with Strategy D and in the minimum number of law enforcement officers (which is irrelevant because this is a range-wide management objective).

Similarly, regardless of management unit, application of Strategy B would have some of the same benefits of the proposed action in that on- and off-road racing would continue to be prohibited and that there would be some public education and recreation use information programs (although as compared to the proposed action, these education/information programs could be less effective because they would not include increased public education and recreation use information programs, particularly to inform the public about road restrictions and resource sensitivities as prescribed for the proposed action and the minimum number of law enforcement officers would be two). However, this alternative could also have potential negative impacts on water resources. First, this strategy would allow motorized public travel in designated washes when dry, which could have negative impacts on some drainage systems if such use were to cause increases in the suspension of sediment in drainage flows, cause soil compaction and affect water infiltration in the wash beds, or otherwise interfere with natural hydrological regimes. Erosion along wash banks, particularly at points of ingress and egress and narrow wash corridors, would be of particular concern. There is also a concern that potential leakage of chemical fluids from vehicles within washes would have a greater potential to directly affect water quality, although such a risk is considered to be low. These potential effects, however, would presumably be minimized, as the vulnerability of wash systems would be considered in the process whereby designated washes would be selected. Furthermore, the potential for some

of these effects would be minimized because driving in washes would not be allowed when they are wet and most vulnerable to compaction/entrenchment or more ready pathways for transport of chemicals (although underlying soils can remain vulnerable to such effects even when the wash appears dry).

Second, because this strategy includes an objective to evaluate the need for and effects of allowing public ORV travel in designated areas, authorized ORV travel could eventually be permitted in certain areas. If this were to occur, there could be negative impacts to water resources from increased erosion rates and associated increased sediment in surface water runoff and/or other means of disruption of hydrological regimes; but, if these potential effects were mitigated properly, such effects could be minimized.

### **5.3.5.3 No-Action Alternative (Strategy A)**

The no-action alternative for this resource category would have similar effects on water resources as described for an alternative employing Strategy B for this resource category. However, public ORV travel would be flatly prohibited and motorized public travel would only be allowed in dry streambeds and wash bottoms in accordance with the Draft Barry M. Goldwater East HMP. Specific washes are not designated in the Draft Barry M. Goldwater East HMP, which applies to BMGR—East. Thus, unless addressed in the transportation plan management objective, washes vulnerable to impacts from driving in them (e.g., because of conditions that could degrade water quality or affect hydrological functions) could be more negatively impacted as compared to the proposed action and Strategy B. One other distinction between this strategy and Strategy B is that there would be no minimum number of law enforcement positions for enforcing visitor rules and regulations. Along with no increased public education measures to inform the public about road closures and resource sensitivities and associated benefits, the potential benefits of these management actions on water resources, as described for the proposed action, would not occur.

### **5.3.6 Rockhounding**

#### **5.3.6.1 Proposed Action (Strategy C in Units 2 and 3 and Strategy D in All Other Units)**

Current rockhounding activity is not known to have any impact on water resources and would not be expected to unless it became a common activity in a localized area near a water source, in which case activity levels could result in increased rates of erosion and degraded water quality. The proposed action (Strategy C in Units 2 and 3 and Strategy D elsewhere) would restrict rockhounding activity from locations where it is currently permitted to occur (e.g., Unit 6, including Area B), in designated special natural/interest areas (Mohawk Mountains and the Tinajas Altas vicinity, per the proposed action for special natural/interest areas), and in areas that are designated as a natural or cultural resource area that is sensitive to impacts arising from

human-induced disturbance. Closing areas to this activity and allowing the potential for closure to occur if water sources are being affected provides previously unafforded protection to water resources potentially impacted by this activity.

### **5.3.6.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

The differences between the proposed action and alternative actions for rockhounding in terms of consequences to water resources are minimal. Under Strategy B, the activity would only be restricted if a compliance issue arises. Since water resources can be negatively impacted without there being a compliance issue, this strategy is less protective of water resources than the proposed action, regardless of management unit. The difference between Strategy D and Strategy C for rockhounding in terms of potential consequences to water resources is miniscule, regardless of management unit. Although both strategies provide unprecedented protection from impacts from this activity, Strategy D could potentially provide more protection if there are adverse impacts to water resources occurring from this activity because this strategy flatly prohibits the activity. However, under Strategy C, prohibiting this activity outside of special/natural interest areas and other designated areas would have to be based on a finding of adverse impact.

### **5.3.6.3 No-Action Alternative (Strategy A)**

With the no-action alternative, rockhounding would be allowed to continue under existing management in all publicly accessible portions of the BMGR with no special provisions for excluding the activity from special natural/interest and other designated natural and cultural resource areas that are sensitive to impacts arising from human-induced disturbance. Thus, as compared with the proposed action, the no-action alternative would have a greater potential to affect water resources if impacts associated with the activity caused disturbances such as increased erosion. The level of impact to water resources, if any, would be expected to be minor within localized areas and negligible on a scale of hydrological regimes affecting watersheds.

### **5.3.7 Wood Cutting, Gathering, and Firewood Use and Collection of Native Plants**

The proposed action (Strategy D in Unit 1 and Strategy C in all other units) and alternatives for this resource category (including the no-action alternative) would not have an effect on water resources. There is no measurable direct or indirect correlation between these alternative management strategy objectives and surface or ground water resources.

### **5.3.8 Hunting**

Similar to the previous resource category, there is no direct or indirect correlation between any of the alternative management strategy objectives for hunting and water resources. Although, if implemented, the special hunting program (a management objective included in the proposed action and all alternative strategies except for the no-action alternative) could be used for habitat improvements (including wildlife waters); these potential effects are separately addressed in Section 5.3.11, General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters. One minor distinction is that, if non-game species collection were having an adverse effect on water resources (e.g., collection of amphibians at water sources), all strategies except for Strategy A would allow for some form of protection (the restriction or limitation of this activity under Strategies B and C and proposed objective to petition the Arizona Game and Fish Commission for closing the BMGR for this activity under Strategy D). Although this is not currently thought to be a management issue on the BMGR, the assessment called for in the proposed action (Strategy B) and Alternative Strategy C would provide more information and the ability for range managers to implement adaptive management for the benefit of water resources, if warranted.

### **5.3.9 Recreational Shooting**

#### **5.3.9.1 Proposed Action (Strategy C)**

The primary effect of recreational shooting on water resources is the potential for lead contamination from spent munitions, which has occurred in off-range areas where this activity is concentrated over long periods of time but is not known to be problematic on the BMGR (see Section 5.19.9 for more detail). The proposed action for recreational shooting (Strategy C range-wide) would continue to allow recreational shooting to occur under existing regulations as long as it is compatible with military use, public safety, and no significant resource issues are identified. It also calls for an assessment of the importance and character of recreational shooting as an activity/issue to determine the appropriateness of this activity on the BMGR and implement a decision based on the findings and includes consideration of designating specific shooting area(s). Currently, recreational shooting occurs in a dispersed fashion, but no data are available to indicate where and how often this activity occurs on the BMGR. The effect of allowing the activity to continue, as compatible, while the assessment is completed cannot be accurately assessed without information about the occurrence of this activity on the BMGR, but it is expected to be minimal. Assessing the importance and character of recreational shooting would be of benefit by providing the needed information on which to make an informed decision and to respond appropriately (using adaptive management) if lead contamination from recreational shooting is an issue on the BMGR. If designated areas for recreational shooting are established, best management practices could be implemented to minimize lead contamination and other potential impacts to water resources.

### **5.3.9.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would not provide the advantages stated above for assessing the impacts of this activity and further decision-making. Strategy B would allow recreational shooting to continue to occur unless significant resource issues are identified, which would potentially be less protective of water resources than the proposed action (in that if impacts are occurring, they would more likely be overlooked under this strategy). Conversely, Strategy D would potentially be more protective of water resources. By prohibiting the activity and assessing the appropriateness of allowing the activity in designated areas, the activity would be more tightly controlled and any potential contamination from spent munitions would be addressed through best management practices.

### **5.3.9.3 No-Action Alternative (Strategy A)**

The no action alternative would potentially provide less protection for water resources than the proposed action. Contamination from this activity is not considered to be problematic on the BMGR. However, without further understanding of how and where recreational shooting is occurring or the ability to control this activity, it could become problematic.

## **5.3.10 Utility/Transportation Corridors**

### **5.3.10.1 Proposed Action (Strategy C)**

The proposed action for utility/transportation corridors would protect BMGR water resources from the effects of corridor establishment beyond what has already occurred and been proposed with the Yuma ASH. The impacts of disrupting natural water drainage patterns on the BMGR are currently most dramatic along State Route 85, where road surface engineering and culverts were designed to divert rainwater runoff in a controlled, but unnatural manner. Additional development within this corridor, as permitted with certain restrictions under the proposed action, would be comparatively minor. The Yuma ASH could have similar impacts on xeric drainages in the western BMGR. The specific impacts and any required mitigation for this corridor are being addressed in the NEPA analysis for this road and will be further addressed in terms of cumulative impacts in this EIS.

### **5.3.10.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would have potentially greater consequences on water resources than the proposed action in that proposals to develop additional transportation/utility corridors would be evaluated. BMGR watersheds have been relatively unaffected by transportation/utility corridors, whereas these types of corridors have had far-ranging effects on other areas of the Sonoran Desert. Even with this provision, any additional corridor development is expected to be rather limited based on the requirements to be compatible with the military mission. Nonetheless, the more corridors there are, the more cumulative disruptions there are to natural drainage flow patterns and, thus, this strategy would not provide the benefits of limiting the corridors as the proposed action would.

Strategy D would be more beneficial to water resources than the proposed action in that it would preclude the development of the Yuma ASH. The State Route 85 corridor would continue to be the only transportation/utility corridor bisecting the BMGR and the existing and potential future effects to water resources from the use and further development of this corridor would continue.

### **5.3.10.3 No-Action Alternative (Strategy A)**

The consequences on water resources from the no-action alternative would be similar to those of the proposed action in terms of managing the existing corridors and allowing for the Yuma ASH. However, like Strategy B, the no-action alternative would allow for new corridor proposals to be examined, which could result in additional transportation/utility corridors and associated impacts to water resources.

## **5.3.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

### **5.3.11.1 Proposed Action (Strategy C)**

There are several management objectives for the proposed action for general vegetation, wildlife, wildlife habitat, and wildlife waters (Strategy C range-wide) that could potentially impact water resources directly and indirectly. The greatest potential direct impact relates to the wildlife water development provisions. The proposed action would allow for the implementation of up to six high priority wildlife water developments projects described in the Lechuguilla-Mohawk and Draft Barry M. Goldwater East HMPs during the first five years of the INRMP. Currently, little is understood about the effects of the water development projects, such as putting in dams to create catchments or tinaja modification, on the hydrological regime and natural composition, structure, and function of Mountain Xeroriparian Scrub and Desert Tinaja/Spring natural communities. By design, the wildlife water developments would impede natural flows and, depending on where these waters are located and how they are constructed, impacts could

negatively affect hydrological regime and drainage patterns within localized areas. Despite the current water developments on the BMGR, the watershed condition is such that the functional attributes of the community are maintained across the landscape (Hall and others 2001). Accordingly, the impacts of six wildlife water development projects would not be expected to be major, either individually or cumulatively. These potential effects, however, would be further assessed and mitigated, as appropriate, on site-specific basis.

At the same time as allowing the construction of up to six water developments and continuing to allow for the maintenance and repair of existing water developments, the proposed action also calls for the review of available data and recommendations regarding water developments to provide for the compilation of better information to base a decision about whether or not to suspend planned water developments, remove existing developments, or add new developments. Monitoring of the six water developments to be implemented could provide baseline information on natural hydrological regimes and be used to track the effects that occur with the water developments. Effects to water quality would likely be among the issues studied in the prescribed study of the benefits and effects of wildlife water developments (see Section 5.6.11.1 for more details).

Other indirect positive impacts to water resources could result from the following management objectives in this resource category:

- The proposed development of procedures to control all trespass grazing by livestock and feral burros because livestock/feral burro grazing can negatively impact water resources by affecting water quality, and changing vegetation and natural hydrological patterns.
- The proposed invasive species strategy because invasive species could change natural hydrological regimes as they can affect water retention rates in soils and increase vulnerability of natural systems to fire (which can further disrupt watershed function).
- The proposed vegetation and wildlife habitat restoration efforts for areas that have been damaged by a discontinued military, agency, or intensive public use could improve ecosystem function and, thereby, the natural structure and function of water resources within the affected areas.
- The identification of key areas for the implementation of restrictions on activities as needed to protect and conserve habitat, ecosystems, and biodiversity could be applied to areas that would be protective of water resources, whether or not they are critical components of the protection and conservation goals.

### **5.3.11.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would allow for the construction of up to 17 new water developments; the repair, redesign, or redevelopment of 16 existing water developments; and the consideration of additional wildlife water developments. Based on expected rates of wildlife water development construction, over the first five years of the INRMP, a similar number of new wildlife water developments and repair, redesign, or redevelopment projects would probably be implemented as prescribed with the proposed action. As the number of wildlife water developments to be constructed under the proposed action thereafter are dependent upon the results of the prescribed review of available data, it is unknown at this time whether the findings would suspend planned water developments, remove existing developments, or add new developments. Thus, no difference between the potential consequences of this objective on water resources as compared to the proposed action can be assessed at this time. However, because this strategy does not call for the studies on the effects of water developments as the proposed action does, there would not be the potential for an increased understanding of the effects of associated activities (such as diverting natural flow patterns in water collection catchments or tinaja modification) on the hydrological regime and natural composition, structure, and function of Mountain Xeroriparian Scrub and Desert Tinaja/Spring natural communities.

Strategy D is identical to the proposed action with respect to wildlife water developments except for that no new developments would be allowed prior to the first five-year review of the proposed INRMP. Under Strategy D, the construction of water developments and any localized impacts to water resources that would occur at up to six sites prescribed under the proposed action would either be delayed up to and perhaps beyond the first five years of the INRMP or not occur, if it is determined that some or all projects would not be implemented. As stated above, because wildlife water developments to be constructed under the proposed action beyond six sites are dependent upon the results of the prescribed review of available data, it is unknown at this time whether the findings would suspend planned water developments, remove existing developments, or add new developments. Thus, at this time, no comparative assessment can be made for the period following the first five years of the INRMP.

### **5.3.11.3 No-Action Alternative (Strategy A)**

The no-action alternative would have the same impacts on water resources with regard to wildlife water developments as described for Strategy B. It would also not have the management objective and benefits from the invasive species strategy or the vegetation and wildlife habitat restoration. In comparison to the proposed action, there would be fewer potential benefits for water resources than with the proposed action.

### **5.3.12 Special Status Species**

The only potential for impact of the proposed action (Strategy C) and alternative actions (Strategy B and Strategy D) and no-action alternative (Strategy A) for special status species management as they relate to water resources is the development of low-elevation waters as a part of the Sonoran pronghorn recovery effort. Although use is expected to be minimal, these water developments would potentially affect groundwater by establishing new wellheads and creating new artificial water sources on the BMGR. Because these water developments would almost certainly be implemented under Sonoran pronghorn management programs whether or not they were included in this EIS, they are discussed in the cumulative impacts section rather than here.

### **5.3.13 Soil and Water Resources**

#### **5.3.13.1 Proposed Action (Strategy D)**

The proposed action objectives for this resource category are the most direct and applicable effects on water resources, and all are beneficial. The proposed action for soil and water resources (Strategy D) is the most protective in the full range of alternatives analyzed in this EIS process. The objectives of the proposed action pertaining to minimizing surface disturbance are as follows:

- Restrict the operation of motorized vehicles and heavy equipment to established roads and previously impacted areas, except when it relates to a specific permitted project
- Assess project site soils for their vulnerability to soil disruption and subsequent wind and water erosion; take measures to minimize soil disturbances
- Use specific techniques to minimize soil disturbance on previously unimpacted soils
- Restrict or modify activities as necessary to comply with statutory requirements for soil and water resources and to prevent erosion in areas of cultural resource sensitivity
- Take measures to minimize soil/water contamination or erosion resulting from vehicle use or other activities
- Temporarily restrict vehicular and construction activities when soils are susceptible to a heightened risk erosion, such as following heavy rain
- Restore areas where vehicle use has caused excessive surface damage, temporarily closing roads if necessary

From these objectives, surface water resources would potentially benefit from the reduced or minimized impact of increased erosion and vehicle use effects that may cause: (1) degraded surface water quality (primarily from erosion and increased sedimentation, the greatest threats to surface water quality on the BMGR), and (2) impediments to natural flow, and/or other natural hydrological functions. Benefits would be moderate to high in localized areas and low in the larger scale context of the watershed. In addition, objective for inventory and monitoring of soils, including the range-wide soil survey could have indirect beneficial effects by providing better information about erosion risks that could be used in making decisions about range management activities.

The objectives to monitor water table levels and to keep groundwater development and exploration to a minimum in the former ACECs and other environmentally sensitive areas would directly benefit water resources by discouraging types of use that could impact groundwater resources and providing data to understand how groundwater use on the BMGR or in the BMGR region is affecting the resource. Because groundwater at the BMGR has been found to be of poor quality (with high concentrations of total dissolved solids and fluoride) and because the withdrawal and reservation of the BMGR precludes surface water or groundwater developments to support non-appropriative land use activities, future groundwater development is not expected to be large scale. Federal agencies may continue to develop surface water or groundwater at selected areas to meet management objectives.

#### **5.3.13.2 Alternative Actions (Strategy B and Strategy C)**

As with the proposed action, Strategy B and Strategy C would provide some protection of water resources, but to a lesser degree. The primary difference between these two strategies and the proposed action is in how they would address surface disturbing activity. Neither alternative strategy would include measures to temporarily restrict vehicular and construction activities when soils are susceptible to a heightened risk of erosion or to restore areas where vehicle use has caused excessive surface damage. While Strategy C includes a general measure for the minimization of soil contamination or erosion resulting from certain activities, such activities would only be restricted or modified to comply with statutory requirements under Strategy B. In addition, neither would include the soil survey and the connected benefits to water resources that would occur with the proposed action.

#### **5.3.13.3 No-Action Alternative (Strategy A)**

The no-action alternative also includes measures that are protective of water resources; however, this strategy is the least protective of those strategies considered in that it offers the fewest objectives for soil and water resources management of those alternatives considered.

### **5.3.14 Air Resources**

#### **5.3.14.1 Proposed Action (Strategy A)**

The provisions in the proposed action (Strategy A) include continuing to control fugitive dust at construction sites and recreation activity areas, which could have indirect impacts on water resources. BMGR groundwater resources would continue to be used at current rates to minimize fugitive dust emissions. Applying water to control dust would continue to result in surface-water runoff with high levels of suspended sediment; however, runoff is minimal as there is little excess water applied.

#### **5.3.14.2 Alternative Actions (Strategy B, Strategy C, and Strategy D)**

With Strategy B, unlike the proposed action, there would not necessarily be the continued control of fugitive emissions which is one of the few ways in which BMGR groundwater is used for military purposes. Although runoff with high rates of sediment may or may not occur in runoff associated with water applications, surface water runoff from rainwater could nonetheless have similar high sediment rates as the proposed action since the surface disturbing activities that would be the source of the emissions would be the same.

With both Strategy C and Strategy D, dust palliatives would be used in some areas. Environmental impacts of such control measures would be evaluated should either strategy be selected. At a programmatic level, the effects of these strategies on water resources would be the same: slightly more beneficial to water resources than the proposed action. Where dust palliatives are used, there would be less sediment generated from the roadway surface. There would also be less infiltration of water where the palliatives (other than water as a palliative) have been applied and commensurately less potential increased disturbance from driving on a wet roadway. However, because there would be less infiltration, the volume of roadway runoff would be slightly increased. Under certain slope conditions and where roadway ditches are not present, rates of water erosion can be accelerated by increased runoff. Overall, however, rates of wind and water erosion would be expected to decrease with the application of dust palliatives.

#### **5.3.14.3 No-Action Alternative (Strategy A)**

Because the proposed action for air resources is the no-action alternative, the effects of the no-action alternative on water resources are the same as described for the proposed action.

### **5.3.15 Visual Resources**

For the most part, the management objectives for visual resources would not have an effect on water resources regardless of management strategy. However, the objective to use already disturbed and impacted land areas, which is a continuation of an objective from the Goldwater Amendment and is included in the proposed action (Strategy B) as well as all other alternative strategies, could continue to have indirect beneficial effects by minimizing the disruption of natural surface waters in previously undisturbed areas.

### **5.3.16 Wildfire Management**

#### **5.3.16.1 Proposed Action (Strategy B)**

The proposed action for wildfire management would have overall beneficial effects on water resources. Although wildfire management techniques may have impacts on water resources, the effects of wildfire occurring in natural communities that are not adapted to fire could have greater impacts on water resources from increased erosion and changes in the natural distribution of nutrients from the upper to lower watershed. The fire management plan would include an evaluation of how water resources may be used or affected by fire prevention, suppression, recovery, mapping, monitoring, and possible mitigation protocols for both human and non-human caused fires in accordance with the threat to human life, property, and natural and cultural resources.

#### **5.3.16.2 Alternative Actions (Strategy C and Strategy D)**

The alternative strategies and potential effects on water resources are the same as the proposed action.

#### **5.3.16.3 No-action Alternative (Strategy A)**

The no-action would potentially be less protective of water resources in that it is less comprehensive in its stated goal and because it does not include the benefits that the proposed action would from the development of the fire management plan.

### **5.3.17 Perimeter Land Use, Encroachment, and Regional Planning**

#### **5.3.17.1 Proposed Action (Strategy D)**

The proposed action for perimeter land use, encroachment, and regional planning would potentially have indirect benefits to water resources that are difficult to quantify or qualify in that they are largely beyond the control of the DoD. Nonetheless, the proactive approach of Strategy D would potentially be of benefit because watersheds are interconnected with perimeter lands and there are other interrelationships and interactions between outside water resources that could affect BMGR water resources. Of note are the objectives regarding pesticide drift and groundwater management.

#### **5.3.17.2 Alternative Actions (Strategy B and Strategy C)**

Strategy B and Strategy C would have similar potential for beneficial effects but would have respectively less potentially beneficial effects than the proposed action, as fewer management objectives are proposed under each.

#### **5.3.17.3 No-action Alternative (Strategy A)**

The no-action alternative would not have the potential benefits of the proposed or alternative actions for this resource category.

### **5.3.18 Aggregate Effects on Water Resources**

#### **5.3.18.1 Proposed Action**

The potential aggregate effects on water resources from the proposed action are overall synergistic beneficial effects. Taken together, the combined benefits of the objectives in the 17 resource management categories would be considerably greater than the individual effects. First, the objectives for soil and water resources management, the most direct and applicable effects on water resources, have additive and interactive benefits with those objectives that address management of forms of physical disturbance (motorized access and unroaded areas, camping and visitor stay limits, recreation services and use supervision, rockhounding, recreational shooting, and utility/transportation corridors). As previously stated, physical disturbance could affect the limited surface water resources at the BMGR in two main ways: (1) by increasing waterborne sediment in storm-water runoff and thereby degrading water quality of receiving waters and (2) by changing natural flow patterns in a manner that could affect the hydrological regime of surface waters in the context of their role in the structure and function of the natural

communities. Additive beneficial impacts of the proposed action in terms of surface-water management result from the combined effect of the resource management and the use management objectives. For example, the inventory of soils using NRCS standards to provide baseline information on soil types, erosion risks, and suitability for various activities (resource management objective) would provide better data that could be applied together with the objectives managing use (e.g., management objectives to restrict camping along certain roadways, or to prohibit rockhounding in certain areas, or to determine prudent locations for designated areas for camping or recreational shooting, if a decision is made in favor of their establishment).

Second, there are additive and interactive impacts within the motorized access and visitor camping and public use management strategies. Since there would be a potential for a large number of aggregate effects within the proposed action for these resource categories, a few examples (which are meant to be illustrative rather than comprehensive) are provided. The proposed definition and prescription of rules for waste disposal together with various recreation services and use supervision objectives (e.g., the expansion of public education and recreation use information programs and maintaining minimum numbers of law enforcement personnel) would have greater combined potential for minimizing wildcat dumping and the associated potential effects to water resources, such as the prevention of littering that has been observed and is potentially impacting water quality at the Baker Tanks. Similarly, the requirement for a special use permit for single parties with more than 20 vehicles in Units 2 and 3 (where Strategy C would be implemented) and more than 10 vehicles elsewhere (where Strategy D would be implemented) in combination with visitor stay limits would reduce large-scale and long-term recreational uses of the BMGR. Because large-scale and long-term recreational uses correlate to greater levels of localized disturbance, there would be resultant preventative benefits to water resources, particularly from the effects of increased erosion. The combined effects of the proposed road management strategy and the vehicle-based camping management objectives would be a reduction by not only the discontinued use and natural restoration of the affected 658 miles of roads, but also in the area affected by roadside vehicle-based camping along the publicly accessible roadways which would be reduced by 352 miles, 36 percent less than that available under the existing condition. Thus, benefits of reduced surface disturbance would potentially be in excess of the estimated 2,393-acre reduction of the upper estimate of surface area occupied by BMGR roads, which is based on a 30-foot conservative road width index (see Table 3-6). Some aspects of these management objectives could have additive effects of localizing potential impacts on water resources from public use that are currently dispersed (i.e., by designating areas for camping and recreational shooting after the proposed evaluation). This is not necessarily a benefit or an adverse impact, but a change in the type of effect.

Third, there are the further additive indirect benefits of the proposed objectives for management of other BMGR resources (general vegetation, wildlife, wildlife habitat, and wildlife waters; air resources; and wildfire management) and perimeter land use, encroachment, and regional planning, which would potentially work together to provide a more comprehensive program for

water resource protection. For example, there would potentially be synergistic beneficial effects for groundwater resources as groundwater monitoring in concert with perimeter land use, encroachment, and regional planning would allow for a better understanding on how perimeter water use may be affecting water reserves on the BMGR. Together, these objectives could also be applied to monitor all geophysical and legal aspects of groundwater management for any potential changes that may impact BMGR water resources. The prescribed study of the benefits and effects of wildlife water developments could provide better information about impacts to water quality. The development of the six proposed wildlife waters could potentially be hastened or supported by the use of fees that could be collected through special permits to hunt on the BMGR and used for habitat management, but the overall effect to water resources would be the same regardless.

Finally, but perhaps most importantly, are the additive effects of the proposed resource inventory and monitoring objectives and the tools they provide for applying adaptive management with regard to all resource management objectives. The development and implementation of a limits-of-acceptable change monitoring to guide recreation use management and protect natural and cultural resources could benefit water resources by identifying where recreation use is potentially affecting water resources and using adaptive management techniques to address these effects.

### **5.3.18.2 Alternative Actions**

#### Management Strategy B

While Management Strategy B would have some of the same impacts on water resources as the proposed action, this strategy would potentially be less beneficial for water resources in aggregate than the proposed action. In brief, the combined effect of this strategy differs from the proposed action in that it would allow for increased public access and use opportunities and would continue most existing conservation management practices rather than the more protective resource management strategy objectives that were selected for the proposed action. Strategy B was selected for the proposed action in only three cases: hunting, visual resources, and wildfire management and, for both hunting and wildfire management, Strategy C was the same as Strategy B. The following summarizes the main differences, in aggregate, between the potential consequences to water resources from Strategy B and as compared to the proposed action:

#### *Effects of Physical Disturbance*

There are many ways in which this management strategy could result in greater levels of physical disturbance than the proposed action. The greatest single difference regards the lack of road closures and potential for additional roads and road use in this strategy. There would be 665 more miles of road and an upper estimate of 2,418 acres more of surface disturbance from roads

and associated shoulders than with the proposed action (based on the 30-foot conservative road width index, see Table 3-6). In addition, this strategy would allow for the travel in designated washes when dry, potentially allow for ORV travel to be permitted in certain areas (following evaluation thereof), only restrict or prohibit recreational shooting and rockhounding if a compliance issue arises, allow vehicle-based camping within 100 feet rather than 50 feet of a road and not restrict it along certain road segments for resource protection purposes, and would allow consideration of additional utility/transportation corridors. Rather than expanding management objectives for soil and water resources as proposed (including provisions to minimize erosion), this strategy would add to the existing management provisions only as needed to comply with statutory requirements and to prevent erosion in areas of cultural resource sensitivity. There would not be the potential for physical disturbance from recreational shooting and camping to be shifted from widely dispersed to localized areas as there would be with the proposed action. Each of these effects must also be considered in terms of the fact that the minimum number of law enforcement officers (two) would not provide the higher degree of protection as would the proposed action, as a greater law enforcement presence would correspond to more effective implementation of management measures.

As Tinajas Altas Mountains ACEC and special management provisions for this area would expire, there could be more potential for adverse impacts to the Tinajas Altas than with the proposed action, as with the proposed action there would presumably be less tolerance for deterioration or damage and perhaps increased attention focused on the monitoring and adaptive management program in areas redesignated as special natural/interest areas. Although this strategy authorizes the long-term development of 11 more wildlife water developments than the six authorized under the proposed action, there would probably be a similar number of waters constructed during the first five years of the INRMP as under the proposed action. Comparative effects beyond the five-year time frame cannot be assessed at this time.

#### *Effects of Resource Inventory and Monitoring, Resource Management, and Coordinated Regional Planning*

Rather than expanding management objectives for soil and water resources as proposed, this strategy would add to the existing management provisions only as needed to comply with statutory requirements and to prevent erosion in areas of cultural resource sensitivity. There would not be the range-wide soil survey using NRCS standards and there would also be less inventory and monitoring and fewer regional and ecosystem management objectives for perimeter land use, encroachment, and regional planning than with the proposed action, including monitoring and coordination objectives related to groundwater and surface water resource management issues. As opposed to the proposed action, there would also not be the study of the benefits and effects of wildlife water developments and any associated findings that could be applied to better understanding of water resource impacts.

### Management Strategy C

There would be even fewer differences in the consequences to water resources, in aggregate, from the implementation of Management Strategy C range-wide and the proposed action. Strategy C was incorporated, at least in part, in all resource categories except for air resources and visual resources, although additional objectives were proposed for resource inventory and monitoring and soil and water resources beyond what would be implemented in Strategy C. Where the management strategy selected for the proposed action was unit-specific rather than range-wide (as for recreation services and use supervision; rockhounding; and wood cutting, gathering, and firewood use and collection of native plants), Strategy C was sometimes, but not always, selected for those units publicly accessible and most frequently used (Units 2, 3, and 6). Thus, generally speaking, Strategy C would provide a balanced mix of public access and use opportunities and resource protection priorities similar to that of the proposed action, but would not include the shift towards resource protection and conservation management as the proposed action does in these instances. The following key differences summarize the main differences, in aggregate, between the consequences of Strategy C on water resources versus those of the proposed action:

#### *Effects of Physical Disturbance*

To the extent that larger group sizes correlate with physical disturbance, there would be more physical disturbance as a special use permit would be required for any single party with more than 20 vehicles rather than with more than 10 vehicles (except for in Management Unit 2). Effects of rockhounding, though minimal, would continue to occur outside of special natural/interest areas and other designated areas within all units rather than just Units 2 and 3.

#### *Effects of Resource Inventory and Monitoring, Resource Management, and Coordinated Regional Planning.*

The resource inventory and monitoring would be somewhat less beneficial under Strategy C in that there would not be the ecosystem-wide efforts that are included in the proposed action. It would not include the range-wide soil survey using NRCS standards. Similarly, perimeter land use and regional planning objectives would not include coordination on issues such as pesticide drift and groundwater management.

## Management Strategy D

The consequences on water resources from this strategy would differ from the proposed action mainly in that there would be less physical surface disturbance as Strategy D would maximize resource protection and conservation management practices at the expense of some public access and use opportunities. Strategy D was selected for the proposed action range-wide in the resource inventory and monitoring; soil and water resources; and perimeter land use, encroachment, and regional planning resource categories. Strategy D was also applied to most units in those resource categories where unit-specific selections were made (motorized access and unroaded areas; recreation services and use supervision; rockhounding; and wood cutting, gathering, and firewood use and collection of native plants). The difference between the proposed action and Strategy D for special status species and wildfire management is nonexistent and it is minor for camping and visitor stay limits and hunting. The following summarizes the main differences, in aggregate, between the consequences of Strategy D on water resources versus those of the proposed action:

### *Effects of Physical Disturbance*

The benefits to water resources as compared to the proposed action would be commensurate with the combined potential reduction in surface disturbance that would result from implementing Strategy D range-wide. As with the other strategies, the key difference in terms of physical disturbance is in the reduction of roads. Applying Strategy D range-wide for motorized access and unroaded areas in Unit 2 in addition to all other areas of the BMGR would result in 42 additional miles of roads closed and restored (by natural or potentially augmented means) than with the proposed action, most of which would be roads generally open to public access. This translates to 152 fewer acres of surface disturbance than the proposed action, plus the reduced disturbance from vehicle-based camping along the subject roadways. Other potentially disruptive activities that would continue to be allowed on a limited basis with the proposed action (including rockhounding, recreational shooting, and non-game species collection) would be prohibited under this strategy (although the appropriateness of allowing recreational shooting to occur in designated areas would be assessed and closing the BMGR to non-game species collection would require approval of the proposed petition to the Arizona Game and Fish Commission). A special use permit would be required for any single party with more than 10 vehicles in all areas of the range, including Unit 2.

As construction of new waters would be suspended for the first five years of the INRMP, the potential localized impacts of the six waters that would be constructed on water resources with the proposed action would not occur.

*Effects of Resource Inventory and Monitoring, Resource Management, and Coordinated Regional Planning*

Higher management standards for air resources and visual resources under this strategy could have indirect impacts benefiting water resources such as reducing erosion via the use of dust palliatives as well as restricting non-military activities and restoring visual resource qualities in unroaded areas. The study of wildlife water developments would probably provide better information regarding the water quality and the effects of these types of developments on hydrological regimes.

### **5.3.18.3 No-Action Alternative**

The consequences on water resources from selection and implementation of the no-action alternative rather than the proposed action is that natural and cultural resources management would continue under the guidances provided by the Goldwater Amendment, HMPs, and various compliance decisions. DoD agencies would adopt the provisions of these plans, as modified to comply with Sikes Act requirements. The only resource category where the no-action alternative was selected as the proposed action is air resources. Although the proposed action differs from Strategy A in all other 16 categories, the key differences between the no-action alternative and the proposed action in terms of consequences on water resources, in aggregate, are summarized as follows:

#### Effects of Physical Disturbance

In the short-term, this strategy would not have any of the potential benefits of the proposed action in terms of road closures and restoration. As the transportation plan is developed and implemented, however, roads would more likely be reduced, although it cannot be quantified if there would be more roads or fewer roads than with the proposed action. Other public use that causes physical disturbance (including vehicle-based camping, rockhounding, and recreational shooting) and recreation services and use supervision would continue to occur under current management provisions. There would be no minimum number of law enforcement positions, making the effective implementation of management objectives via enforcement less likely than with the proposed action. Public travel would be allowed in dry streambeds and wash bottoms in accordance with the Draft Barry M. Goldwater East HMP. There would not be the potential for physical disturbance from recreational shooting and camping to be shifted from widely dispersed to localized areas as there would be with the proposed action. During the first five years of the INRMP, the same number of surface waters as the proposed action would likely be implemented (six), potentially affecting water resources in localized areas to probably the same extent as the proposed action.

## Effects of Resource Inventory and Monitoring, Resource Management, and Coordinated Regional Planning

Continued management under existing guidance would have fewer beneficial effects in terms of resource inventory and monitoring and management of visual resources and wildfire. There would not be the additional objectives for soil and water resources that could provide for additional reduction of erosion and would include a range-wide soil survey using NRCS standards. Objectives for perimeter land use, encroachment, and regional planning would be nonexistent. The proposed studies to better understand the benefits and effects of wildlife waters would not be implemented. Any associated benefits would not occur.

### **5.4 CLIMATE AND AIR RESOURCES**

#### **5.4.1 Resource Monitoring**

##### **5.4.1.1 Proposed Action (Strategy D)**

Applying resource monitoring Management Strategy D range-wide could potentially result in minor impacts on the air quality. Potential impacts could result from increases in fugitive dust emissions from additional resource monitoring activities that involve traveling within the BMGR on unpaved roads. However, monitoring activities would generally vary in location and time and, with the vast size of the BMGR, effects would be considered short term and temporary.

##### **5.4.1.2 Alternative Actions (Strategy B and Strategy D)**

With the range-wide application of Management Strategy B or Management Strategy C, there would still be an increase in monitoring activity compared with the no-action alternative, and this could have minor impacts on the air quality similar to those described for the proposed action. However, these impacts would be less than those of the proposed action and commensurate with the reduced level of resource monitoring proposed in those strategies.

##### **5.4.1.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, resource monitoring activities would essentially be the same as those currently in effect or planned. Thus, associated impacts would not be expected to differ greatly from the existing conditions. By comparison, this alternative would have less impact on the air quality than that of the proposed or alternative actions.

## **5.4.2 Special Natural/Interest Areas**

There is no measurable direct impact from either the proposed action, alternative actions, or no-action alternative attributable to special natural/interest area management. The selection and range-wide application of Management Strategy C (proposed action), Strategy B or D (alternative actions), or Strategy A (no-action alternative) is not expected to result in a change in the number of persons who visit the range and the associated travel on unpaved roads.

## **5.4.3 Motorized Access and Unroaded Area Management**

### **5.4.3.1 Proposed Action (Strategy C)**

Under the proposed action, Management Strategy C would be implemented for this resource management element. Air resource impacts from this management strategy principally are defined by potential changes in the public access. Those units that are generally accessible to the public are Units 2, 3, 6, and a small part of Units 1 and 7. As discussed in Section 4.12.1.4, available recreation use data indicate that more visitation occurs in BMGR—West than in BMGR—East and that the predominant use (at least in BMGR—East) is for hunting.

With the application of Management Strategy C, roads would be reduced by an estimated 658 miles occupying an upper estimate of about 2,400 acres of roadbed and associated shoulders (see Table 3-6 and Figures 3-1 and 3-2), but most roads that would be closed are redundant roads. Although most areas would remain accessible, the available road network in areas accessible to the public would be reduced. Adverse effects to air resources may potentially increase under this scenario if the number of vehicles that utilize the road system remains constant but these vehicles are required to use the remaining open roads; this may reduce impacts in one area but increase impacts in those areas of open roads from the increased concentration of vehicular emissions and fugitive dust. In publicly accessible areas, however, the proposed road closures may also reduce vehicle miles traveled in recreational driving involving recirculating vehicle use on redundant routes, which could reduce associated emissions. Although resulting dust from such use would be lessened on the BMGR, users could, however, engage in similar use within the airshed.

Another factor would be the relative susceptibility of soils to be suspended in the form of dust when disturbed. Use of roads in more stable, rocky, gravelly, loamy soils having low wind erosion hazard rather than sandy, silty soils having moderate to severe wind erosions hazards would reduce generation of fugitive dust. Under the proposed action, this would be the case, particularly in the vicinity of Yuma Mesa and Fortuna, San Cristobal, Ten Mile, Growler, and Midway wash systems, which have soils characterized as having moderate to severe wind erosions hazards.

### **5.4.3.2 Alternative Actions (Strategy B and Strategy D)**

The consequences of the alternative actions for roaded and unroaded areas on the air resources are comparatively assessed by again focusing on the consequences in terms of public access if Management Strategies B or D were applied range-wide.

If Management Strategy B were applied range-wide, the 2,222 miles of existing roads would remain open. As compared with the proposed action, vehicular emissions and fugitive dust would likely be more dispersed because of the greater number of roads available for travel (see Table 3-6 and Figures 3-1 and 3-2). In addition, new roads could potentially be developed for public access and/or future motorized public access to currently restricted areas if there is a change in military security restrictions. However, only 7 miles of additional road are currently proposed and these roads would not be available for public access. Should there be future increases in motorized public access as compared to the proposed action, this could potentially encourage more public visitation. Emissions would not be expected to increase, however, unless there is a positive correlation between the number of publicly accessible roads and the amount of public visitation and recirculating vehicular traffic.

Compared to the proposed action, the application of Management Strategy D would decrease the road network by an additional 107 miles compared to the proposed action application of Strategy C, of which 67 miles are roads generally accessible to the public (see Table 3-6 and Figures 3-1 and 3-2). As with the proposed action, the additional decrease in the miles of available road would increase concentration of emission along the open roads. This additional decrease in the road network may further reduce the number of vehicle miles traveled in recreational driving involving recirculating vehicle use. Any resultant difference in emissions would likely be too small to result in an appreciable difference compared to the proposed action.

### **5.4.3.3 No-Action Alternative (Strategy A)**

Management Strategy A would retain the current 2,222-mile road network with no proposal to add roads or close existing roads until such time as a transportation plan could be completed. As compared with the proposed action, vehicular emissions and fugitive dust would likely be more dispersed because of the greater number of roads available for travel. If no roads were closed, BMGR visitation would likely continue to increase as it has in recent years and recirculating-type recreational vehicular use would continue on redundant roads; therefore, the overall quantity of vehicle emissions might be expected to be higher than with the proposed action.

#### **5.4.4 Camping and Visitor Stay Limits**

##### **5.4.4.1 Proposed Action (Strategy C)**

The range-wide application of Strategy C, would not result in any substantive change from the existing conditions in allowable camping locations or terms of stay, and would therefore not result in any noticeable change to air resources. If the evaluation of designated camping areas results in their establishment and favored use over other areas available for vehicle-based camping, there could be more localized air quality impacts from vehicular emissions and dust at the designated camping areas in comparison to more widely dispersed impacts.

##### **5.4.4.2 Alternative Actions (Strategy B and Strategy D)**

An alternative action implementing Strategy D would have the same potential impacts as the proposed action, except that it would restrict vehicle-based camping stays to 7 consecutive days, as opposed to 14 consecutive days with the other three alternatives. To the extent that campers would select a different camping location where they could stay longer, this alternative could result in a reduction in the number of people who camp on the BMGR and the number of vehicle miles traveled on unpaved roads. If vehicular use were to decrease, this would reduce vehicular emissions and fugitive dust on the BMGR.

An alternative action implementing Strategy B would not change the camping stay limits, but would allow vehicle-based camping within 100-feet of roads rather than 50 feet, changing the potential extent of associated surface disturbance, but not the frequency or type of use or vehicle miles traveled. Any change in air quality would be minimal, limited to the extent that the additional disturbed soils would result in additional fugitive dust emissions.

##### **5.4.4.3 No-Action Alternative (Strategy A)**

No changes in camping patterns would be expected with the no-action alternative; therefore, no effect on air quality would occur. This would be the same as compared to the proposed action, with the exception that there would be no potential for changes in emissions due to the establishment of designated camping areas.

### **5.4.5 Recreation Services and Use Supervision**

#### **5.4.5.1 Proposed Action (Strategy C in Unit 2 and Strategy D in All Other Units)**

Under the proposed action, Management Strategy C would be applied to Unit 2 and Management Strategy D would be applied to all other areas of the BMGR. Air resource impacts from these management strategies principally are defined by the continued prohibition of high emission producing activities such as off-road travel and on- and off-road racing and potential changes in public access and vehicular travel. The number of vehicles in a single group that would require a special use permit distinguishes these two strategies with 20 vehicles the threshold with Strategy C and 10 vehicles the threshold with Strategy D. Requiring a special use permit for groups with relatively large numbers of vehicles would potentially act as a deterrent and reduce the frequency of such use and thereby help to minimize the concentrations of fugitive dust and vehicular emissions. In addition, application of either of these strategies may reduce impacts to air resources through the expressed restriction of public vehicular access to all washes that are not part of the designated road system open to the public. However, this effect is expected to be negligible because there are only a few washes on the range wide enough to accommodate this activity and the activity is not associated with high levels of emissions as gravel cover in wash beds reduces the airborne suspension of underlying fine silt and sand particles.

#### **5.4.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

Under the alternative Management Strategy B, motorized public travel in dry, designated washes would be allowed, and the potential for allowing public off-road travel and access to mines in designated areas would be evaluated. Parties with up to 30 vehicles would be allowed without the need for a special use permit. The application of any of these actions may increase adverse effects on the air resources compared to the proposed action due to increases in vehicular travel and the generation of fugitive dust.

As previously stated, there is little distinction between Strategy C and Strategy D. Given that there are few groups of range visitors that have between 10 and 20 vehicles (see Section 5.12.5), there would be no measurable difference in potential consequences on air resources with implementing Alternative Strategy C in Unit 1 and Units 3 through 7 and Alternative Strategy D in Unit 2.

#### **5.4.5.3 No-Action Alternative (Strategy A)**

The no-action alternative would have a greater potential for adverse effects on air resources than the proposed action, primarily due to the less restrictive requirements for public access and

travel. Groups would not be required to obtain a special use permit unless there were more than 50 vehicles in a single party (as compared to 10 or 20). Single parties with more than 50 vehicles are more rare than those with more than 10 or 20 (see Section 5.12.5). There would also be the potential for driving in some washes, pending the finalization of the Draft Barry M. Goldwater East HMP.

#### **5.4.6 Rockhounding**

Management strategies associated with rockhounding would have little, if any, effect on air resources because any allowable rockhounding would be limited to surface collection of less than 25 pounds for personal use. It is unlikely that allowing this activity or prohibiting it would change vehicular use patterns, which is the primary influence on air quality.

#### **5.4.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

##### **5.4.7.1 Proposed Action (Strategy D in Unit 1, Strategy C in All Other Units)**

Under the proposed action, Management Strategy D would be applied to Unit 1 and Management Strategy C would be applied to all other areas of the BMGR. Allowing wood gathering could encourage vehicular use to access areas with denser concentrations of dead and downed wood. However, because the use of any wood collected would be limited to campfires, any additional vehicular use would likely be minor. Campfires would continue to be allowed under any alternative; however, the prohibition of wood gathering and native wood campfires with Strategy D could discourage some campers from building a campfire when camping in the vicinity of Tinajas Altas as they would have to haul wood in from off of the range. This could reduce the amount of air pollutants associated with open burning generated from campfires in the publicly accessible portion of Unit 1. However, any impact would be minor.

##### **5.4.7.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

Management Strategy B would allow wood cutting, gathering, and firewood use and may have more impact to the air quality than Strategy C, which prohibits all forms of wood cutting or wood collection not associated with currently dead and downed wood. This could result in additional vehicular use for these activities and resulting emissions. If alternative Strategy D were applied in the other publicly accessible units of the range (i.e., primarily Units 2, 3, and 6), there could be minor reductions in emissions from campfires in these areas as the prohibition of native wood campfires may reduce campfires using wood from other off-range sources or

charcoal. Conversely, if Strategy C were applied in Unit 1, there could be minor additional emissions, as compared to the proposed action, from native wood campfires in this unit.

#### **5.4.7.3 No-Action Alternative (Strategy A)**

The no-action alternative would not change the existing air resource conditions of the BMGR. Because the no-action alternative would continue to prohibit collection of firewood within the former ACECs, this would prohibit native wood campfires within these areas. Compared to the proposed action, which prohibits native wood campfires primarily in the vicinity of the former Tinaja Altas ACEC, the no-action alternative could potentially result in slightly more campfires and the associated pollutants from burning. However, the difference would be so slight that it would be unmeasurable except in the most localized sense.

### **5.4.8 Hunting**

#### **5.4.8.1 Proposed Action (Strategy B)**

The proposed action would include the assessment of the need for a special hunting permit program for the BMGR that requires payment of nominal fees to be used for the protection, conservation, and management of wildlife. If such a program were implemented as a result of this assessment, it is possible that fewer hunters would visit the BMGR, thereby reducing vehicular traffic within the BMGR and associated vehicular emissions and fugitive dust impacts. However, hunters may still be active and generate emissions elsewhere in the airshed.

#### **5.4.8.2 Alternative Actions (Strategy C and Strategy D)**

Strategy C would be identical to the proposed action and would result in the same effects.

Strategy D would be similar, but would also potentially close the BMGR to non-game species collection (subject to Arizona Game and Fish Commission approval of the proposed petition). To the extent that this prohibition would reduce vehicular activity, it would further reduce impacts to air resources.

#### **5.4.8.3 No-Action Alternative (Strategy A)**

The no-action alternative would continue existing game management programs. While this alternative would not change the current air resource conditions of the BMGR, it would be less

likely than the proposed action or other action alternatives to reduce vehicular emissions and fugitive dust.

### **5.4.9 Recreational Shooting**

#### **5.4.9.1 Proposed Action (Strategy C)**

To some degree, the analysis of air resource impacts associated with the proposed action, Management Strategy C, cannot be determined until the assessment of the importance and appropriateness of recreational shooting on the BMGR has been completed and a decision is made to allow, prohibit, or restrict this activity. The assessment of air resources is focused on the potential for changes in public access and vehicle use. To the extent that recreational shooting encourages increased visitation and results in more vehicle miles traveled, it potentially could adversely affect air quality; conversely, placing restrictions on the type of weapons that can be used, the area of use, and the time frame for their use, may discourage visitation and vehicle activity on the BMGR resulting in reduced impacts on the air quality. The only immediate restrictions—requiring a special use permit for shooting automatic weapons and shooting at night—are thought to be uncommon activities not associated with substantive vehicle use.

#### **5.4.9.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would allow for recreational shooting on the range as long as it is compatible with military use, public safety, and no significant resource issues are identified. Strategy B would not change the current effect on air resources, as this strategy is similar to the current practice. However, because urban growth is encroaching on established shooting ranges and some shooting ranges near urban areas are closing, there potentially could be increased interest in recreational shooting on the BMGR in the future if Strategy B were selected and recreational shooting opportunities were retained.

Strategy D, on the other hand, would prohibit all recreational shooting activities on the range. An assessment to determine the appropriateness of allowing the activity in designated areas would be conducted to determine if recreational shooting should be allowed in designated areas. Strategy D could potentially cause a decrease in the number of recreational shooters and associated vehicular activity on the BMGR, thereby reducing the impact on the air resources to a greater extent than the proposed action.

### **5.4.9.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, recreational shooting would be allowed under the existing regulations. Thus, there would be no change in existing air resource impacts related to this activity. If demand for recreational shooting on the BMGR increases, there could be some future air quality degradation to the extent that vehicular use on the range increases.

### **5.4.10 Utility/Transportation Corridors**

#### **5.4.10.1 Proposed Action (Strategy C)**

With implementation of the proposed action, the only new transportation corridor that would be allowed is the Yuma ASH, which would pass through a portion of the westernmost part of the BMGR. All other future utilities or transportation developments or improvements would be restricted to the existing corridors. Highway construction associated with the Yuma ASH would include grading and other earthwork, introduction of construction vehicles, and other ground disturbances that would be expected to result in short-term increases in fugitive dust and other emissions. The introduction of the Yuma ASH would result in long-term impacts from vehicular traffic on a paved highway through the BMGR. Air quality implications are being addressed in a separate Environmental Assessment for the Yuma ASH. Some degradation of air quality resulting from vehicle emissions can be expected, but no air quality compliance issues are anticipated.

New utility development proposals would be restricted to existing corridors and the proposed actions would be subject to NEPA and/or other regulatory requirements. Any effects on air quality from utility installations and transportation corridor improvements (e.g., widening of State Route 85) would generally be expected to be limited to the construction period, but would be addressed through project-specific NEPA documentation.

#### **5.4.10.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would allow development of additional utility/transportation corridors on a case-by-case basis. Because of the degree of planning already accomplished for the Yuma ASH, it is likely that this proposed transportation corridor would be allowed, resulting in the same potential effects as described for the proposed action. Other corridor development could occur, but would be constrained by requirements to be compatible with the military mission and environmental review.

Strategy D would restrict all future utility/transportation corridors to existing corridors. This would preclude development of the Yuma ASH. Compared to the proposed action, Strategy D

would result in less effect on the air quality within the BMGR, but could actually result in degradation of the regional air quality. Without the Yuma ASH, vehicles would be forced to use existing streets and highways; if this results in traffic congestion, vehicles emissions would increase and degrade air quality in the region.

### **5.4.10.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, utility developments would be treated the same as the proposed action, except that new transportation corridors could potentially be developed subject to compatibility with the military mission and environmental review. Thus, impacts to air resources would be the same as the proposed action unless new corridors were established.

## **5.4.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

### **5.4.11.1 Proposed Action (Strategy C)**

A number of new programs are proposed in Strategy C, including conducting surveys, monitoring, developing strategies to control the spread of invasive species, restoring habitats, and identifying sensitive habitat areas. Most of the objectives proposed would not directly affect air quality, but increase vehicular activity to implement the objectives related to additional surveys, monitoring work, and other actions may impact air resources. Constructing up to six wildlife water developments could involve surface disturbance, which contributes to fugitive dust. Such actions would be subject to additional NEPA review and site-specific air quality effects would be addressed at that time.

### **5.4.11.2 Alternative Actions (Strategy B and Strategy D)**

Management Strategies B and D would also involve the implementation of additional surveys, monitoring work, and other actions. Increases in vehicular access to conduct these activities could also impact the air resources. Under Strategy B there would be up to 17 wildlife water developments, which could have localized, short-term impacts on air quality to be addressed in site-specific NEPA documentation. As compared to the proposed action, impacts during the first five years of the INRMP would be comparable to those of the proposed action since it is unlikely that more than six water developments would be implemented during the first five years of the INRMP. Under Strategy D, however, there would be no wildlife water developments during the first five years of the INRMP.

### **5.4.11.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, the focus of new work would be on finalizing and implementing the habitat management plans, which address new wildlife water developments. While developing up to 17 wildlife waters could include surface disturbing activities, additional NEPA documentation on the site-specific proposals would address air resources effects.

### **5.4.12 Special Status Species**

The proposed action, alternative actions, and no-action alternative would all allow for some species monitoring and recovery efforts. To the extent that these efforts result in an increase in vehicular activity, there could be some degradation of air quality from vehicle emissions and fugitive dust. The degree of differences in the number of activities that might require vehicular access cannot be distinguished clearly enough to differentiate the air quality effects of the management strategies.

### **5.4.13 Soil and Water Resources**

The proposed action, Strategy D, is distinguished from the other strategies in that it includes conducting a range-wide soil survey, restricting vehicular and construction activities when soils are susceptible to erosion, and restoring areas where vehicle use has caused excessive surface damage. If the soil surveys involve increased vehicular activity on the BMGR, this may adversely impact the air quality; however, the improved understanding of the soils of the range could lead to better management decisions such as avoiding ground-disturbing activities in areas where the soils are susceptible to erosion, which would benefit air quality in the long term. The restoration of surface-damaged areas would help to prevent suspension of dust and could result in an improvement to the overall air quality.

These distinguishing factors associated with the proposed action would generally benefit air quality in the long term more than the other alternatives. Overall, however, the benefits of Strategy D over the alternative strategies would be minor and air quality impacts would be comparable regardless of whether the proposed action, an alternative action, or no-action management strategy is implemented.

#### **5.4.14 Air Resources**

##### **5.4.14.1 Proposed Action (Strategy A)**

The range-wide application of Management Strategy A would continue to minimize impacts to the air resources through the control of fugitive dust emissions at construction and recreational sites.

##### **5.4.14.2 Alternative Actions (Strategy B, Strategy C, and Strategy D)**

Of the alternative management strategies, Strategy D may be the most effective at reducing impacts to the air resources by monitoring air quality trends, avoiding activities in areas of deteriorating air quality, and using dust palliatives on heavily traveled roads. Compared to the proposed action, Strategy C would be better at controlling fugitive dust through the use of dust palliatives on heavily traveled roads as well as at construction sites. Strategy B would have more adverse impact than any of the other alternatives because it offers no management objectives to control dust.

##### **5.4.14.3 No-Action Alternative (Strategy A)**

The proposed action for air resources is the no-action alternative. The effects would be the same as described for the proposed action.

#### **5.4.15 Visual Resources**

None of the management strategies proposed for visual resources with the proposed action, alternative actions, or no-action alternative would have a measurable effect on air resources. All strategies would include making efforts to use land areas that are already disturbed and impacted over undisturbed areas, which would potentially help to prevent new sources of fugitive dust.

#### **5.4.16 Wildfire Management**

##### **5.4.16.1 Proposed Action (Strategy B)**

Management Strategy B would include developing a fire management plan that establishes fire prevention and suppression practices based on the best known science. This could potentially reduce impacts to air resources caused by uncontrolled burning.

#### **5.4.16.2 Alternative Actions (Strategy C and Strategy D)**

Management Strategies C and D (the alternative actions) are identical to the proposed action and would have the same effects.

#### **5.4.16.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, wildfire management suppression would continue to be managed under the existing objective and no change in effects would be expected.

### **5.4.17 Perimeter Land Use, Encroachment, and Regional Planning**

#### **5.4.17.1 Proposed Action (Strategy D)**

Air quality is a regional issue because air is not stagnant so sources of air pollution do not stay within the immediate area of where they are generated. While DoD cannot control the sources of air pollution that are outside of the BMGR, working with the agencies and organizations responsible for land uses along the BMGR perimeter and in the region could help to ensure that the parties are coordinating to help prevent or minimize deterioration of the air quality. The proposed action, Strategy D, includes assessing the implications of adjacent land use plans and developing management responses (as necessary) to protect and conserve BMGR natural and cultural resources. If such an assessment determines that adjacent land use plans could result in a significant adverse effect on air resources, management responses would be prepared.

#### **5.4.17.2 Alternative Actions (Strategy B and Strategy C)**

Management Strategies B and C would be similar to the proposed action in that they also include assessing the implications of adjacent land use plans and developing management responses (as necessary) to protect and conserve BMGR natural and cultural resources. These strategies include fewer monitoring and coordination activities than Strategy D, but most of these differences would not appreciably change the effect on air resources compared to the proposed action.

### **5.4.17.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, no local or regional coordination would necessarily occur. While air resource effects would not differ from the existing condition, the benefits of such coordination would not be realized as with the proposed action.

### **5.4.18 Aggregate Effects on Climate and Air Resources**

The impacts associated with the various management strategies are directly related to public access and any associated vehicular activity or action that contributes to the emission of fugitive dust. None of the proposed or alternative strategies are expected to have any measurable or long-term impact on the air quality of the BMGR principally due to the limited and isolated activities associated with each strategy in relation to the near pristine nature and vastness of the BMGR. It is impossible to quantify impacts because no data are currently available to accurately quantify the amount of vehicular use on the BMGR or on which specific roads such use occurs. The qualified assessment of the potential impacts is sufficient to discern possible difference in the proposed management strategies, but with no clear measurable degree on the amount of difference between the strategies. The discussion that follows addresses the minimal differences in impact that may be expected among the strategies proposed in aggregate and is based on differences that may be expected in public access, vehicular activity, or other action that may cause or contribute to particulate emissions; emissions of other criteria pollutants are expected to be indiscernible.

#### **5.4.18.1 Proposed Action**

The resource management elements that would likely decrease current levels of impacts to air resources through implementation of their respective proposed management strategies include the following:

- Motorized Access and Unroaded Area Management
- Recreation Services and Use Supervision
- Woodcutting, Gathering, and Firewood Use, and Collection of Native Plants
- Soil and Water Resources
- Air Resources
- Wildfire Management
- Perimeter Land Use, Encroachment, and Regional Planning

The strategies proposed for each of these resources contain measures that limit or reduce public access, vehicular activity, or other actions that may cause or contribute to increases in fugitive dust.

Those resource management elements that may produce negative impacts to the air quality through the use of the proposed strategies include:

- Resource Inventory and Monitoring
- General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters
- Special Status Species

The management strategies associated with each of these resource categories contain measures that increase public access, vehicular activity, or other actions that may cause or contribute to increased impacts to fugitive dust emissions on the BMGR.

Those resource management elements that may provide no change in impacts to the air quality through the use of the proposed strategies include:

- Special Natural/Interest Areas
- Camping
- Rockhounding
- Hunting
- Recreational Shooting
- Utility/Transportation Corridors
- Visual Resources

While constructing the Yuma ASH is not an element of the proposed INRMP, the proposed management strategy provides for a management policy that would allow for a portion of the highway to pass through the BMGR. The Yuma ASH would introduce short-term adverse impacts during highway construction and long-term adverse impacts from the emissions of the vehicles traveling on this highway for the portion that passes through the BMGR. However, the regional air quality would be expected to improve with the Yuma ASH by relieving traffic congestion on other travel corridors.

Because the net amount of change in vehicular use and other activities that may influence air quality cannot be quantified based on available data, there is no method for quantifying the net aggregate effect. However, net effects would probably be slightly more beneficial to air resources than the existing condition; the overall quality of air in the airshed would not change as a result. As most air quality impacts would be short term, intermittent, and localized, additive and/or interactive types of aggregate impacts would be the exception rather than the rule. An example where both additive and interactive impacts could occur and result in a greater combined reduction in air emissions and improve air quality would be the closing of redundant roads in combination with requiring special use permits for single parties with more than 10 or 20 vehicles. Here, the combined impact of these two objectives could be realized in localized areas of portions of the BMGR open to public access where larger-sized groups could be

deterred, plus the reduction of vehicle miles traveled in association with recirculating-type vehicle use that would be precluded by road closures, resulting in less net emissions.

#### **5.4.18.2 Alternative Actions**

##### Strategy B

With the application of Management Strategy B range-wide, the following may result in increased impacts to air quality compared to the proposed action due primarily to less restrictive measures affecting fugitive emissions.

- Motorized Access and Unroaded Area Management (which allows for new road development, including the 7-mile Cabeza Prieta NWR bypass roads, and allows for higher vehicle miles traveled in recreational driving in recirculating patterns on redundant road networks and on roads with moderate to severe potential for wind erosion)
- Recreation Services and Use Supervision (which allows for the possible establishment of a designated ORV use area and travel in designated washes when dry and does not require a special use permit until there are 30 or more vehicles in a single party)
- Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants (which allows for wood gathering and campfires range-wide)
- Recreational Shooting (which continues to allow for recreational shooting anywhere on the range where it is compatible with military operations and public safety rather than limiting the activity to designated areas)
- Air Resources (which has no requirement to control fugitive dust at construction sites or recreation activity areas)

Compared to the proposed action, the range-wide application of Management Strategy B may result in decreased air quality impacts for the following resource management elements due to more restrictive measures affecting fugitive emissions.

- Resource Inventory and Monitoring (which would minimize the number of additional vehicular trips on the BMGR because there would be fewer inventory and monitoring activities)

Management Strategy B would result in similar air resource effects as the proposed action for the following resource management elements:

- Special Natural/Interest Areas

- Camping and Visitor Stay Limits
- Rockhounding
- Hunting
- Utility/Transportation Corridors
- General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters
- Special Status Species
- Soil and Water Resources
- Visual Resources
- Wildfire Management
- Perimeter Land Use, Encroachment, and Regional Planning

As compared to the proposed action, the net aggregate effect on air quality from Strategy B would be slightly greater based on the relative degree of vehicular use and other activities that may influence air quality (in particular, the emissions from recirculating type driving and not requiring a special use permit until there are 30 or more vehicles in a single party), plus the absence of any special management objective for air resources.

### Strategy C

Compared to the proposed action, the application of Management Strategy C range-wide may result in decreased air quality impacts for the following resource management elements due to more restrictive measures affecting fugitive emissions:

- Resource Monitoring (which would potentially result in less vehicular trips on the BMGR because there would be fewer inventory and monitoring activities)
- Air Resources (which would include the use of dust palliatives on heavily traveled roads)

Management Strategy C would result in similar air resource effects as the proposed action for the following resource management elements:

- Motorized Access and Unroaded Area Management
- Special Natural/Interest Areas
- Camping and Visitor Stay Limits
- Recreation Services and Use Supervision
- Rockhounding
- Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants
- Hunting
- Recreational Shooting
- Utility/Transportation Corridors
- General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters
- Special Status Species

- Soil and Water Resources
- Visual Resources
- Wildfire Management
- Perimeter Land Use, Encroachment, and Regional Planning

As compared to the proposed action, the net aggregate effect on air quality from Strategy C would be slightly improved over that of the proposed action, principally due to the management objective that would call for the use of dust palliatives on heavily traveled roads.

### Strategy D

The range-wide application of Management Strategy D, which generally maximizes resource protection, is not expected to cause or contribute to increased impacts to the air quality for any of the resource management elements as compared to the proposed action.

Compared to the proposed action, Management Strategy D may result in decreased impacts to the air quality for the following resource management elements due to more restrictive measures affecting fugitive emissions:

- Camping and Visitor Stay Limits (which would limit the duration of the camping stay, perhaps discouraging the number of campers and thus the number of vehicle miles driven on the BMGR)
- Recreation Services and Use Supervision (which would require a special use permit for a single party with 10 or more vehicles, thus limiting the number of vehicles generating dust in a given location)
- Recreational Shooting (which prohibits recreational shooting, thus eliminating any vehicular trips for this purpose)
- Rockhounding (which prohibits rockhounding, thus eliminating any vehicular trips for this purpose)
- Utility/Transportation Corridors (which would eliminate the introduction of the Yuma ASH within the BMGR and the associated vehicular traffic, short-term impacts associated with construction would not occur, but long-term impacts from traffic congestion in other areas could occur from not constructing the highway)
- Air Resources (which would avoid new activity in areas of deteriorated air quality)

The application of Management Strategy D range-wide would have air quality effects that are similar to the proposed action for the following resource management elements:

- Resource Monitoring
- Special Natural/Interest Areas
- Motorized Access and Unroaded Area Management

- Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants
- Hunting
- General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters
- Special Status Species
- Soil and Water Resources
- Visual Resources
- Wildfire Management
- Perimeter Land Use, Encroachment, and Regional Planning

As compared to the proposed action, the net aggregate effect on air quality from Strategy D would probably be indiscernible from that of the proposed action, based on the relative degree of vehicular use and other activities that may influence air quality (in particular, the short-term impacts of the Yuma ASH and further limiting recreational opportunities such as driving, camping, rockhounding, etc.)

#### **5.4.18.3 No-Action Alternative**

Applying Management Strategy A range-wide, which continues the existing management practices, may result in increased impacts to the following resource management elements as compared to the proposed action:

- Motorized Access and Unroaded Area Management (which would allow for higher vehicle miles traveled in recreational driving on recirculating patterns within redundant road networks with moderate to severe potential for wind erosion)
- Recreation Services and Use Supervision (which would allow for motorized access of dry streambeds and washes and would not require a special use permit unless a single party has 50 or more vehicles)
- Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants (which would allow native wood campfires range-wide)
- Recreational Shooting (which would allow recreational shooting where compatible with military use and public safety)
- Perimeter Land Use, Encroachment, and Regional Planning (which does not provide for local and regional coordination with other agencies and organizations for resource management on a regional basis)

With the application of Management Strategy A range-wide, the following resource management elements may result in decreased impacts to air quality compared to the proposed action due to more restrictive measures affecting fugitive emissions:

- Resource Inventory and Monitoring (which would have the least amount of inventory and monitoring activity, thus reducing the need for vehicular trips)

The range-wide application of Management Strategy A would result in similar impacts to the proposed action for the following resource management elements:

- Special Natural/Interest Areas
- Camping and Visitor Stay Limits
- Rockhounding
- Hunting
- Utility/Transportation Corridors
- General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters
- Special Status Species
- Soil and Water Resources
- Air Resources
- Visual Resources
- Wildfire Management

The net aggregate impact from the no-action alternative would be similar to the proposed action, but perhaps result in less beneficial impacts because there would be fewer restriction on some activities that could result in greater vehicle miles traveled and associated emissions (the opportunity for recirculating driving in redundant road networks located and use of roads in areas with moderate to severe potential for wind erosion with no special use permit requirement until a group has 50 or more vehicles in a single party).

## **5.5 GENERAL VEGETATION**

### **5.5.1 Resource Inventory and Monitoring**

#### **5.5.1.1 Proposed Action (Strategy D)**

The proposed action (Strategy D range-wide) would emphasize resource protection and conservation priorities, and reflects a shift from single-species, compliance-driven natural resource management approaches towards broader, ecosystem based management approaches. Of the alternative strategies considered, this approach is the most comprehensive, and best satisfies the intent of DoD Instruction 4715.3 and the associated ecosystem management

principles. A monitoring system that sets limits of acceptable change and uses adaptive management would be implemented. Assuming that the proposed monitoring program identifies detrimental impacts to vegetative resources, an adaptive management response is developed and implemented, and the management response is effective, there would be the potential for beneficial impacts to vegetative resources. This strategy also recommends development of a monitoring system that integrates with existing monitoring and management activities within the greater Sonoran Desert ecoregion. This would allow for management of vegetative resources in a landscape context, and provide a better basis for coordinating management with managers of lands adjacent to the BMGR. In this way, this strategy may be viewed as an opportunity to create a comprehensive, landscape-scale monitoring program for the portion of the Sonoran Desert that crosses agency boundaries. Resource management decisions made to benefit plants and plant communities based on this monitoring could extend beyond the BMGR.

TNC's study (Hall and others 2001) and the management data gaps and issues identified in Section 4.5.4 may serve as a basis for the monitoring program. Accordingly, the proposed action would lead to increased knowledge of the composition, structure, and function of the natural plant communities, and would help characterize their response to disturbance as well as a better understanding of the effects of invasive species. The biology of crucifixion thorn (the only plant species identified by TNC as a conservation element in Hall and others 2001) is largely unknown, and questions about this endemic species and its potential association with significant archeological sites could be investigated under this action.

#### **5.5.1.2 Alternative Actions (Strategy B and Strategy C)**

Strategy C primarily differs from the proposed action in that it does not promote the integration of monitoring and management plans for the BMGR with those of the greater Sonoran Desert ecoregion. In addition, Strategy C would not compare the ecological trends between low-use and high-use locations. In comparison to the proposed action, there would be less potential for general vegetative resources to benefit from management actions that may be developed as a result of such monitoring programs.

In contrast to Strategies C and D, Strategy B involves compliance-driven monitoring only, and would therefore focus monitoring on protected plant species, instead of on the natural plant communities of which they are a part. As compared to the proposed action, there would be less potential for monitoring to identify adverse effects to general vegetative resources and to benefit from any management actions developed in response. It is difficult to further assess within any degree of certainty how general vegetation might benefit less from these alternative strategies versus the proposed action.

### **5.5.1.3 No-Action Alternative (Strategy A)**

The no-action alternative (Strategy A) is focused on single species, compliance-driven monitoring, and does not promote ecosystem management principles. Inventory and monitoring of vegetation would be limited to that necessary to address the occurrence of protected plant species on the BMGR and the potential effects on those species, as required by law or through consultation with the USFWS. As compared to the proposed action, there would be less potential for monitoring to identify adverse effects to general vegetative resources and to benefit from any management actions developed in response.

## **5.5.2 Special Natural/Interest Areas**

### **5.5.2.1 Proposed Action (Strategy C)**

Applying Strategy C range-wide would redesignate the three ACECs and the flat-tailed horned lizard HMA as “special natural/interest areas,” but allow the SRMAs and Backcountry Byway to expire. By redesignating the ACECs as special/natural interest areas, it is expected that there would be less tolerance for deterioration or damage in these areas than in other locations and the monitoring and adaptive management program would have increased attention focused on these areas. For vegetative resources, this would be beneficial because several native plant communities located within the proposed special natural/interest areas have special qualities or attributes recognized with their former ACEC designation. The proposed action would also evaluate the potential for altering existing or establishing additional special natural/interest areas, which could also be beneficial to other plants or plant communities.

As further detailed in Sections 4.5.1.3 and 4.11.1.3, each of the dune complexes on the BMGR (located within the former Gran Desierto Dunes ACEC and Mohawk Mountains and Sand Dunes ACEC) has a distinctive plant species composition, and both complexes would likely benefit from management as special/natural interest areas. The Gran Desierto Dunes have a plant community that is an unusual assemblage of species found nowhere else in Arizona. These dunes are within the flat-tailed horned lizard HMA so the proposed redesignation of the HMA would also provide extra protection for the dune vegetation by treating the dunes not as an isolated system, but as an integral part of the larger landscape. HMA management provisions, which would be retained under the proposed action, would be expected to continue to benefit vegetative resources by limiting disturbance within this area. The Mohawk Mountains and Sand Dunes ACEC encompasses the largest and least-disturbed dune system in Arizona. This area contains stands of the crucifixion thorn (identified as a conservation element) located west of the Mohawk Dunes and along the margins of the Mohawk Playa, just east of the dunes. The semi-stabilized sand dune system is covered with biological soil crust and supports two other species of interest,

Schott's wire lettuce and Spanish needle. A recent survey found 120 plant species in 35 families present within the Mohawk Sand Dunes alone (Felger and others 1998).

The Tinajas Altas Mountains ACEC contains a unique assemblage of plant species adapted to extremely hot and arid conditions, including the Davis Plain ironwood tree population and an example of the Elephant Tree-Limberbush on Xeric Rocky Slopes natural community. The ironwood population within the Davis Plain has been previously subject to poaching, with reports of both live and dead ironwood being trucked into Mexico for use as domestic and brick kiln fuel in the past. Ironwood stumps in this area have been estimated to be 900 to 1500 years old (BLM 1990). Thus, any increased management attention that may be associated with the redesignation of this ACEC as a special natural/interest area would help to protect these plant species.

The two SMRAs that would be permitted to expire without being granted any special designation are not currently open to public access, and their SRMA designation was primarily assigned to recognize the presence of geologically outstanding volcanic formations. While the Sentinel Plain Lava Flow SRMA has some noteworthy native plant assemblages including creosotebush-big galleta scrub (see Section 5.5.2.2), the Crater Range SMRA is primarily vegetated by creosotebush-white bursage scrub, which is widely represented throughout the BMGR. Similarly, there are no vegetative resources of special note along El Camino del Diablo Backcountry Byway. Thus, allowing these areas to expire is not expected to result in impacts to general vegetative resources.

### **5.5.2.2 Alternative Actions (Strategy B and Strategy D)**

All alternatives would include the redesignation of the Flat-tailed Horned Lizard HMA and would equally benefit vegetative resources within this area as management provisions limit disturbance within this area.

Strategy D differs from the proposed action because it would redesignate all ACECs, SRMAs, and the Backcountry Byway as special natural/interest areas, instead of allowing the SRMAs and Backcountry Byway designations to expire. If increased management attention were focused on these areas as a result of the special natural/interest area designation, this strategy would potentially be more protective of native vegetation within these areas than would the proposed action. Although most of these areas within the SRMAs and the Backcountry Byway corridor do not contain outstanding vegetative resources, general vegetative resources within these areas could still benefit from the increased management attention that may be associated with a special natural/interest area designation. The redesignation of the Sentinel Plain Lava Flow SRMA as a special natural/interest area could garner attention to and possibly result in monitoring of the only documented occurrence of the Creosotebush-Big Galleta Scrub Natural Community found

on the BMGR and development of adaptive management responses. Given that this portion of the range is closed to public access, any management action could nonetheless pertain to military and/or agency use in this area.

Strategy B would potentially be less protective of native vegetation than the proposed action because it would allow the ACECs, SRMAs, and Backcountry Byway to expire without assigning them any special designation, and would therefore not necessarily result in increased management attention focused on these areas. This has the potential to negatively affect the native vegetation of these areas and the Mohawk Mountains and Sand Dunes ACEC and the Tinajas Altas Mountains ACEC, in particular, because both areas have plant communities of relative significance and are (at least in part) accessible for outdoor recreation and disturbance that can be associated with certain types of recreation activity (e.g., illicit ORV use, which has historically been documented to have impacts on vegetative resources within Tinajas Altas Mountains ACEC). Unlike the proposed action and Strategy D, this alternative does not include any provision for evaluating the potential for altering existing or establishing additional special natural/interest areas; vegetative resources within any additional special natural/interest area could benefit from increased resource monitoring and management attention.

### **5.5.2.3 No-Action Alternative (Strategy A)**

Under Strategy A, the designations and applicable special management provisions of existing ACECs, SRMAs, the HMA, and the Backcountry Byway would be retained. The vegetation resources in these areas would be managed and protected to the same extent that they are currently. As compared to the proposed action, the no-action alternative protects general vegetation in these areas through management prescriptions that, although sometimes inappropriate (e.g., addressing recreation use within SRMAs where there is no public access), limit surface disturbing activities. Unlike the proposed action, the no-action alternative does not include a provision for altering existing or establishing additional special natural/interest areas and any potential associated impacts to vegetation.

## **5.5.3 Motorized Access and Unroaded Area Management**

### **5.5.3.1 Proposed Action (Strategy C)**

As detailed in Section 3.4.4.2, the proposed action for this resource management element would keep the principal components of the existing network open for vehicular use but would close vehicle access to redundant roads, particularly in local areas with dense road networks. The closure of the 658 miles, or 30 percent, of BMGR roads as prescribed by the proposed action would generally be beneficial to vegetation on the BMGR. The upper estimate of the surface area

occupied by roads and associated shoulder areas would be reduced from 0.47 percent to 0.33 percent of the 1,733,921-acre range (based on the conservative 30-foot road width index, see Table 3-6). There is little available data or documentation of the effects of BMGR roads on vegetation and natural communities, but there were many scoping comments submitted specific to concerns that the proliferation of roads on the BMGR is detrimental to vegetative resources. Most of the data that are available for the BMGR pertain to the well established and frequently used roads that support the military or agency missions and would not be closed under the proposed action (e.g., Malusa and others 2001, Hall and others 2001). This can be supplemented, to some extent, by other studies in the southwestern United States that provide some applicable data as well as field observations and aerial photography. Using this information as a basis for assessment, closing roadways and eliminating associated vehicular traffic and other associated activities as proposed under Strategy C for motorized access and unroaded area management would have the potential to:

- Prevent physical damage to plants from uses that occur in association with the road; physical damage can kill plants, or weaken them such that they are more susceptible to the elements, disease-causing pathogens, or attack by insect pests
- Reduce dust accumulation on leaves, which can restrict photosynthetic activity (this has not been identified as an issue on the BMGR, but could potentially be an issue in some areas of the BMGR)
- Prevent potential damage that may be occurring to biological soil crusts (a significant source of nitrogen in some plant communities) that could be occurring in association with some of the roads (no data are currently available on this subject on the BMGR; however, in other areas of the Southwest the proliferation of roads for ORV travel have caused such damage)
- Prevent vehicles from introducing seeds of weedy or non-native species that may be carried on their tires or frames, particularly species that are known to prosper in disturbed soils [such as Sahara mustard, which has been documented by Malusa and others (2001) to be occurring in the Mohawk and San Cristobal valleys]
- Prevent soil compaction, which may alter the water relations of some vegetation (i.e., the process by which plants take up and use water) (no data are available on how BMGR vegetation may be affected by soil compaction in association with roads)
- Reduce changes in rainwater runoff patterns (e.g., flooding caused by at-grade stream crossings that are not designed to handle flows created by rain events), which could either wash out vegetation, or affect the distribution of water or nutrients to vegetation (which

has been documented by aerial photograph interpretation in various areas of the BMGR, primarily along well-established and frequently used roads)

- Reduce the chance of fire introduced by hot vehicle components or cigarette smoking (although this has never been a documented cause of fire on the BMGR)
- Limit the areas that people can access on the BMGR via motorized means, therefore reducing any associated disturbance to vegetation, including illegal collection of cacti or other plant species (which may occur on the BMGR, but has not been identified as an ongoing problem)

As to be discussed further in Section 5.5.18, Aggregate Effects on General Vegetation, some of the benefits related to disturbance that may be associated with roads would be expected to be more pronounced along public use roads (e.g., from uses such vehicle-based roadside camping). Under the proposed action, 621 miles of roads would be available for general public access under the proposed action, which is 352 miles or 36 percent less than is currently available under the existing condition. Conversely, such effects could become more pronounced along the roads that would remain open as such uses and associated disturbance could become more concentrated.

Road closures would have the additional effect of increasing the size of unroaded areas on the BMGR; Strategy C includes an objective to conserve existing unroaded areas of 3,000 acres or more to the extent they are compatible with military or agency missions. The number of unroaded areas of 3,001 acres or more would decrease by 44 as a result of combining smaller areas into larger blocks of unroaded area. This includes an increase in unroaded areas greater than 50,000 acres in size from five to eight to include contiguous areas primarily in creosotebush-bursage desert scrub natural community. Large unroaded areas provide a greater degree of conservation and protection for vegetation than areas where vegetative communities may be disturbed (or possibly fragmented) by roads and their associated impacts on vegetation. While BMGR roads have caused physical damage to vegetation in and sometimes near roadways, most plant communities on the BMGR are not known to have been affected to any large degree by such fragmentation effects. To the extent that roads are associated with the spread of invasive plant species, plant communities in unroaded areas may be less impacted by these invasive species.

Natural vegetative communities that have the most roads, and would therefore benefit most from their closure include:

- *Creosotebush-Bursage Desertscrub*. Being the most common vegetation type on the BMGR and the most prevalent in valley areas where most roads to be closed are located, the creosotebush-bursage desertscrub natural community would potentially benefit from the reduction in any adverse effects associated with roads to a greater degree than any

other natural plant community. Closure of roughly 550 miles of the 1,800 miles of road within this vegetation type (a reduction of about 31 percent range-wide) is to be implemented under the proposed action, primarily within Management Units 1, 2, and 5. In localized areas, benefits may be pronounced, but on a range-wide basis the benefits would likely be relatively low. When translated into the upper estimate of surface area occupied by roads and associated shoulders within this natural community, there would be a reduction from about 6,540 acres to 4,540 acres within the estimated 1.29 million-acre area occupied by this natural community range-wide. In other terms, rather than 0.5 percent of the occurrence of this natural community on the BMGR being occupied by roads, 0.3 percent of it would be occupied by roads under the proposed action. Unroaded areas of more than 3,000 acres in this natural community that would be conserved to the extent compatible with the military or agency missions include areas in the Davis Plain/Yuma Desert, Lechuguilla Desert, San Cristobal Valley, Childs Valley, and Saucedo Valley. Another potential benefit would be less disturbance and natural recovery of biological soil crusts (which influence nitrogen and water relations, soil erosion, and seedling germination/establishment, as well as providing food and nesting materials for insects and wildlife). These biological soil crusts frequently occur in this community type, and they are vulnerable to disturbance. Also, roads may facilitate invasion of this natural community by non-native species such as Sahara mustard, red brome, and buffelgrass, which can build up to densities that carry fire and lead to destruction of native vegetation that is critical for wildlife. Other plants associated with this vegetation type are ocotillo, cacti, ironwood, mesquites and paloverde, all of which are protected by the Arizona Native Plant Law.

- *Paloverde-Mixed Cacti-Mixed Scrub on Bajadas*. Management Units 4, 5, 6, and 7 contain the majority of this natural community type, and it has more miles of roads embedded within it than any other vegetation type on the BMGR except for creosotebush-bursage desertscrub. If the proposed action were implemented, approximately 20 miles of the approximately 215 miles of road within this vegetative community would be closed (a 10 percent reduction range-wide). Benefits would occur within the localized affected areas, but would be minor on a range-wide basis. In range-wide terms, the upper estimate surface area occupied by these roads and associated shoulders currently represents about 780 acres and would be reduced to about 710 acres of the estimated 210,000 acres of the range-wide occurrence of this natural community. In other terms, the current 0.4 percent of this community occupied by roads range-wide would be reduced to 0.3 percent. Foothill paloverde, mesquite, ironwood, ocotillo, and many cacti occur in this native community type, and all are considered vulnerable to illegal salvage or harvest and are therefore protected under the Arizona Native Plant Law.
- *Elephant Tree-Limberbush on Xeric Rocky Slopes*. This vegetation occurs within Management Units 1 and 2, and the proposed action would lead to a closure of about half

of the roads (about 55 of about 105 miles) within this natural community type (a 52 percent decrease). Range-wide this natural community occupies 90,600 acres of the BMGR and the upper estimate of the surface area occupied by existing roads and associated shoulders is 380 acres; the proposed action would reduce this to about 205 acres. Range-wide the percent of this natural community occupied by roads would be reduced from 0.4 percent to 0.2 percent. Although this may be viewed as a small effect in these terms, there may be moderate benefits in that the BMGR and Cabeza Prieta NWR contain the only representations of this community in the United States. A portion of this natural community within the Tinajas Altas and Gila mountain areas is currently exposed to heavy recreational vehicle use, relative to the other areas in the United States where this natural community occurs (Hall and others 2001). Recreation use in this area has resulted in some reported damage to vegetation in the vicinity of Tinajas Altas, although the level of effect has not been quantified. Reduction in redundant roads and better control of motorized vehicle use would therefore be expected to have moderate benefits in localized areas, such as near Tinajas Altas. Elephant tree, Kearney sumac, and Bigelow beargrass, which are species restricted from salvage by the Arizona Native Plant Law, are dominants in this plant association.

Other natural communities that contain fewer miles of road relative to those listed above, and yet may benefit somewhat from the road closures included in the proposed action are discussed below.

- *Creosotebush-Big Galleta Scrub*. This community type occurs on deep, sandy soils and has been mapped in only one area on the BMGR – the Sentinel Plain area within Management Unit 5, although it may also be found near the Dune Complex and Dune Endemics community type. While relatively few roads currently exist in this community type (about 28 miles), the proposed action would have the effect of reducing the length of roadways by about 20 miles (68 percent), which would contribute to its protection from any related disturbance. Because these roads do not serve a military or agency purpose and are closed to public use, they are infrequently used and have relatively low levels of disturbance associated with them. Range-wide, the upper estimate of surface area currently occupied by roads and associated shoulders within the 24,500-acre occurrence of this natural vegetative community on the BMGR is about 100 acres; the proposed action would reduce this to about 30 acres. The estimated area of this natural community occupied by roads would be reduced from 0.4 percent to 0.1 percent. Thus, benefits are expected to be minor on this scale, but greater benefits may occur in localized areas affected by the subject roads. In first-order drainages or bottomlands within this natural community, velvet mesquite (a species protected from harvest by the Arizona Native Plant Law) may provide the tree canopy layer. The big galleta, which occurs in relative abundance in this plant community, is a rhizomatous species, meaning it has an underground horizontal/compressed stem that bears shoots along its upper surface, which

contributes to soil stabilization and erosion prevention. Thus, reducing any impacts on this species may also potentially benefit earth and water resources within affected areas.

- *Valley Xeroriparian Scrub.* This community contains several plant species restricted from salvage or harvest by the Arizona Native Plant Law. The proposed action, if implemented, would lead to a closure of approximately 8 miles of road in this natural community (an approximately 28 percent decrease from the existing road network located within this community). Range-wide this community is estimated to occupy 2,325 linear miles in the BMGR. The approximately 28 miles of road currently in this community is 1.2 percent of this area; the proposed action would reduce this area to 0.9 percent. This community also occurs in many of the unroaded areas that would be greater than 3,000 acres and thus conserved to the extent compatible with the military and agency missions. Since road development in this natural community has the potential to alter the flow regime, as well as the composition and structure of this community type, it would benefit at low levels, primarily in localized areas, from the proposed road closures and prohibition of further road development for public use.
- *Valley Bottom Floodplain Complex.* Approximately 10 miles of road within this community type, primarily located within Management Units 4 and 5, are subject to closure under the proposed action (a reduction of close to one half). This community is relatively uncommon (it is estimated to cover 29,000 acres or 1.7 percent of the range) and the proposed road closures would reduce the acreage within this community from about 75 to 40 acres. The range-wide percent of this natural community occupied by roads would be reduced from 0.3 percent to 0.1 percent. The proposed action would have the effect of making the occurrence of this natural community on the BMGR almost entirely unroaded (the remaining roads that would traverse this community would total less than 10 miles and cover a surface area slightly more than 35 acres). Because this vegetation provides forage, cover, nest sites, and perches that are scarce in adjacent communities, it is of high value to wildlife. According to Hall and others (2001), the BMGR contains some of the best remaining examples of this community in Arizona, and perhaps the entire Sonoran Desert. Roads are potentially correlated with spread of invasive species in this community because non-native seeds may be transported and distributed via vehicles and the seeds are more likely to germinate in the Valley Bottom Floodplain Complex where water is more accessible. In particular within this natural community, there is concern regarding invasive species such as Sahara mustard and buffelgrass reaching densities sufficient to carry fire that could kill the native species, which are especially not fire-adapted (Hall and others 2001). For these reasons, the benefits to this natural community associated with the proposed road closures would potentially have greater benefits for vegetation than similar closures proposed in other natural communities, but in view of the small area of this community occupied by roads, the total magnitude of the benefits would be very modest.

If the closed roads were permitted to recover naturally, they would eventually revegetate, although there could be some problems created by non-native species, which could colonize such corridors even in the absence of their active use because seeds can be distributed by wind or water and some invasive plant species are known to colonize and prosper in disturbed soil environments.

The proposed action would allow for site-specific planning to establish the Cabeza Prieta NWR bypass roads within Management Unit 2. The 7 miles of roads that would be built to bypass the Cabeza Prieta NWR would necessitate the clearing of some vegetation, and would therefore create some localized negative effects on vegetation in the area. These added roads, would primarily traverse creosotebush-bursage desertscrub vegetation and create one additional unroaded area in each of the 101- to 500-acre, 1001- to 3,000-acre, and 3,001- to 5,000-acre categories, but would do so at the expense of eliminating an unroaded area from the 5,001- to 10,000-acre category (see Figures 3-4 and 3-5) primarily within this natural community (see Figure 2-5). Some elephant tree-limberbush vegetation in the southern Copper Mountains would also be potentially affected by the east-west bypass road (see Figure 2-5).

### **5.5.3.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would result in the retention of all roads that would be closed under the proposed action, plus implementation of site specific planning for the Cabeza Prieta NWR bypass roads, a difference of 665 miles (see Tables 3-6 and Figures 3-1 and 3-2). The subject roads are mostly located within the creosotebush-bursage desertscrub natural community, a difference of about 560 miles as compared to the proposed action (including the Cabeza Prieta NWR bypass road). Within the elephant tree-limberbush on xeric rocky slopes natural community, there would be a about 50 more miles of road as compared to the proposed action, within the paloverde-mixed cacti-mixed scrub on bajadas there would be about 20 more miles of road as compared to the proposed action, and within the creosotebush-big galleta scrub natural community there would be about 20 more miles as compared to the proposed action. The surface area occupied by these roads in each natural community in relation to the area occupied by these natural communities range-wide is discussed in Section 5.3.3.1.

Retaining the existing road network (rather than reducing it) would not have the potential beneficial impacts to vegetation as described for the proposed action. As noted, most of these roads are likely having minor localized effects on vegetation within localized areas, but under this strategy any effects that the subject roads were having on native plant communities would continue. The predicted effects of continued use of these roads and associated activities (e.g., vehicle-based camping) include some physical damage to vegetation (including biological soil crusts) and, depending on site-specific conditions, the potential spread of non-native species or

for changes in distribution of water in the community due to disruption of natural runoff patterns. These effects are likely greatest in areas where road concentrations are greatest (i.e., where illicit ORV travel has occurred in the past and caused the proliferation of roads, such as in the Gila Foothills and the Tinajas Altas areas). Many of the roads that would be closed under the proposed action but remain open under this alternative strategy are redundant to other roads within the same localized plant community, particularly within the creosotebush-bursage desert scrub natural community.

In addition, Strategy B would allow future motorized public access to currently restricted locations if changes in military activities permit. If implemented, this action could further effects of these existing roads by potentially introducing additional uses and types of uses along these roadways which could have minor negative effects on vegetation (e.g., vehicle-based roadside camping). Strategy B lacks the provision for conserving existing unroaded areas of 3,000 acres or more that the proposed action includes. Thus, the potential benefits to vegetative resources as described for the proposed action would not occur under this alternative strategy.

Strategy D, in comparison to the proposed action, would have greater potential for beneficial impacts to vegetative resources affected by the roads that would remain open under the proposed action, but would be closed under this strategy. Strategy D would close a total of approximately 765 miles of road, reducing the existing road network by about 34 percent. Strategy D would close 107 more miles of road than the proposed Strategy C, resulting in about a 4-percent difference between Strategies C and D. Differences between unroaded areas under this strategy and the proposed action are too slight to discern a difference in impacts to vegetation as compared to the proposed action. About 82 miles (or 77 percent) of this 107-mile difference in roads to be closed under Strategy D but not under the proposed action is within the creosotebush-bursage desert scrub vegetative community. When translated into the upper estimate of surface area occupied by these roads and associated road shoulders within this natural community, the difference between Strategy D and the proposed action is about 300 acres within the estimated 1.29 million-acre area occupied by this natural community range-wide (or from 0.4 percent to 0.3 percent of the occurrence of this natural community that would be occupied by roads). Within the elephant tree-limberbush on xeric rocky slopes natural community, an additional 15 miles of road would be closed. When translated into the estimated upper estimate of surface area occupied by these roads and associated road shoulders within this natural community, the difference between Strategy D and the proposed action is about 55 acres within the estimated 90,600 acres of this natural community range-wide. Within the valley xeroriparian scrub natural community, about 9 more miles of road would be closed under this strategy as compared to the proposed action. Whereas the proposed action would reduce this area of roads within this 2,325-linear-mile natural community on the BMGR to 0.9 percent, Strategy D would reduce the area occupied by roads to 0.5 percent of this natural community on the BMGR. While some of the benefits that may be realized under this strategy, but not the proposed action may be measurable in localized areas, the difference in range-wide benefits to general vegetation would be minor.

Site-specific planning for the bypass roads to reroute vehicle traffic around rather than through the northwest corner of the Cabeza Prieta NWR would not be implemented and the potential effects of such roads, assessed at a programmatic level for the proposed action, would not occur. Agency (Border Patrol) use of the roads within the northeast corner of the Cabeza Prieta NWR Wilderness and any associated impacts to vegetative resources would continue.

The benefits to vegetative resources from unroaded area management would be similar to that described for the proposed action. However, this strategy would reduce the number of unroaded areas in the BMGR of 3,000 acres or less by about 72 percent, from 526 to 145, as compared to 67 percent, from 526 to 171, under the proposed action (see Figure 3-5). There would be seven fewer unroaded areas of 3,001 to 10,000 acres and one additional unroaded area of 10,001 to 50,000 acres.

Unlike the proposed action, this alternative includes objectives to prohibit development of new public use roads and to restore closed roads where feasible and prudent to remediate a degraded ecological process or enhance wildlife usage. Both would have the potential for additional beneficial impacts as compared to the proposed action. New roads of any kind would destroy vegetation within the roadway and potentially have effects that extend beyond the road (e.g., possibly due to change in natural drainage patterns or introduction of non-native species). While most roads to be closed would probably not warrant remediation, where a formalized restoration effort is implemented, there would likely be quicker vegetative recovery and better control to prevent the introduction and/or spread of non-native species. This is because remediation may include actions to promote the propagation of native species rather than leaving disturbed soil potentially vulnerable to propagation by non-native species, which are known to take root in disturbed soils prior to and out compete native species, thus allowing them to spread.

### **5.5.3.3 No-Action Alternative (Strategy A)**

Under the no-action alternative (Strategy A range-wide), all 2,222 miles of roads in the current inventory would be retained, and unroaded areas greater than 3,000 acres would not be conserved. Overall, this action would not result in any of the benefits for vegetation that were discussed in Section 5.5.3.1 for the proposed action, at least until completion of a future transportation plan. Probably the greatest difference between the proposed action and this alternative would be noted within the creosotebush-bursage desertscrub natural community type because about 550 miles of roads would not be closed. Within the elephant tree-limberbush on xeric rocky slopes natural community, about 50 miles of road would not be closed. A collective total of about 56 miles of road closures proposed in the creosotebush-big galleta scrub, paloverde-mixed cacti-mixed scrub on bajadas, valley xeroriparian scrub, and valley bottom floodplain complex would not be closed. However, in the long-term, completion of a

transportation plan could result in the closure of some roads not meeting military, agency, or public use needs. Without an understanding of what that transportation plan might include, the specific long-term effects of the no-action alternative on general vegetation cannot be evaluated.

#### **5.5.4 Camping and Visitor Stay Limits**

##### **5.5.4.1 Proposed Action (Strategy C)**

Application of Management Strategy C range-wide would continue to permit dispersed self-contained camping within areas open to the public. It also would allow vehicle-based camping within 50 feet of most roads that are open to public use for up to 14 consecutive days within a 28-day period (similar to the existing situation). Camping would continue to affect vegetation at low levels and in a dispersed fashion as vegetation is trampled or removed by vehicles and people at and near campsites, particularly from vehicle-based roadside camping. The proposed action would require that all campsites be more than ¼ mile away from designated natural and cultural resources that are sensitive to human-caused disturbance. Camping may be restricted along certain road segments (e.g. if there is a cultural resource site or a special-status plant population located nearby). This action would benefit vegetation because it would reduce the stress that vehicles and people impose on areas with unique or sensitive flora.

The proposed assessment of the effects of establishing designated camping areas would determine the relative impacts to vegetation that are caused by concentrated, rather than dispersed camping activity and assist in the implementation of a camping policy that would be protective of biological resources.

##### **5.5.4.2 Alternative Actions (Strategy B and Strategy D)**

Management Strategy D for this resource element would potentially be more protective of vegetation than the proposed action because, in addition to the benefits outlined above, it would limit the duration of vehicle-based camping to 7 consecutive days, which is a reduction from the 14-day limit identified for the proposed action. This would have the effect of limiting the duration of each localized disturbance event, thus possibly reducing the stress on vegetation and potentially providing time between disturbance events sufficient to allow the vegetation to recover.

By contrast, the application of Management Strategy B could potentially cause more damage to vegetation as compared to the proposed action because it would allow vehicle-based camping within a 100-foot zone adjacent to existing roads, which is double the area currently allowed. Unlike the proposed action or Strategy D, Strategy B would not restrict camping along road

segments where sensitive biological or cultural resources are located nor would an assessment of effects of establishing designated campsites be conducted.

#### **5.5.4.3 No-Action Alternative (Strategy A)**

The no-action alternative would have fewer potential benefits to vegetation than the proposed action because it would not include management objectives to (1) restrict camping along certain road segments for resource protection purposes, (2) study the effects of designated camping sites, and (3) restrict camping within ¼ mile of natural and cultural resources that are determined to be sensitive to human-caused disturbance. However, an action similar to item 1 may be implemented through a future transportation plan.

#### **5.5.5 Recreation Services and Use Supervision**

##### **5.5.5.1 Proposed Action (Strategy C in Unit 2 and Strategy D in All Other Units)**

This management element includes consideration of vehicular travel; access permits; law enforcement; signs, gates, and fences; and mine access. Currently, the vast majority of Management Units 4, 5, and 7 are closed to public access, while the majority of Units 2, 3, 6, and the southeastern portion of Unit 1 are generally open to visitors with a BMGR permit.

The proposed action is to apply Management Strategy C to Unit 2 and Strategy D to all other management units. These two management strategies are identical except that a single party with 10 or more vehicles would need a special use permit to use most of the publicly accessible areas of the BMGR, but the special use permit would not be required until 20 vehicles were traveling in a single party within only Management Unit 2. The proposed action would also continue range-wide objectives to prohibit public ORV travel and on- and off-road racing and would restrict motorized public travel in all washes, except where the wash is a designated part of the road system open to the public and is dry.

As first explained in Section 5.2.5.1, the objective to restrict motorized public travel in all washes, except for where the wash is a designated part of the road system open to the public and when the wash is dry, is consistent with the Goldwater Amendment. Unrestricted driving in washes large enough to accommodate a vehicle is traditional among some BMGR users, but this activity has not been previously authorized and BLM law-enforcement officers have enforced restrictions on this activity in the past. The proposed action would have the potential to minimize vehicle access to washes by clarifying the policy and implementing user education programs as proposed. This would potentially benefit vegetation at low to moderate levels in localized areas primarily by limiting disturbance to vegetation, particularly along the banks of the wash

(especially in narrow washes), and in braided washes (where vegetation might occur within the wash). Vehicles driving in washes could also introduce invasive species to wash areas. Vegetation that occurs within large wash beds, such as burrobush, could be affected by vehicle use in washes, although such species are fairly tolerant as they are adapted to scouring floods and resprout after topkill (Hall and others 2001). However, it should be noted that such effects might be lessened because, as noted in Section 4.12.1.3, the current BMGR General Vehicle Operating Rules specify that “individuals must not operate a vehicle in a manner that is likely to unnecessarily damage or disturb land, wildlife, or vegetation resources.” Further, Arizona laws and regulations specify that “(i)t is unlawful for a person to drive an off-highway vehicle with reckless disregard for the safety of persons or property.” (Arizona Revised Statutes, 28-1174A). This action would also reduce the public’s access to valley xeroriparian scrub habitat, which includes vegetation that is highly variable due to a complex vegetative structure with multiple layers that are often connected by vines, and includes plant species that are vulnerable to salvage (e.g. blue paloverde, ironwood, cacti, and honey mesquite). If traditional points of ingress and egress to the wash are not located at road intersections, there could be additional effects to general vegetation and biological soil crusts that may be present on banks outside the scour zone, but this is not generally the manner in which washes are believed to have traditionally been used for motorized travel on the BMGR.

Continuing to prohibit public ORV travel off-road and on- and off-road racing, continuing to require compliance with general vehicle operating rules, and providing for adequate law enforcement, would continue to protect vegetation throughout the publicly accessible portions of the range, particularly those species that are most sensitive to the types of disturbance that could be caused by these activities, including the biological soil crusts found in creosotebush-bursage desertscrub.

Requiring a special use permit for larger group sizes could potentially benefit vegetation by discouraging use by larger groups, which can create larger and more intense areas of vegetative disturbance relative to smaller groups (e.g., vehicle-based roadside camping). Requiring the retention of at least six law enforcement officers would continue to ensure that there would be personnel to prevent/deter visitors from violating rules regarding protection of sensitive plant resources (e.g., more law-enforcement officers to prevent poaching of ironwood). Other benefits to vegetation may be derived from the proposed increase in public education information programs and the development and implementation of limits-of-acceptable change monitoring to guide recreation use management and protect natural resources (including vegetation).

### **5.5.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

The primary difference between Strategy D and Strategy C is the requirement to obtain special use permits for parties with 10 vehicles with Strategy D instead of 20 vehicles with Strategy C. Although the direct and indirect impacts of vehicles on vegetation may be more intense in association with larger group sizes, no meaningful comparison of how potential effects to vegetation might differ between these two alternative management strategies can be made. In theory, two groups of 10 could have the same impacts on general vegetation as one group of 20. Visitation by groups having more than 10 vehicles has historically been infrequent on the BMGR. Thus, there would be no discernable difference in impacts to vegetative resources if Strategy D were applied to Unit 2 instead of Strategy C (as proposed) or Strategy C were applied to all other units rather than Strategy D (as proposed).

Compared to Strategies C or D, Alternative Management Strategy B would potentially be generally less protective of vegetation because it would allow motorized public travel in designated washes when dry, require fewer law enforcement officials, allow parties with up to 30 vehicles without a special use permit, and consider the potential for public ORV use in designated off-road areas. Opening areas to ORV use has the potential to negatively affect vegetation through the direct physical damage that can be done to plants and the indirect effects from increased vulnerability to invasion by non-native pest plant species (e.g. Sahara mustard) and/or plant pathogens. Biological soil crusts (which play a number of important ecological roles in many arid lands) are particularly vulnerable to ORVs and trampling, and once damaged can take decades to recover. As described in Section 5.5.5.1, public access to washes can lead to negative impacts on vegetation. However, these factors would presumably be taken into consideration during the process of deciding which areas of the BMGR may be opened to ORV use and which washes would be designated opened to motorized travel, and some of these potential effects could therefore be minimized or eliminated. Further, if any significant adverse impacts were identified, such uses would not be permitted. Thus, as compared to the proposed action, Strategy B could have minor to moderate effects on vegetation in localized areas, depending upon which areas are designated for these types of motorized public access.

### **5.5.5.3 No-Action Alternative (Strategy A)**

The main difference in potential impacts to vegetation resources from adopting the no-action alternative, as compared to the proposed action, would arise from the rules regarding vehicular travel. Similar to Strategy C and D, the no-action alternative would prohibit public ORV travel and, as with all other alternatives, on- and off-road racing would be prohibited and compliance with general vehicle operating rules would be required. These objectives would continue to have the previously noted benefits on general vegetation. The no-action alternative would allow

motorized public travel in dry washes in accordance with the Draft Barry M. Goldwater East HMP. As previously noted, driving in washes is not currently sanctioned on the BMGR and such use, even within the vehicle operating guidelines, can disturb vegetation at low to moderate levels in localized areas—particularly along the banks of the wash and in braided washes where vegetation might occur within the wash—and potentially introduce invasive species to wash areas. Because a special use permit would not be required for parties with fewer than 50 vehicles, there would be a greater potential for large groups and the associated potential for increased disturbance of individual plants within a short time (e.g., if the group camped in a localized area); however, this is regarded as an unlikely impact since most parties that visit the BMGR have fewer than 10 vehicles.

In comparison to the other management strategies, for objectives not related to motorized vehicle access, and recreation services and use supervision, the no-action alternative would not include an objective for a minimum number of law enforcement officers and there are fewer objectives related to environmental education. Both of these could translate into less protection for general vegetation as compared to the proposed action.

### **5.5.6 Rockhounding**

#### **5.5.6.1 Proposed Action (Strategy C in Units 2 and 3 and Strategy D in All Other Units)**

Surface removal of rock would be prohibited under the proposed action (Strategy D) for Management Units 1, 4, 5, 6, and 7. Although rockhounding is not believed to be an intensive use of the BMGR, some rockhounding may occur within the publicly accessible portions of Units 1 and 7 and within Unit 6. At current levels, rockhounding is not thought to be associated with any measurable effects to general vegetation. However, prohibition of rockhounding would also prevent the removal of rock-dwelling lichens from the BMGR (which has not been identified as a management issue on the BMGR).

In Units 2 and 3 (which are generally located west of the Mohawk Mountains and open to public access), the proposed action would be Strategy C, which would continue to allow surface rockhounding for personal purposes, but restrict collection to no more than 25 pounds and restrict the activity from special natural/interest areas (i.e., the Mohawk Mountains ACEC which would be redesignated as a special natural/interest area under the proposed action) and other designated natural or cultural resource areas that are sensitive to impacts arising from human-induced disturbances. If there were unknown deleterious effects occurring as a result of rockhounding, this strategy would potentially be less protective of vegetation than prohibiting rockhounding. However, this activity is not known to be a concern for general vegetation (including lichens) on the BMGR and if effects were identified, the activity could be prohibited in areas with sensitive plant communities under this management objective.

### **5.5.6.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

Management Strategy B would limit rock removal to no more than 25 pounds, but would not restrict surface rockhounding for personal (i.e., non-commercial) purposes from special natural/interest and other designated natural and cultural resource areas that are sensitive to impacts arising from human-induced disturbances. This action would not have the potential to afford special protection for general vegetation if such impacts were identified. Rockhounding would only be prohibited if a compliance issue were to arise.

Another alternative for Units 2 and 3 is Strategy D, which would have more potential benefit to vegetation than the proposed action in these areas by prohibiting rockhounding and, thus, any associated effects to vegetation. Conversely, the alternative in all other units is Strategy C, which would potentially have less benefit to vegetation, as described for Units 2 and 3 in the proposed action.

### **5.5.6.3 No-Action Alternative (Strategy A)**

The no-action alternative would continue to limit rock removal to 24 pounds plus one piece, and would not impose any other restrictions on rockhounding activity. In the event that rockhounding is currently or were in the future causing impacts to general vegetation, this strategy would provide the least protective alternative for general vegetation.

## **5.5.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

### **5.5.7.1 Proposed Action (Strategy D in Unit 1, Strategy C in All Other Units)**

Under the proposed action, within Unit 1 all cutting, collection, burning, or removal of native wood would be prohibited. In all other units, the use of dead and downed wood for campfires would be allowed, but all other wood cutting, collection, or removal from the BMGR would be prohibited. Within Unit 1, any effects to vegetation as a result of allowed wood cutting, gathering, and firewood use would no longer occur. This unit includes nearly all of the former Tinajas Altas Mountains ACEC, which is open to the public and where wood collection is currently prohibited. Given that the Davis Plain area has been subject to over harvesting of ironwood in the past (U.S. Department of Interior, BLM 1990); the demand for ironwood for carving; their slow-growing nature; and several scoping comments that expressed concerns regarding wood cutting, gathering, and firewood use in and around this area, this strategy would

potentially provide needed protection for general vegetation associated with these types of uses in this unit. For these reasons, the potential benefits to general vegetation are regarded as low to moderate.

With the application of Strategy C in all other units, the use of dead and downed wood would be allowed for campfires, but all other forms of wood cutting or wood collection and removal of wood from the range would be prohibited. Whereas currently collection of dead and downed wood for campfires within expired ACECs and within 150 feet of El Camino del Diablo is prohibited, collection of dead and downed wood would be allowed along El Camino del Diablo, within that portion of the expired Mohawk Mountains and Sand Dunes ACEC within Unit 3, and the small Unit 2 portion of the former Tinajas Altas Mountains ACEC. While wood cutting can have deleterious effects on woody plant species, effects to general vegetation associated with continuing to allow the collection of dead and downed wood throughout Units 2 through 7 are regarded as minor. With the exception of the former ACECs areas and El Camino del Diablo corridor, effects would continue as the range-wide policy outside of these areas per the Goldwater Amendment has been to allow the collection of dead and downed wood. Potential effects would be limited to trampling of vegetation that may be caused by the search for and dragging of larger pieces of firewood, which could damage some vegetation and potentially be detrimental to biological soil crusts in affected areas. Additionally, any effects to plants that may occur from the elimination of a source of nutrient to the soil that is produced through the natural decay of dead and downed wood would also continue to occur. The objective to monitor native wood supplies in high-use areas and restrict collection if resource conditions indicate would be a new management objective for the BMGR that would be expected to have beneficial impacts on general vegetation for any affected area.

The proposed action would continue to allow for wood campfires range-wide, but native wood fires would be prohibited within Unit 1. Some concerns were raised in scoping that campfires can kill biological soil crusts and potentially cause wildfires. The proposed action includes the management objective to require all campsites to be more than ¼-mile away from designated natural and cultural resources that are sensitive to impacts arising from human-induced disturbances. This objective could be applied to areas where biological soil crusts are located and provide protection for these resources. In the absence of such protection, the impact to biological soil crusts from campfires would be limited to localized areas of the campfires and is currently not believed to be a management issue on the BMGR. The fact that a campfire-ignited wildfire has never been reported on the BMGR is evidence that this risk is low; however, as plant communities on the BMGR are not fire resistant and are potentially at increased risk for being able to carry fire due to the spread of invasive species, the continued risk is notable.

With the proposed action (and all alternative actions) plants listed in the Arizona Native Plant Law (including plant parts, seeds, or fruit) would be prohibited from collection (but not the use of dead wood for permissible campfires as is specifically exempted in the law) unless for

authorized salvage or Native American purposes. The Native Plant Law is designed to protect certain plant species, particularly those that might be vulnerable for collection and use in landscaping.

#### **5.5.7.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

While Strategy B would prohibit removal of wood from BMGR, it would allow the cutting and gathering of wood, and firewood use in a sustainable manner. This represents the least protective alternative for vegetation. In comparison to the proposed action, there could be low to moderate impacts in localized areas, particularly from wood cutting, and also the use of downed and dead wood.

Applying Strategy D in Management Units 2 through 7 would have more benefit for vegetation than the proposed action in that it would restrict wood collection and the use of native wood for campfires, particularly given that these areas are generally open to public access, and most firewood use occurs in these units. Benefits would be similar to those described for the proposed action to apply this strategy in Unit 1; however, unlike Unit 1, over-harvesting of firewood has not been noted as a resource management issue.

Applying Strategy C in Unit 1 would potentially be less protective of vegetation than the proposed action (Strategy D). Due to the current management concerns regarding wood collection within former Tinajas Altas Mountains ACEC, this strategy could result in greater impacts to vegetation than the proposed action since collection of dead and downed wood would be allowed where it has previously been restricted. However, given the current management concerns, wood collection may still be prohibited in this area under the Strategy C provision to restrict wood collection if resource conditions dictate.

#### **5.5.7.3 No-Action Alternative (Strategy A)**

Currently, woodcutting or wood collection for commercial or domestic use is prohibited, but use of dead and downed wood for campfires is allowed except within the former ACECs and within 150 feet of El Camino del Diablo Backcountry Byway. This alternative would likely be more beneficial to vegetation than Strategy B because of its continued prohibition regarding wood cutting and collection of dead and downed wood in certain areas; however, it would probably be less protective of vegetation in Unit 1 and in high-use areas where wood collection may be restricted if resource conditions dictate as described for the proposed action in Section 5.5.7.1.

### **5.5.8 Hunting**

None of the alternative management strategies would have a measurable effect on vegetation on the BMGR because the objectives for each strategy are primarily focused on issues concerning wildlife and the implementation of a hunting permit program. One potential result of making changes to the current level of hunting management is that the implementation of a hunting fee to be considered with Management Strategy B (the proposed action) and Management Strategies C and D (the alternative actions), or petitioning the Arizona Game and Fish Commission to close the BMGR to non-game species collection (Management Strategy D) may indirectly benefit vegetation by reducing the number of people incidentally disturbing plant resources. Any benefit, however, would be minor.

### **5.5.9 Recreational Shooting**

The proposed action (Management Strategy C) may have a more beneficial effect on vegetation than would either Management Strategy A or B because it would consider designating specific shooting areas, and those could be located in areas lacking sensitive plant communities or species. In some areas of the BMGR, saguaros and other cacti have been observed as damaged from intentional or inadvertent recreational shooting. Although dispersed recreational shooting would not necessarily be prohibited as a result of having designated areas, it would likely decrease in favor of using designated areas where the activity could occur under safer conditions.

Management Strategy D would initially prohibit recreational shooting and therefore temporarily eliminate any impact to vegetation that may be occurring due to current levels of recreational shooting. If the shooting were eventually allowed to resume under this strategy, it would be in designated areas only. Thus, any impacts to vegetation from recreational shooting would be confined to localized areas and would be expected to be minor.

### **5.5.10 Utility/Transportation Corridors**

#### **5.5.10.1 Proposed Action (Strategy C)**

Management Strategy C would restrict all future utility/transportation corridor development to existing corridors except for the Yuma ASH, which had an application filed prior to 6 November 2001. If the Yuma ASH is constructed as planned, some vegetation on the BMGR within the creosotebush-bursage desert scrub natural community would be cleared and the roadway may provide a new pathway for invasive species (particularly Sahara mustard), but no utilities would be allowed to follow in that corridor. The effects of the Yuma ASH are being assessed in a separate NEPA document, and will be further discussed in the cumulative effects analysis.

The proposed action would also continue to confine construction of non-military overhead transmission lines to alignments immediately parallel to the existing Gila Bend to Ajo line. Non-military underground facilities would continue to be restricted to the west of and parallel to the Tucson Cornelia and Gila Bend Railroad. This would continue to be of benefit to vegetative resources, as this is a previously disturbed corridor, although further development of this existing State Route 85 corridor may lead to some localized clearing of vegetation or other disturbance that can directly affect vegetation and/or facilitate invasion by exotic species. If herbicides are used in the maintenance of these corridors, they should be used in accordance with appropriate best management practices and the manufacturers recommendations in order to prevent any harmful effects on native vegetation. Proposals for the establishment or upgrade of utility/transportation facilities within this corridor would be subject to a separate environmental review and approval process, which would be expected to identify more specific vegetative effects.

#### **5.5.10.2 Alternative Actions (Strategy B and Strategy D)**

Strategy D, which would restrict all future utility/transportation developments to existing corridors, would be more protective of vegetation than the proposed action because it would not allow vegetative clearing in undisturbed areas for the establishment of new corridors (including the Yuma ASH). Management provisions for the State Route 85 corridor and associated impacts to vegetation would be the same as noted for the proposed action.

Management Strategies B, which would not continue the existing management provisions of the State Route 85 corridor and evaluate development of utility/transportation proposals on a case-by-case basis, could potentially result in vegetative clearing for construction or maintenance beyond what would potentially occur under the proposed action. The Yuma ASH would likely be constructed and further corridors, as compatible with the military mission, could also be established. Because new corridors beyond the Yuma ASH could be established, this alternative has the greatest potential to reduce the quantity of vegetation and to lead to the potential introduction of invasive plant species in affected areas.

#### **5.5.10.3 No-Action Alternative (Strategy A)**

The effect of the no-action alternative on vegetation is similar to that of the proposed action. However, additional clearing and potential introduction of invasive species could occur in the development of future corridors, which would be considered on a case-by-case basis and could be developed rather than precluded, as they would be (other than the Yuma ASH) with the proposed action.

## **5.5.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

### **5.5.11.1 Proposed Action (Strategy C)**

The range-wide implementation of Management Strategy C would have a beneficial effect on vegetation. Although it is current policy to control trespass grazing by livestock and feral burros, this policy has not historically been effectively implemented as evidenced by ongoing issues related to trespass livestock and feral burros. The proposed action would continue the objective to develop procedures to control all trespass livestock and feral burros, plus includes Perimeter Land Use, Encroachment, and Regional Planning objectives that include monitoring the quantity of livestock permitted on perimeter grazing allotments and maintaining a list of names, addresses, and brands of permittees to be able to respond to trespass grazing. In addition, historically management of trespass grazing has been a BLM function, whereas with the MLWA of 1999 as furthered by the INRMP, the military would assume this role. Range operators could notify the appropriate military officials of any observed trespass grazing concerns (e.g., livestock/feral burros observed, required fence maintenance) and provide the information directly to the appropriate military department/function, which would presumably be a more efficient and effective means for addressing this issue (see Section 5.5.18.1). If accomplished, the ongoing control of trespass grazing would be of benefit to vegetative resources because livestock consume native vegetation at rates in excess of what plants are adapted to from consumption by native herbivores and omnivores. In addition, livestock and feral burro grazing is a known cause of the introduction and spread of invasive species and has been noted as a concern for the BMGR by some experts (Hall and others 2001).

The proposed evaluation of cumulative impacts of land disturbance would provide new information to land managers on the extent and level of impacts to vegetation from uses that have never before been evaluated comprehensively (particularly effects from recreation, Border Patrol activities, and UDAs). Based on this information, criteria would be established to protect important habitat. Any resultant benefit would be dependent on the extent that such criteria would benefit vegetative resources and cannot be further defined at this time. Similarly, the objective to identify key areas and implement restrictions on activities as needed to protect and conserve habitat, ecosystems, and biodiversity may benefit vegetative resources in varying degrees within any identified key area where a management action restricts an activity that may have an effect on vegetation. The objective to implement vegetation and wildlife habitat restoration efforts for areas that have been damaged by a discontinued military, agency, or intensive public use could have benefits similar to those described in Section 5.5.3.2 relative to the restoration of roads. Where a formalized restoration effort is implemented, there would likely be quicker vegetative recovery and better control to prevent the introduction and/or spread of non-native species.

Measurable and wide-ranging benefits for vegetation would be expected to potentially result from the objective to conduct surveys for, establish control priorities for, prevent the introduction of, and monitor populations of invasive species and develop coordinated strategies to locally eradicate and/or control the spread of invasive species (e.g. Sahara mustard and buffelgrass) commensurate with the threats they pose to natural resources on the BMGR and within the greater Sonoran Desert ecoregion. The density and distribution of invasive species on the BMGR is not accurately known, although Sahara mustard is found in sandy soils in many areas throughout the BMGR and buffelgrass is known to have invaded at least part of the BMGR. Other non-native grasses including Lehmann lovegrass, red brome, and Mediterranean grass have also been recorded on the BMGR. One study in the Mohawk Dunes (Malusa and others 2001) found that roads used by the Border Patrol may be the main vectors for the dispersal of Sahara mustard in this area. This objective allows for the extent of the invasives to be identified and controlled before they reach densities sufficient to carry fire, and before they become so well established that they displace native plant species. In addition, the BMGR vegetation map would be updated. All of these actions would aid in the conservation and preservation of native vegetation, including species and natural community conservation elements.

Lastly, the proposed development of six wildlife waters within the first five years of the INRMP could result in short-term, minor localized impacts to vegetation that may be killed or physically harmed in association with wildlife water development construction activities. Long-term minor impacts to vegetation and plant communities in the vicinity of these wildlife waters may also occur as these areas may be used for forage by some herbivores instead of other areas that are not proximal to the water source. Krausman and Czech (1997) note this concern along with a need for more data on the impact of ungulates on plant communities surrounding water developments. These effects would be analyzed in more detailed and site-specific NEPA documentation to be completed prior to the construction of the wildlife water projects. Because additional wildlife water developments beyond the first five years of the INRMP would be dependent upon the findings of the proposed study of the benefits and effects of wildlife water developments, any impacts of additional waters beyond these six developments cannot be evaluated at this time even programmatically.

#### **5.5.11.2 Alternative Actions (Strategy B and Strategy D)**

The elements of Management Strategy D that would affect vegetation are identical to the proposed action and would have the same effects, with the exception of the management objectives related to the number of wildlife water developments that would be constructed during the first five years of the INRMP. Where six new waters would be developed under the proposed action, no wildlife water developments would be constructed under Strategy D; therefore, there would not be any impacts to vegetation in association with construction activities. Thereafter, the

potential impacts of wildlife water developments are not known under any strategy, as they would be dependent upon the proposed study efforts.

In regard to elements affecting vegetation, Strategy B would only differ from the proposed action in that it would not identify key areas and implement restrictions on activities as needed to protect and conserve habitat, ecosystems, and biodiversity. Both alternative actions would be protective of vegetation, although Strategy C could potentially provide additional protection for vegetation (which could include natural community and species conservation elements) in these localized areas if restrictions on activities are implemented and are protective of vegetative resources. Although 17 wildlife water developments would be implemented and additional developments considered under this strategy, a similar number as the proposed action (six) would probably be implemented during the first five years of the INRMP. As stated previously, because the potential impacts of wildlife water developments are not known under any strategy, no comparative assessment can be made beyond the first five years of the INRMP. As with the proposed action, wildlife water developments could damage or kill vegetation within the localized areas impacted by the development activities and plant communities in the vicinity of the water development may be affected by increased foraging rates. These impacts are regarded as minor and localized.

### **5.5.11.3 No-Action Alternative (Strategy A)**

With respect to vegetation on the BMGR, the no-action alternative would have many of the same benefits as the proposed action. The main difference would be the lack of management objectives regarding (1) the identification of key areas and implementation of restrictions on activities as needed to protect and conserve habitat, ecosystems, and biodiversity; (2) the implementation of vegetation and wildlife habitat restoration efforts for areas that have been damaged by a discontinued military, agency, or intensive public use; and (3) the specific invasive species management objective. The difference in level of beneficial effect of this alternative relative to the proposed action would depend on the effectiveness of these three management objectives in protecting vegetative resources beyond the protection that is afforded under current management policy. Of these, the invasive species management objective has the greatest potential to have measurable wide-ranging beneficial impacts on vegetation, which would not necessarily occur under the no-action alternative. In addition, like Strategy B, the 17 remaining wildlife water development projects proposed in the HMPs would be authorized, although a similar number would probably be implemented during the first five years of the INRMP; thus, effects to vegetation within localized affected areas would be the same as the proposed action (at least for the first five years of the INRMP, which is all that can be assessed at this time).

## **5.5.12 Special Status Species**

### **5.5.12.1 Proposed Action (Strategy C)**

The main effect that implementation of Management Strategy C would have on vegetation would be to improve the available knowledge about special status plant species, some of which have never been formally surveyed for, and others which have not been the subject of surveys in recent years. The surveys being proposed could therefore provide up-to-date information on the distribution and abundance of four special status plant species reported on the BMGR: Acuña cactus, Pierson's milkvetch, sand food, and individual crested saguaros, as well as several more species that are protected by the Arizona Native Plant Law (see Sections 4.7.1.3 and 5.7.12.1 for details on protected plant species). During these efforts, additional insights could be gained relative to general vegetation resources and natural community and species conservation elements. However, the survey activities themselves could cause minor localized impacts to vegetation (from incidental trampling, collection of samples, etc.).

### **5.5.12.2 Alternative Actions (Strategy B and Strategy D)**

Management Strategy D is identical to the proposed action and would therefore have the same potential benefits and effects on plant species. Strategy B would not initiate or continue surveys for special status plant species, and would therefore have less benefit to this resource category than the proposed action. The potential environmental consequences of the alternative actions on protected species are discussed in more detail in Section 5.7.12.2.

### **5.5.12.3 No-Action Alternative (Strategy A)**

The no-action alternative is more focused on wildlife issues (e.g. Sonoran pronghorn) and would therefore have little direct benefit to special status plant species. The potential environmental consequences of the no-action alternative for protected species are discussed in more detail in Section 5.7.12.3.

## **5.5.13 Soil and Water Resources**

### **5.5.13.1 Proposed Action (Strategy D)**

Management Strategy D (and all other management strategies) would continue to restrict motorized vehicles to established roads or previously impacted areas, and minimize groundwater development and exploration in former ACECs and other environmentally sensitive areas. The

benefits of restricting vehicular traffic would be similar to those described in Section 5.5.5.1 for continuing to restrict ORV travel.

Groundwater development and exploration can have localized impacts of varying degree on vegetation, largely dependent on whether existing roadways are used for access or if construction of new roadways is deemed necessary. Restricting the activity in former ACECs and other environmentally sensitive areas would have benefits within these areas, but such effects could nonetheless occur in other areas of the BMGR and have similar impacts on vegetation.

With the proposed action, a range-wide soil survey would be conducted, which could provide valuable information about the relationship between plant communities of interest and the soils on which they occur, although survey activities themselves could have minor short-term impacts on vegetative resources. Areas where vehicle use has caused excessive damage would be restored with the proposed action, and could have benefits similar to those described in Section 5.5.3.2 relative to the Strategy D provision for the restoration of closed roads. Where a formalized restoration effort is implemented, there would likely be quicker vegetative recovery and better control to prevent the introduction and/or spread of non-native species.

#### **5.5.13.2 Alternative Actions (Strategy B and Strategy C)**

Management Strategies B and C would still provide many of the same benefits listed above for the proposed action. However these alternative strategies would not include soil surveys or the restoration of damaged areas and the associated benefits to vegetative resources.

#### **5.5.13.3 No-Action Alternative (Strategy A)**

The no-action alternative for soil and water resources would have the same effect on vegetation as described for Management Strategies B and C.

### **5.5.14 Air Resources**

#### **5.5.14.1 Proposed Action (Strategy A)**

The proposed action for air resources, Management Strategy A, includes dust control measures at construction sites and recreation activity areas, and the development of best management practices for activities that might potentially generate non-point source pollution. Dust control indirectly benefits vegetation because it prevents accumulation of excessive amounts of dust on leaves, which can interfere with photosynthesis. As stated in Section 5.5.3.1, this has not been a documented problem for plants on the BMGR, but could be occurring in some areas of the range.

#### **5.5.14.2 Alternative Actions (Strategy B, Strategy C, and Strategy D)**

Management Strategies C and D would have essentially the same effect on vegetation as the proposed action. The more aggressive use of dust palliatives to control dust on heavily traveled roads could further limit the amount of dust that settles on leaves, potentially resulting in a slightly more beneficial effect than the proposed action.

Management Strategy B would be the least beneficial to vegetation because it would not involve any particular management of excessive fugitive dust. If any effects to vegetation were occurring due to dust settling on leaves and interfering with photosynthesis, this strategy would not necessarily provide any benefits.

#### **5.5.14.3 No-Action Alternative (Strategy A)**

The proposed action is the no-action alternative so effects for air resources would be the same as those described for the proposed action.

### **5.5.15 Visual Resources**

Management of visual resources has the potential to beneficially affect vegetation whenever it results in directing new activity or construction to already disturbed and impacted land areas. In that sense, all the management strategies proposed would have the same potential for consequences that would generally benefit vegetation on the BMGR.

### **5.5.16 Wildfire Management**

#### **5.5.16.1 Proposed Action (Strategy B)**

Appropriate fire management has obvious benefits to vegetation. For plant communities that are fire-adapted, fires can have the beneficial effects of reducing fuel load (thus keeping fire temperatures low and rendering them less damaging to vegetation) and promoting the growth and development of native species. In contrast, man-made fires in plant communities that are not fire-adapted (e.g. the valley bottom floodplain complex) can have serious consequences for the ecological health of the natural community because the species composition can be drastically altered, often shifting from an assemblage of native species with high habitat value to a non-native dominated community of low value to both humans and wildlife. The proposed action,

Management Strategy B, would lead to the development of a range-wide fire management plan based upon the best scientific information available, which would be beneficial for vegetation on the BMGR.

#### **5.5.16.2 Alternative Actions (Strategy C and Strategy D)**

Management Strategies C and D are identical to the proposed action and would have the same effects.

#### **5.5.16.3 No-Action Alternative (Strategy A)**

This management strategy involves putting out fires as they occur, in order to achieve the lowest acreage loss in the most cost effective manner. This strategy may not provide the same degree of benefit when compared to the proposed action because most vegetation on the BMGR would potentially be more vulnerable to the effects from wildfire, should one occur, as this fire management policy is primarily driven by economic and safety concerns.

### **5.5.17 Perimeter Land Use, Encroachment, and Regional Planning**

#### **5.5.17.1 Proposed Action (Strategy D)**

The proposed action, Strategy D, would be the most protective of vegetation resources because it is more comprehensive than any of the alternatives, and yet it considers this issue from an ecosystem management approach. This approach recognizes the BMGR as an integral part of the larger region, and aims to monitor land use changes in perimeter areas and develop appropriate management responses to those changes. In addition, this strategy would lead to participation as a stakeholder in local and regional land-use planning processes as well as any regional ecosystem management efforts. Coordination with adjoining property owners/managers, federal agencies, and others involved in regional or national conservation matters would lead to management of the BMGR in a broader regional context. Issues such as groundwater management, soil or water quality, use of agricultural chemicals, trespass grazing, and illegal immigration would all be considered, and their effect on the cultural and natural resources of the BMGR assessed. The proposed action emphasizes the ecological health of the BMGR in a broader context, rather than focusing on piecemeal management of single species.

### **5.5.17.2 Alternative Actions (Strategy B and Strategy C)**

The alternative actions also embrace an ecosystem management approach, and share many of the benefits of the proposed action. The alternative strategies specifically do not include provisions for examining the following issues: pesticide use, soil or water quality, geophysical/legal aspects of groundwater management, and the interrelationship or dependence of resources on-and off-range. The alternative actions would not identify threats to off-range resources that may negatively affect BMGR resources, and would not take advantage of opportunities to coordinate management with adjoining property owners (including permittees on perimeter grazing allotments). The main difference between the alternatives is that Strategy B is more reactive to existing or future land use plans, while Strategy C promotes more active participation in local or regional planning efforts and coordination with other entities whose activities might affect natural or cultural resources on the BMGR. Each of the aforementioned objectives could have beneficial impacts to vegetation, depending on the type of coordinated efforts that are developed and the degree that such actions could impact vegetation.

### **5.5.17.3 No-Action Alternative (Strategy A)**

The no-action alternative would not result in any of the benefits described for the proposed action. While some individual management plans/policies address perimeter land use, encroachment, and regional planning on a formal and informal basis, no comprehensive management strategies addressing natural resource conservation and preservation are currently in place.

## **5.5.18 Aggregate Effects on General Vegetation**

### **5.5.18.1 Proposed Action**

The aggregate, or combined, effects of the 17 resource management elements of the proposed action on vegetation have the potential to be greater than the effects of individual management elements alone. Overall, the effects associated with the proposed action for all management elements taken together are expected to be beneficial for general vegetation. By and large, the BMGR vegetative communities are in good overall health, with areas, such as the San Cristobal Valley bottom floodplain complex, representing some of the best-preserved examples of specific natural communities in the Sonoran Desert. All of the management alternatives would continue to provide management that would be at least generally protective of general vegetation. In general, however, the proposed action advocates the more conservation-oriented management strategies (i.e., Strategy D or C) and therefore it tends to be more protective of vegetation resources than continuation of existing management practices (Strategy A) or consideration of

additional public use opportunities (Strategy B). With the proposed action, the only management elements for which Strategy C or D were not selected as the proposed action, were hunting (Strategy B), visual resources (Strategy B), air resources (Strategy A), and wildfire management (Strategy B). Although Strategy B was selected for hunting, there is no distinction between Strategies B and C for that element and Strategy D differs only in terms of a proposed petition to the Arizona Game and Fish Commission to close the BMGR to non-game species collection. There are no distinctions between Strategy A and Strategies B, C, and D for air resources that should meaningfully affect vegetation resources. The same conclusion can be drawn from comparing Strategies B, C, and D for visual resources. Strategies C and D for wildfire management are identical to Strategy B.

Many of the alternative resource management elements address varying levels of public access and use of the BMGR including the following: motorized access and unroaded area management, camping and visitor stay limits, recreation services and use supervision, rockhounding, and recreational shooting. In addition to applying to the public, some management strategies apply equally to military and agency uses. As detailed in Section 5.5.3.1, potential benefits to vegetation that would result from the 658 miles of road closures (representing a 30 percent decrease from the existing BMGR road network or a decrease in terms of aggregate area occupied by the 1,733,921-acre range from 0.47 percent to 0.33 percent). Related aggregate impacts are likely in that, in addition to eliminating the effects on vegetation from the road, much of the disturbance that may occur in these areas incidental to the roads themselves would also be eliminated (e.g., from uses such as vehicle-based roadside camping or wood collection). Under the proposed action, 621 miles of road would be available for general public access under the proposed action, which is 352 miles or 36 percent less than is currently available under the existing condition. The approximately 7-mile Cabeza Prieta NWR bypass roads would have localized effects on vegetation.

Conversely, effects associated with roads could become more pronounced along the roads that would remain open as such uses and associated disturbance could become more concentrated. Likewise, the potential establishment of designated areas for camping and recreational shooting uses could shift any impacts that may currently be occurring to vegetation from dispersed locations to localized areas. Given the low levels of recreation use of the BMGR, however, any such impacts to vegetation would be minor, even in aggregate.

In addition to this aggregate effect related to the proposed decrease in motorized access and any associated effects on vegetation, aggregate effects could occur from other restrictions or limitations on public, military, and/or agency use that could reduce or eliminate any effects to vegetation that may be occurring as a result of these activities. Some of these are continuations of existing policy, some are part of the proposed action, and some could be imposed after further assessment. Activities that could have effects on vegetation include the following:

- The collection or salvage of native plants on the BMGR (including plant parts, seeds, or fruit) listed in the Arizona Native Plant Law (except in cases where the plants are being salvaged prior to disturbance or for protected Native American purposes) would continue to be prohibited; any salvage efforts would continue to occur in compliance with the Arizona Native Plant Law and with appropriate level of coordination with the Arizona Department of Agriculture.
- Wood cutting and removal of wood from the range would continue to be prohibited range-wide and wood gathering and native wood fires would be prohibited in Unit 1.
- Off-road ORV use and on- and off-road racing would continue to be prohibited, and motorized travel in washes would continue to be restricted to where the wash is a designated part of the road system open to the public and is dry.
- Vehicle-based camping would continue to be restricted to 14 consecutive days within a 28-day period except by special use permit and within 50 feet of most existing roads designated as open to public use, and new restrictions on camping along certain road segments for resource protection purposes would be possible. The benefits and effects of establishing designated camping areas would be assessed and a decision would be implemented based on the findings.
- Surface rockhounding for personal (i.e., non-commercial) purposes would be restricted from special natural/interest and other designated natural and cultural resource areas that are sensitive to impacts arising from human-induced disturbances.
- The importance and character of recreational shooting as an activity/issue would be assessed to determine the appropriateness of this activity on the BMGR. A decision based on the findings would be implemented and could include the consideration of designating specific shooting area(s).
- The effects of non-game species collection on wildlife, habitat, and other resources would be evaluated and, if indicated, limitations or restrictions of collection activities within the authority of state law could be implemented.
- Certain policies would continue, such as using already disturbed and impacted land areas and allowing the operation of motorized vehicles and heavy equipment only on established roads and previously impacted areas, except when related to a specific permitted project.
- Procedures would be developed to control all trespass livestock and feral burros, including monitoring the quantity of livestock permitted on perimeter grazing allotments

and maintaining a list of names, addresses, and brands of permittees to be able to respond to trespass grazing.

- Groundwater development and exploration would be restricted to a minimum in former ACECs and other environmentally sensitive areas.

Taken together, these actions would have the potential for a greater combined beneficial effect for vegetation resources on the BMGR than they would individually as assessed in the preceding subsections for each of the 17 resource elements.

The other overall result of the proposed action is that natural resources such as vegetation would be considered in a broader, regional context, and a more adaptive, ecosystem management approach would be taken towards stewardship. The combined result of implementing the proposed action for resource categories that apply to resource management, rather than management of specific types of use activities, include resource inventory and monitoring; special/natural interest areas; utility/transportation corridors; general vegetation, wildlife habitat, wildlife, and wildlife water development; special status species; and perimeter land use and regional planning. Some of the actions applicable to general vegetation that have a potential for additive or interactive effects would include the following:

- Guaranteed levels of law enforcement would be available and public education and enforcement programs would continue or be expanded.
- Utility/transportation corridor development would be restricted to the development of the Yuma ASH and limited development of the State Route 85 corridor.
- Areas where vehicle use has caused excessive surface damage would be restored and roads would be temporarily closed if necessary.
- Other perimeter land use, encroachment, and regional planning procedures would include improved coordination with other agencies and local/regional land-use planning processes, and increased participation in regional management efforts.
- Funds from a special hunting permit program (if implemented) would be used for the protection, conservation, and management of wildlife and wildlife habitat.
- The expired ACECs would be redesignated as special natural/interest areas.
- A resource monitoring program would be developed and existing special management provisions for protection of vegetation would be maintained or established, as needed.

- Monitoring, surveying and mapping efforts to provide reliable and up-to-date scientific information about the status of resources and their response to ongoing military and civilian use of the BMGR would be increased.
- Survey for invasive plant species would be conducted and control priorities for preventing the introduction of invasive species would be developed along with programs to monitor populations of invasive species and to develop coordinated strategies to locally eradicate and/or control the spread of these species.
- A range-wide fire management plan would be developed.

Like those management objectives for management of uses, these actions for resource management, when implemented together, would potentially result in combined greater long-term benefits for vegetation and lead to a more scientifically based approach towards resource management.

When assessing the aggregate effects of the proposed action on vegetation resources of the BMGR, it can be concluded that the combined benefits of all these actions is greater than the benefits of the individual actions themselves. Additive beneficial effects of the proposed action on vegetation result from the combined effect of the use management and resource management objectives.

#### **5.5.18.2 Alternative Actions**

If Management Strategy B was implemented range-wide, the result would be potentially less beneficial for vegetation than if the proposed action were implemented. This strategy favors public access to the BMGR, potentially to the detriment of natural resources. The overall aggregate effect of this strategy includes the following: limiting natural resource management to those measures necessary to achieve basic regulatory compliance; maintaining existing motorized public access; and allowing the expiration of ACECs, SMRAs and the Backcountry Byway and their management without special provisions; and supporting a wide range of recreation opportunities. The provisions of Strategy B that relate most directly to vegetation include several with positive effects (e.g., developing a procedure to control all trespass grazing; surveying for and controlling invasive species; implementing restoration efforts in areas damaged by discontinuation of military, agency, or intensive public use; conducting surveys of special status species and implementing habitat improvements in support of endangered species recovery plans and developing a sound range-wide fire management plan) and some with potential adverse effects (e.g., retaining the existing road network (covering 2,229 miles [including the Cabeza Prieta NWR bypass roads] or a surface area of 8,105 acres or 0.47 percent of the total range acreage), allowing for woodcutting, wood gathering, and firewood use,

evaluating proposals to develop additional utility/transportation corridors, possibly allowing ORV use in designated areas, and allowing vehicle-based camping to occur within 100 feet of existing publicly accessible roads instead of 50 feet.

The aggregate effects on vegetation that would occur if Management Strategy C were implemented range-wide would be similar to those for the proposed action, but with a few exceptions. The proposed action would restrict wood collection and native wood campfires in Unit 1, while range-wide application of Strategy C would allow for collection of dead and downed wood and native campfires within this unit. Wood collection has been prohibited within the former Tinaja Altas Mountains ACEC portion of Unit 1 since 1990. The application of Strategy C range-wide would eliminate this prohibition and allow wood collection for native wood campfires to resume in this area. Likewise, the proposed action would not allow rockhounding outside of Units 2 and 3 and Strategy C would allow that activity in all units. The proposed action involves the development of an ecosystem monitoring system within the context of the greater Sonoran Desert Ecoregion, whereas Strategy C does not. The proposed action also includes a range-wide soil survey that would provide valuable information about the relationship between soil and vegetation types, and it has provision for restoring areas where vehicle use has caused excessive surface damage, and Strategy C would do neither of these things. The result is that when taken together, the proposed action is of more potential benefit to vegetation than would be the range-wide application of Strategy C.

The additive beneficial effects of implementing Strategy D range-wide could be slightly greater than those that would occur if the proposed action were implemented. There would be 107 more miles of roads closed, allowing natural or augmented vegetation to benefit an estimated surface area of 389 acres. On a range-wide basis, the surface area occupied by roads would be 0.31 percent of the range as compared to 0.33 percent under the proposed action and 0.47 percent under the existing condition. Vehicle-based camping would be limited to 7 consecutive days within a 28-day period before a special use permit was required, instead of a limit of 14 days. This may translate into less localized physical damage for vegetation located near vehicle-based campsites. In addition, no future utility/transportation corridors would be permitted (including the Yuma ASH), rockhounding would be prohibited, and (if a petition to the Arizona Game and Fish Commission is approved) the BMGR could be closed to non-game species collection under Strategy D; these actions could all lead to some localized benefits for vegetation. Like the proposed action, aggregate effects to vegetation could result from the shift of some activities from dispersed areas to more concentrated areas or designated areas (i.e., camping and recreational shooting). When considered together, the conclusion can be drawn that for vegetation resources on a range-wide basis, Strategy D is very similar to the proposed action but it may offer some additional localized benefits.

### **5.5.18.3 No-Action Alternative**

Implementation of the no-action alternative in place of the proposed action would result in the continued management of natural resources such as vegetation under guidance from the Goldwater Amendment, HMPs, and various compliance decisions. The provisions of these plans, as modified to comply with the requirements of the Sikes Act, would be adopted by DoD agencies. The aggregate effects of the no-action alternative would differ from those of the proposed action in terms of both public use and access and resource management. This alternative would not have all of the potential benefits of the proposed action except as related to the benefits of ongoing management actions. Some aggregate benefits could result from the combined effects of existing use management and resource management objectives and policies. Further, as a transportation plan eventually would be developed, it is possible that a reduction in the road network would eventually occur and result in some of the same benefits as the proposed action in relation to road closures.

## **5.6 GENERAL WILDLIFE AND WILDLIFE HABITATS**

### **5.6.1 Resource Inventory and Monitoring**

#### **5.6.1.1 Proposed Action (Strategy D)**

The proposed action is to implement Management Strategy D range-wide. The general effects to vegetation from the proposed resource inventory and monitoring objectives, as discussed in Section 5.5.1.1, parallel the general effects to wildlife habitat associated with this strategy.

The proposed action would have the potential to provide better information about the general wildlife and wildlife habitats on the BMGR and to identify and to help characterize their response to disturbance through the monitoring of key indicators of environmental health and the detection of trends in the BMGR ecosystem. This is primarily because this strategy proposes to adopt a limits of acceptable change system to monitor key indicators of environmental effects of ongoing military and civilian use of the BMGR and to use the findings of monitoring to develop adaptive management responses to emerging resource conservation and protection problems. Additionally, this is because this strategy would focus on the monitoring of ecosystems instead of single species monitoring.

It is expected that the proposed inventory and monitoring program would, to some extent, be based on the efforts of TNC (Hall and others 2001) and address the management data or information gaps identified in Section 4.6.4. The species conservation elements identified by Hall and others (2001) were, in part, selected because of the unique role they play in structuring communities. These species conservation elements may play a disproportionate role in

maintaining the critical ecological processes that maintain natural communities. If the proposed inventory and monitoring program were successful in identifying where detrimental impacts to wildlife and wildlife habitat were occurring and effective adaptive management responses were developed and implemented, there could be beneficial impacts to wildlife habitat and wildlife species.

#### **5.6.1.2 Alternative Actions (Strategy B and Strategy C)**

The range-wide application of Strategy B for this resource management element would have less potential for benefits for wildlife resources than those resource-monitoring programs outlined under the proposed action. While Strategy B includes the development and implementation of systems to monitor the effectiveness of compliance actions, it lacks the implementation of a limits of acceptable change inventory and monitoring and adaptive management response program. The difference between the benefits of this strategy and the proposed action would depend on the extent to which the proposed program would be more effective in the protection of wildlife habitat and wildlife over existing programs, plus the monitoring of the effectiveness of compliance actions.

The range-wide application of Strategy C could further the benefits of Strategy B. Like the proposed action but unlike Strategy B, Management Strategy C would include a limits of acceptable change system and adaptive management response in response to monitoring the key indicators of environmental effects of ongoing military and civilian use of the BMGR. The provisions of Strategy C would also be designed to detect trends within the BMGR ecosystem that would indicate overall biodiversity and health. It would have most of the same potential for benefits of the proposed action for wildlife resources, but it does not include a few additional provisions that are part of the proposed action (including comparative monitoring of heavily used sites versus relatively unused sites and monitoring that considers the BMGR in the context of the greater ecoregion for which it is a part). To the extent these excluded provisions would provide greater protection of wildlife and wildlife habitat, Strategy C may not be as beneficial as the proposed action.

#### **5.6.1.3 No-Action Alternative (Strategy A)**

The range-wide application of Strategy A for this resource management element would have less potential to benefit wildlife resources than the proposed action. Resource inventory and monitoring would include implementation of those activities established or planned under the Lechuguilla Mohawk HMP and Draft Barry M. Goldwater East HMP. These programs focus on goals specific to game or special status species rather than ecosystem management goals, thus wildlife habitat monitoring would be limited to actions such as monitoring of ground and habitat disturbance.

## **5.6.2 Special Natural/Interest Areas**

### **5.6.2.1 Proposed Action (Strategy C)**

The proposed action is to apply Strategy C range-wide. Section 5.5.2.1 includes a discussion of the potential consequences to vegetation associated with this strategy, which are analogous to the predicted effects on general wildlife habitat.

The proposed action would continue to recognize several wildlife habitat communities by assigning them special natural/interest area status. The wildlife and wildlife habitat within these areas, while somewhat described in Sections 4.6.1.2 and 4.11.1.3, are further described here. Each of the dune complexes on the BMGR (encompassed by the former Gran Desierto Dunes ACEC and Mohawk Mountains and Sand Dunes ACEC) provides habitat for rare and sensitive species such as flat-tailed horned lizard and Cowles fringe-toed lizard, and both would potentially benefit from the increased management attention that would presumably be associated with the special natural/interest area designation. Other reptile species likely to be present and potentially benefit include leopard lizard, Colorado Desert fringe-toed lizard, banded sand snake, western shovel-nosed snake, spotted leaf-nosed snake, western ground snake, and sidewinder. The Gran Desierto Dunes is a rare and unique dune system that provides habitat for many species of reptiles with limited distributions associated with dune and dune-fringe environments. This area is within and largely protected by the Flat-tailed Horned Lizard HMA. The redesignation of the HMA as a special/natural interest area and continuation of existing management provisions, which are primarily for protection of the flat-tailed horned lizard, would continue to benefit this protected species as well as other general wildlife and wildlife habitat by limiting activity and development within this area.

Both the Mohawk and Gran Desierto dune environments also provide habitat for small, nocturnal rodents such as pocket mice and kangaroo rats and larger mammals including rabbits and hares, ground squirrels, wood rat, grasshopper mouse, coyote, and kit fox. Birds such as the horned lark, loggerhead shrike, mockingbird, black-tailed gnatcatcher, and black-throated sparrow may be present. Breeding pairs of the primary excavator (cavity) guild, including the Gila woodpecker and ladder-back woodpecker, occur in the former Mohawk Mountains and Sand Dunes ACEC, as does the Le Conte's thrasher species conservation element.

The Mohawk Mountains contain habitat for desert bighorn sheep, including high-elevation wildlife water developments supporting members of the ephemeral water-breeding amphibian guild, and roosting sites for bat species including the California leaf-nosed bat and cave myotis. Mohawk Pass provides an important corridor for movement of some wildlife between the San Cristobal Valley and Mohawk Valley. Breeding birds that were identified as species conservation elements occur in the Mohawk Mountains and Sand Dunes ACEC, including the

Gila woodpecker and ladder-back woodpecker of the primary excavator (cavity) guild and Le Conte's thrasher.

The former Tinajas Altas Mountains ACEC contains habitat and migration routes for desert bighorn sheep and a unique assemblage of deep-water tinajas that function as vital water sources to wildlife and may provide habitat for species in the ephemeral water-breeding amphibian guild. Other mammals supported by this habitat include ringtails, coyote, javelina, and small rodents. Cipriano Pass is an important corridor for movement of some wildlife between the Yuma Desert and Lechuguilla Desert valleys and for desert bighorn sheep moving north and south. Breeding populations of the primary excavator (cavity) guild (Gila woodpecker and ladder-back woodpecker) and Le Conte's thrasher occur in this area.

The El Camino del Diablo Backcountry Byway, designated for its historic significance and recreational value, does not have any remarkable value for wildlife or wildlife resources; thus, there would be no consequences on wildlife resources from its expiration and management without special management provisions (with the exception of the collection of dead and downed wood, which is discussed in Section 5.6.7.1). Although the two former SMRAs were designated for the presence of geologically extraordinary volcanic formations rather than biological resources, some notable wildlife or wildlife resources are present in these areas.

The former Sentinel Plain Lava Flow SRMA habitat includes creosotebush-big galleta scrub community that, unlike off-range communities, has been protected from the effects of livestock grazing. As the lava flow captures a unique substrate, the associated fauna may show local adaptations not found elsewhere on the BMGR. Kangaroo rats may be conspicuous faunal associates of this community (Hall and others 2001). However, the discontinuation of special management provisions would not be expected to affect these wildlife resources. The area would continue to be closed to public use and livestock grazing.

The former Crater Range SRMA functions as a movement corridor for desert bighorn sheep and contains an important tinaja for wildlife. The portion of this area that is generally open to public access with a permit (east of State Route 85 in Management Unit 6) currently is subject to habitat disturbance from motor vehicles, though there are few roads, and purportedly from collection of herpetofauna (Hall and others 2001). Current management provisions for this SRMA have not been implemented, although they could provide some protection from these and other types of disturbance, but Hall and others (2001) note that this area would benefit from more rigorous management standards. Because the SRMA would not be redesignated as a special natural/interest area with the proposed action, this former SRMA would not necessarily receive any greater management attention than other areas of the BMGR. Other management standards that could benefit this area, such as those regarding motorized access and collection of non-game species, are addressed in the management provisions for other resource management elements (see Sections 5.6.3.1 and 5.6.8.1, respectively).

Lastly, the proposed action calls for an evaluation of altering existing or the establishment of additional special natural/interest areas that could be designated for protection of wildlife and wildlife habitats. If such additional areas were designated, there could be additional benefit for wildlife and wildlife habitats.

### **5.6.2.2 Alternative Actions (Strategy B and Strategy D)**

All alternatives would include the redesignation of the Flat-tailed Horned Lizard HMA and equally have the same potential benefit to wildlife resources within this area, as described for the proposed action.

Strategy D differs from the proposed action because it would redesignate all former ACECs, SRMAs, and the Backcountry Byway as special natural/interest areas, instead of allowing the former SRMAs and Backcountry Byway to expire. Range-wide application of Strategy D would have the potential to be more protective of wildlife and wildlife habitats than would the proposed action. This is because, like the former ACECs, wildlife and wildlife habitat within the former SRMAs and Backcountry Byway would potentially benefit from these designations and any increased management attention that may be associated with the special natural/interest area designation, even though the primary resources for which they were recognized were not related to wildlife resources. The redesignation of the former Crater Range SRMA as a special natural/interest area, in particular, would have potential benefits for wildlife and wildlife habitat, for the reasons noted in Section 5.6.2.1.

Strategy B would be expected to be less protective of wildlife resources than Strategies C or D because it would allow the ACECs, SRMAs, and Backcountry Byway to expire without assigning them any special designation. While these areas would be managed according to the management objectives relative to the 16 other resource management elements that would apply to the Management Units in which they occur, they would not be afforded any additional protection through special provisions or increased management attention. This would reflect a change in previous management where specific management prescriptions for these areas addressed management concerns. This change in management focus could potentially have negative impacts on the wildlife and wildlife habitats of these areas, particularly the former Mohawk Mountains and Sand Dunes ACEC and Tinajas Altas Mountains ACEC. In addition to containing valuable wildlife resources, both areas are (at least in part) accessible for outdoor recreation, and prior management prescriptions focused on limiting associated disturbance within these former ACECs. In addition, (unlike the proposed action and Management Strategy D) this alternative does not include any provision for altering existing or establishing additional special natural/interest areas, which could benefit wildlife resources.

### **5.6.2.3 No-Action Alternative (Strategy A)**

The range-wide application of Strategy A for this resource category would result in the retention of the special management designation and provisions for the former ACECs, SRMAs, the HMA, and the Backcountry Byway. Generally, resultant impacts to wildlife and wildlife habitat would likely be similar to those predicted for the Strategy D. However, in contrast to both Strategy D and the proposed action, the no-action alternative would not allow for the potential designation of expanded and/or new special natural/interest areas and the benefits that might be afforded by this.

### **5.6.3 Motorized Access and Unroaded Area Management**

Roads have been documented to affect wildlife and wildlife habitats in a number of ways, including the fragmentation and degradation of wildlife habitats, and direct mortality of certain species from impacts with vehicles (e.g., horned lizards, snakes and other reptiles are attracted to road surfaces—particularly paved roads—for basking, some mammals are attracted to road corridors to feed on the roadside perennial vegetation—or with some dirt roads—perennial vegetation within the roadbed, and large mammals frequently use roads as movement corridors because their lack of vegetation facilitates movement). The subject BMGR dirt roads, most of which are unimproved, have a lower magnitude of impact than paved roads with high traffic volumes; however, there is an assumed correlation in increased potential for impacts to wildlife and wildlife habitat based on the degree of modification of the earth surface associated with creating the road (i.e., with a bulldozer and grader or by the repeated passing of vehicles, of a wide or relatively narrow girth, etc.) and frequency of use and maintenance. U.S. Border Patrol-maintained drag roads and roads providing access to the military ground operational areas are the best example of the types of BMGR roads that would have the highest degree of impact on wildlife and wildlife habitats. However, none of these roads are proposed for closure. The roads proposed for closure are, for the most part, roads that were created through repeated use rather than through mechanical dirt-moving and are relatively narrow and infrequently used. At any rate, even these roads can cause direct, permanent disturbance of the habitat, cause erosion that can reduce the quality of aquatic habitats (xeroriparian areas, playas and puddles, and tinajas/wildlife waters under certain conditions), and facilitate invasion by non-native pest plant species that can displace native habitat through competition or fire. There may also be short-term denial of access to habitat for some species that avoid areas of human activity (like roads) or flee the area when cars or people approach. Where roads are located near or within critical movement corridors (e.g., mountain passes) this denial could be more serious to some species such as bighorn sheep.

### **5.6.3.1 Proposed Action (Strategy C)**

If implemented, the proposed action would keep the principal components of the existing network open for vehicular use but would close vehicle access to redundant roads, particularly in local areas with dense road networks. The proposed action would reduce the 2,222 miles of inventoried roads on the BMGR by 658 miles to an estimated 1,564 total miles (a 30 percent decrease) (see Table 3-6). Approximately 621 miles of road would be available for public use under the proposed action (i.e., 66 percent of the roads currently accessible to the public would remain). The number of unroaded areas of 3,001 acres or more would decrease by 44 as a result of combining smaller areas into larger blocks of unroaded area; this includes an increase from five to eight of unroaded areas greater than 50,000 acres in size.

The discussion of the effects that roads have on vegetation (Section 5.5.3.1) is applicable to wildlife habitat. For the reasons discussed in Section 5.5.3.1 and those discussed above, the proposed reduction of roads would provide some localized benefits to wildlife. The reduction of roads would also limit the areas to which people have motorized access on the BMGR. This would reduce associated disturbance, which could affect some wildlife and wildlife habitats. On a range-wide basis, potential overall benefits to wildlife and habitat would be minor. Roads necessary for wildlife and wildlife habitat management activities would remain open. New or reestablished vehicle access for management purposes would be provided in the future as needed, in accordance with NEPA and other applicable laws, to support emerging management requirements. Management access would continue to have existing benefits on wildlife and wildlife habitat.

Under the proposed action, site-specific planning would be implemented for two bypass roads, totaling approximately 7 miles, which would reroute law enforcement vehicle traffic around rather than through the northwest corner of the Cabeza Prieta NWR and Wilderness. This may lead to the establishment of new roads through undisturbed wildlife habitat (primarily creosotebush-bursage desertscrub and elephant tree-limberbush vegetation). These roads may be used and maintained on a relatively frequent basis by the Border Patrol and, thus, the harmful effects of roads explained above would be more pronounced on these roads than on some other range roads. Nevertheless, these effects may somewhat balance those related to the shift away from use of the roads within the Cabeza Prieta NWR wilderness for periodic Border Patrol surveillance. Further analysis and determinations with regard to level of effect and mitigation, as necessary, would occur with the site-specific planning for these roads.

In general, the roads that would be closed under the proposed action are roads that are used on a relatively infrequent basis and are not regularly maintained. With the redundant road networks that would be reduced with the proposed action, these effects may be more pronounced in relation to roads that are more widely dispersed through a habitat or species' range. Although there is no known scientific study to point to, redundant road networks (such as those that would be reduced under the proposed action) have a greater assumed magnitude of impact on wildlife

and wildlife habitat than a single road would. Natural communities that are important to wildlife, and would therefore benefit the most from road closures include:

- **Xeroriparian Scrub.** As also noted in Section 4.6.1.2, mountain and valley xeroriparian scrub habitats are extremely important for wildlife, and they probably support the most species on the BMGR by providing abundant food, cover, nest sites, perches, and relatively more water for wildlife than any other habitat type. Riparian areas are also used as corridors for wildlife movement. In the Lower Colorado River Valley Subdivision of the Sonoran Desert, xeroriparian washes comprise less than five percent of the area, and yet support 90 percent of its bird species (Phillips and Comus 2000). Besides supporting more nesting bird species than any other habitat type on the BMGR, xeroriparian scrub acts as resource for migrating birds who use the rich insect fauna found in flowering paloverde, mesquite, and ironwood as food during spring migration (Hall and others 2001). It provides a potential water source for amphibians (which depend on water for breeding) and desert bighorn, and it also functions as a wildlife corridor for large mammals. Some bat species, both common and protected species, use xeroriparian habitat for perennial forage. The proposed action, if implemented, would lead to a closure of approximately 8 miles of roads in valley xeroriparian scrub (approximately 28 percent decrease from the existing road network located there). Approximately one mile of road would be closed in the mountain xeroriparian scrub, which currently contains an estimated 5 miles of roads.
- **Creosotebush-Bursage Desertscrub.** As also noted in Section 4.6.1.2, creosotebush habitats with deep soils contain species including Arizona pocket mouse, kangaroo rats, kit fox, badger, and many species of reptiles that create burrows under the vegetation canopy. Creosotebush dominated vegetation supports comparatively fewer bird species than other habitat types (e.g., xeroriparian scrub) however the LeConte's thrasher breeds in creosotebush associations. Closure of roughly 550 miles of road within this habitat type (a reduction of about 30 percent) would be implemented under the proposed action, primarily within Management Units 1, 2, and 5 (i.e., in areas affected by a comparatively greater densities of roads, such as in the foothill areas of the Gila Mountains). Most of these roads are the redundant type roads that are currently creating multiple sources of habitat disturbance dispersed throughout a localized area. With the proposed reduction of redundant road networks, there would be less habitat disturbance in this habitat type, particularly within in the Lechuguilla Desert. The remaining roads may, however, have higher levels of noise and associated activity along them when they are in use. Given the relatively low levels of use in these areas, however, such an increase would not be expected to be great enough to cause discernible impacts to any individual animals or species populations. In addition, new public roads would not be developed, and some closed roads may be restored. To the extent compatible with the military mission, unroaded areas greater than 3,000 acres in this natural community would be conserved, in

areas including the Davis Plain/Yuma Desert, Lechuguilla Desert, San Cristobal Valley, Childs Valley, and Saucedo Valley areas.

- **Paloverde-Mixed Cacti-Mixed Scrub on Bajadas.** Mixed Sonoran desert scrub habitats have caves and abandoned mine shafts that provide roosting and nursery colony sites for the resident bat species on the BMGR. Wildlife (including mountain lion, desert bighorn sheep, and mule deer) often seek water in this habitat, and (within Sonoran pronghorn range) Sonoran pronghorn may be seasonally dependent on the chain fruit cholla found here (Hall and others 2001). Management Units 4, 5, 6, and 7 contain the majority of this habitat, which has more miles of roads in it than any other vegetation type on the BMGR, except creosotebush-bursage desertscrub. If the proposed action were implemented, there would be about 20 miles of road closed (or a 10 percent reduction) in the road network within this community.
- **Elephant Tree-Limberbush on Xeric Rocky Slopes.** This habitat occurs within Management Units 1 and 2, and the proposed action would lead to a closure of about 50 miles or approximately about half of the roads within this natural community type. The BMGR and Cabeza Prieta NWR contain the only representations of this community in the United States, and the portion within the Tinajas Altas and Gila mountain areas receive relatively heavy recreational vehicle use compared to other areas with this vegetation type (Hall and others 2001). Bats also have roosting sites within this habitat type.

Dune complexes on the BMGR are valuable because they host a variety of rare and endemic species; however, there are currently only about 3 miles of roads associated with this habitat type, and no road closures would occur under the proposed action. However, these roads, located along the international border in the southern U.S. extent of the Gran Desierto Dunes and across the southern Mohawk Dunes, extending eastward from Marine Corps Ground Support Area 67, would be restricted to government use only. Similarly, the proposed action would continue to restrict the road to Mohawk Playa to government use only and close roads leading in and through Aguila Playa. Although these proposed changes are small, the motorized access and unroaded area management objectives may have beneficial impacts on these habitats, because the occurrence of dunes and playas would be mostly within large unroaded areas that would be conserved as compatible with military and agency missions.

To summarize, the proposed action for motorized access and unroaded area management would likely provide some localized benefit to wildlife and wildlife habitats on the BMGR. The magnitude of this effect would vary commensurate with habitat type, resident wildlife use characteristics, and road densities to be reduced. Low to moderate benefits may occur in some localized areas, but the overall range-wide benefit to wildlife and wildlife habitat would likely be minor.

### **5.6.3.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Strategy B would have less potential for beneficial effects to wildlife and wildlife habitats than the proposed action (Strategy C). Under this strategy, more roads would remain open, including some roads within those natural communities most valuable to wildlife.

The Strategy B road and unroaded area management strategy would evaluate allowing public use of new roads developed for agency use, and would retain the existing road network and level of motorized public access unless a compliance issue arises. Under Strategy B, the 2,229 miles of road (including the Cabeza Prieta NWR bypass roads) are mostly located in creosotebush-bursage desertscrub habitat. Other vegetation types that are important as wildlife habitat include valley and mountain xeroriparian scrub (which combined would have 33 miles of roads under Strategy B, which is 9 more miles than under the proposed action) and the valley bottom floodplain complex (which would have about 21 miles of roads under Strategy B, compared to about 11 miles under the proposed action). Strategy B would continue to restrict access along a 5-mile road leading to Mohawk Playa to government use only, but roads would not be closed in the vicinity of Aguilla Playa. These playa habitats are important to endemic species including desert toads; some concerns have been raised that roads may have an adverse effect on these areas, but such impacts have not been verified at this time (see Section 5.3.3.1). Additional roads for motorized public or agency use would be evaluated and negative effects to wildlife and wildlife habitats could occur from the added roads, although such roads would be evaluated on a site-specific basis and would not be constructed if there were significant adverse impacts that could not be mitigated. Thus, the application of Strategy B would not have the potential beneficial effects of the proposed action and could eventually have negative impacts on wildlife and wildlife habitat.

There would potentially be more benefits to wildlife and wildlife habitats if Strategy D were implemented, rather than the proposed action, because it would close all roads that did not meet military or agency needs and would not build the bypass roads to reroute vehicle traffic around the Cabeza Prieta NWR. Also, there would be restoration of habitat along closed roads where feasible and prudent. If Strategy D were implemented rather than the proposed Strategy C, an additional estimated 107 miles of roads, which are primarily located in creosotebush-bursage vegetative communities (about 82 miles) and Elephant Tree-Limberbush on Xeric Rocky Slopes (about 15 miles), would be closed. The potential effects of the Cabeza Prieta NWR bypass roads described for the proposed action in Section 5.6.3.1 would not occur, but agency (Border Patrol) use of the roads within the northeast corner of the Cabeza Prieta NWR Wilderness and any wildlife disturbance occurring in association with that use would continue.

### **5.6.3.3 No-action Alternative (Strategy A)**

The no-action alternative, which employs Strategy A range-wide, would not have the potential benefits for wildlife and wildlife habitats that were described in Section 5.6.3.1 for the proposed action, because the 2,222 miles of roads in the current inventory would be retained and there would be no provision for the conservation of unroaded areas greater than 3,000 acres. However, this strategy does include provisions for minimizing new road construction, and for developing a transportation plan that would facilitate effective management of an appropriate road system, and closing roads not meeting current needs. Therefore, potential benefits similar to those of the proposed action with regard to road closures could be realized with the implementation of the transportation plan.

### **5.6.4 Camping and Visitor Stay Limits**

#### **5.6.4.1 Proposed Action (Strategy C)**

The proposed action for camping and visitor stay limits is Strategy C, although the portion of the BMGR principally affected by these management objectives is that which is open to general public access. Under the proposed action, dispersed self-contained camping would continue to be permitted within areas open to the public and vehicle-based camping would continue to be allowed within 50 feet of existing roads that are open to public use for up to 14 consecutive days within a 28-day period. The proposed action would continue to restrict camping within ¼-mile of wildlife water sources, but would also require that all campsites be more than ¼ mile away from designated natural and cultural resources that are sensitive to human-caused disturbance and could restrict camping along certain road segments (e.g. if there is a cultural resource site, or a special-status plant population located nearby).

This action would potentially have minor benefit to wildlife and wildlife habitats because it would somewhat reduce the impact area and continue to limit the duration that vehicles and people impose on wildlife and wildlife habitats from camping. This would in turn reduce small-scale wildlife habitat disturbance that could affect insect, reptile, and small mammal species. Impacts to wildlife associated with camping often can include general habitat disturbance and degradation due to noise, light pollution, high-intensity wood gathering, and vehicle activity. Although it has not been documented on the BMGR, camping may affect movement patterns or behavior of some wildlife species and denial/deferral of wildlife movements (e.g., if there is intense camping in mountain passes like Cipriano and Tinajas Altas passes. The continuation of dispersed, self-contained and vehicle-based camping in most areas open to the public would continue to potentially result in low levels of these types of impacts to wildlife and wildlife habitats. New and continued limitations on camping in certain areas considered to be sensitive for selected wildlife would benefit wildlife and wildlife habitat in these areas. These potential effects may be better understood through the proposed assessment of the benefits and effects of

establishing designated camping areas. Such a study would determine the relative impacts to wildlife and wildlife habitats that are caused by concentrated rather than dispersed camping activity and assist in the implementation of a camping policy that would be protective of biological resources.

#### **5.6.4.2 Alternative Actions (Strategy B and Strategy D)**

The distinctions in potential impacts on wildlife and wildlife habitat between the alternative actions for camping and visitor stay limits as compared to the proposed action are considered minor; they are noted here to distinguish the potential environmental consequences between the alternative management strategies.

Management Strategy D, if applied range-wide, may be minimally more protective of wildlife and wildlife habitats than the proposed action because it would limit the duration of vehicle-based camping to 7 consecutive days without a special use permit, which is a reduction from the current and proposed 14-day limit. Although longer-term stays comprise a small percentage of the camping that occurs on the BMGR, this management objective may benefit wildlife and wildlife habitats by potentially reducing both direct and indirect disturbance associated with longer-term stays by as much as one-half.

In contrast, the application of Management Strategy B would allow for some increased disturbance of wildlife habitats because it would allow vehicle-based camping to occur within 100 feet of roads open to the public rather than 50 feet (the current and proposed-action standard). Unlike the proposed action, Strategy B would not include an assessment of designated camping areas and the potential benefits and effects thereof. (Even if camping areas were not established, the study could potentially provide additional information about the effects of camping on wildlife and wildlife habitat.) Strategy B would not require campsites to be no more than ¼ mile from designated areas sensitive to human-induced disturbances or along certain road segments for resource protection purposes, and would therefore not include the potential benefits of this management objective, as discussed for the proposed action.

#### **5.6.4.3 No-Action Alternative (Strategy A)**

The no-action alternative would have fewer potential benefits to wildlife and wildlife habitats than the proposed action because it would not: (1) restrict camping along certain road segments for resource protection purposes, (2) study the effects of designated camping sites, and (3) restrict camping within ¼ mile of natural and cultural resources that are designated to be sensitive to human-caused disturbance. As previously stated, the benefits to wildlife and wildlife habitat that could result from such actions are considered minor, but are identified here for comparative purposes.

### **5.6.5 Recreation Services and Use Supervision**

#### **5.6.5.1 Proposed Action (Strategy C in Unit 2 and Strategy D in All Other Units)**

Wildlife and wildlife habitats would potentially benefit from the proposed action (Strategy C in Unit 2 and Strategy D in all other units) for recreation services and use supervision. Some of the current limitations that would continue with the proposed action include prohibiting on- and off-road racing and public ORV travel. These activities can affect wildlife and wildlife habitat by causing direct and indirect disturbance to wildlife and wildlife habitats. Direct disturbance to these resources includes habitat degradation, injuries, and mortalities caused by the activities, and indirect disturbance includes noise impacts.

The proposed restrictions on driving in washes (except where the wash is a designated part of the road system open to the public and is dry) for all of the management units would potentially benefit wildlife because driving through washes flushes out wildlife, which is of particular concern for those species seeking thermal cover during hot, dry summer months, for example. Washes provide important habitat to wildlife as they function as wildlife corridors, provide den and ambush sites for carnivores, provide shade during hot periods, and provide habitat for a wide range of wildlife. Nesting birds, large mammals, and invertebrates, make disproportionate use of the resources within washes compared with surrounding areas and some species, including zebra-tailed lizards, are specialized to the wash microhabitat. Although driving in washes is not currently a sanctioned activity on the BMGR, it is known to traditionally occur in association with some BMGR washes.

The proposed action for all the management units except Unit 2 includes a requirement for a special use permit for a single party with 10 or more vehicles. In Unit 2, a special use permit would be required for a single party with 20 or more vehicles. Wildlife and wildlife resources may benefit from either of these management strategies, although there would be no measurable difference between whether the special use permit is required for parties with 10 or more vehicles versus 20 or more vehicles. Requiring a special use permit for larger group sizes could benefit wildlife and wildlife habitats in discouraging use by larger groups, which relative to smaller groups can create larger and more intense areas of habitat disturbance, greatly increased noise levels, and increased trash dispersal.

Other benefits to wildlife and wildlife habitats that may be derived from the proposed action include an increase in public education information programs; the assessment of the need for additional gates, fencing or signs, which could deter motorized access in unauthorized areas; and the prohibition on public entry to mines, which could benefit species associated with this habitat including a host of sensitive bats species. Requiring the retention of at least six law enforcement officers would continue to ensure that there would be personnel to prevent/deter visitors from

violating rules regarding protection of sensitive wildlife resources (e.g., more law-enforcement officers to prevent poaching of reptiles or illegal ORV travel). Developing and implementing a limits-of-acceptable change monitoring program would guide recreation use management and potentially allow for better protection of natural resources by providing better data on the effects of recreation use on wildlife and wildlife habitats.

#### **5.6.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

Regardless of the management unit, increased restrictions and permit requirements as related to the recreation services and use supervision objectives would potentially benefit wildlife and wildlife habitats. The alternatives for Management Unit 2 include Strategies B and D. The alternatives for the rest of the Management Units include Strategies B and C. Strategy D provides the highest level of restrictions on types of activities and Strategy C is the same as Strategy D except with regard to requiring a special use permit for single parties with more than 20 vehicles (rather than more than 10 vehicles with Strategy D), while Strategy B has considerably fewer restrictions on public use and access.

Alternative Management Strategy B would be generally less protective of wildlife and wildlife habitats than the proposed action because it would result in the following:

- Evaluation of the need for and effects of allowing public ORV travel in designated areas (a practice not currently allowed)
- A lower minimum number of law enforcement positions as compared to the proposed action (requires two positions)
- An increase from the proposed action in the number of vehicles allowed per group (30 vehicles) before requiring a special use permit (this is a decrease from the existing requirement of a special use permit only for a party with 50 or more vehicles; the requirement under proposed action would be for parties with 10 to 20 vehicles)
- Allowing public travel in designated washes when dry (the proposed action would only allow motorized public travel in washes where the wash is a designated part of the road system open to the public and is dry)
- Maintenance of existing signs, gates, fencing, and public education programs (without the improvements that are included in the proposed action)
- Maintenance of existing levels of resource protection (instead of the development of limits-of-acceptable change monitoring to protect natural resources as included in the proposed action)
- Evaluating the feasibility of allowing public entry to mines where such use is compatible with safety and resource protection requirements and implementing a program for such use under special use permit provisions, if feasible.

Most of these distinctions between the proposed action and Strategy B would not have a measurable impact on wildlife and wildlife habitats. However, the potential to allow ORV travel in designated areas, allow motorized public travel in designated washes, and allow public entry to mines on the range is of particular concern. Opening areas to ORV use has the potential to negatively affect wildlife and wildlife habitats through the direct physical damage and disturbance that such use can cause to habitats in the affected area. As described in Section 5.5.5.1, washes are considered important habitat for wildlife and allowing public motorized access to washes could lead to negative impacts on wildlife and wildlife habitats. Some mine shafts and adits are used as roosting sites for bats, shelter for bighorn sheep and other species, and support unique microhabitats for other species. However, these factors would presumably be taken into consideration during the process of evaluating the need for and effects of designating ORV use areas, deciding which washes would be designated as open to motorized travel, and evaluating where allowing public entry to mines would be compatible with safety and resource protection requirements. Therefore, some of these potential effects could be avoided, reduced, or minimized. If significant adverse impacts were identified that could not be mitigated, such actions would not be authorized. In summary, Strategy B could have minor to moderate effects on wildlife and wildlife habitats in localized areas, depending upon which areas are designated for these two uses.

### **5.6.5.3 No-action Alternative (Strategy A)**

The main difference in impacts to wildlife and wildlife habitats from adopting the no-action alternative rather than the proposed action would arise from the rules regarding vehicular travel. Similar to the proposed action, the no-action alternative would prohibit public ORV travel. The no-action alternative would allow motorized public travel in washes (in accordance with the Draft Barry M. Goldwater East HMP) with effects that would be similar to those as described for Strategy B. A special use permit would be required for groups of 50 or more vehicles per group – a less stringent requirement compared to the proposed action and other action alternatives. In contrast to the proposed action, the no-action alternative would also not increase the level of law enforcement, signs, fencing, gates, and environmental education; thus, this strategy would not provide any of the potential improvements for the protection of sensitive wildlife and wildlife habitats related to these objectives.

## **5.6.6 Rockhounding**

### **5.6.6.1 Proposed Action (Strategy C in Units 2 and 3 and Strategy D in All Other Units)**

The proposed action for rockhounding is Strategy C in Units 2 and 3 and Strategy D elsewhere. Rockhounding would be prohibited in most areas of the BMGR, but would be allowed to occur on a limited basis in the majority of the publicly accessible portions of BMGR—West. The

amount of rockhounding that occurs within the BMGR is believed to be minimal and so too are any associated impacts on wildlife and wildlife habitats (e.g., associated foot traffic and the removal of rocks, which can disrupt microhabitats). In all areas except for Units 2 and 3, these effects would be eliminated through the proposed prohibition of rockhounding. Within Units 2 and 3, these effects could be lessened because rockhounding would be restricted within special natural/interest areas and in other designated areas that were determined to be sensitive to impacts arising from human-induced disturbance.

#### **5.6.6.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

Regardless of the management unit, increased restrictions on rockhounding would have the potential to have minor and highly localized benefits to wildlife and wildlife habitats. An alternative action that employed Strategy D for this resource management element may benefit wildlife and wildlife habitats more so than Strategy B or Strategy C as, with the activity prohibited, there would be no potential for effect. An alternative action that employed Strategy C for this resource category offers more potential protection than Strategy B. Whereas with Strategy C rockhounding would be prohibited within designated areas (special natural/interest areas and other areas sensitive to human-induced disturbance), the activity would be allowed under Strategy B unless a compliance issue arises.

#### **5.6.6.3 No-Action Alternative (Strategy A)**

With the no-action alternative, rockhounding would likely be allowed to continue under existing management in all publicly accessible portions of the BMGR with no special provisions for excluding the activity from special natural/interest and other designated natural and cultural resource areas that are sensitive to impacts arising from human-induced disturbance. Thus, as compared with the proposed action, the no-action alternative would have a greater potential to affect wildlife and wildlife habitats if impacts associated with the activity degraded wildlife habitat.

### **5.6.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

#### **5.6.7.1 Proposed Action (Strategy D in Unit 1 and Strategy C in All Other Units)**

The proposed action for this resource element would likely have minor beneficial effects to wildlife and wildlife habitats. There would be continued protection of habitat from the continued prohibition of collection of plants listed in the Arizona Native Plant Law, including plant parts, seeds, or fruit (the use of dead wood for permissible campfires is specifically exempted in the

law). Prohibition of all wood cutting activities range wide and collection of dead and downed wood within Unit 1 would likely benefit wildlife and wildlife habitats because wood, standing or dead and downed, provides important habitat to insects (that also provide a food source to larger wildlife), lizards, raptors, nesting birds, and small mammals. In addition, downed wood provides a source of soil nutrients and substrate that keeps vegetation associated with wildlife habitats healthy. Although Strategy C allows the collection of dead and downed wood for campfires, it also promotes the monitoring of this activity in high use areas, with a provision to instate restrictions if resource conditions dictate the need.

Under the proposed action, collection of dead and downed wood would be allowed within the former Mohawk Mountains and Sand Dunes ACEC and the small Unit 2 portion of the former Tinajas Altas Mountains ACEC. While currently prohibited, collection of dead and downed wood would be allowed within 150 feet of El Camino del Diablo. Given that wood collection in these areas has been prohibited since the 1990 Goldwater Amendment, wildlife resources associated with dead and downed wood in these areas could be affected by this change in management policy for these areas.

#### **5.6.7.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

Distinctions between the potential consequences of alternative actions and the proposed action for this resource element on wildlife and wildlife habitats are minor. All alternatives would continue to require compliance with the Arizona Native Plant Law and would prohibit the removal of wood from the range. Management Strategy B, which allows wood cutting, gathering, and firewood use as long as wood is used at a sustainable rate and no regulatory compliance issue arises, represents the least resource-protective alternative. Management Strategy D represents the most protective because it flatly prohibits all of these activities. Allowing woodcutting under Strategy B would potentially affect arboreal wildlife species and habitats, including nesting birds.

A notable impact that could occur if Strategies B or C were applied in Unit 1 rather than Strategy D is that wood collection (plus woodcutting with Strategy B) would be allowed within the former Tinajas Altas Mountains ACEC, which is open to general public use and where wood collection is currently prohibited. This area could be particularly vulnerable to the effects to wildlife resources that could occur from a change in management policy, particularly considering that the Davis Plain portion of this former ACEC has been subject to illegal over-harvesting of ironwood in the past (although collection of ironwood is regulated by the Arizona Native Plant Law). Similarly, if Management Strategy D were selected for Management Units 2 and/or 3 rather than Strategy C, the potential impacts to wildlife resources within the portions of the former ACECs and El Camino del Diablo within these units, as assessed in Section 5.6.7.1 for the proposed action, would not occur.

### **5.6.7.3 No-Action Alternative (Strategy A)**

The current policy regarding wood cutting, gathering, and firewood use dictates that woodcutting or wood collection for commercial or domestic use is prohibited, although the use of dead and downed wood as firewood is permitted. In addition, firewood gathering is prohibited in all former ACECs and within 150 feet of El Camino del Diablo Backcountry Byway. While the impact of these management objectives would be similar to that assessed for the proposed action, this strategy has no provision to monitor wood supplies in high-use areas and restrict wood collection if resource conditions dictate. Therefore, the no-action alternative for this resource category would potentially be slightly less protective than the proposed action.

## **5.6.8 Hunting**

### **5.6.8.1 Proposed Action (Strategy B)**

Application of Management Strategy B range-wide is the proposed action for hunting. Although all the alternatives propose to continue the existing game management programs throughout the range, the proposed action would, in addition, assess the need for a special hunting permit program that requires the payment of nominal fees that would be used for the protection, conservation and management of wildlife and wildlife habitats on the range, and would include habitat improvement and related activities. The proposed assessment (based on hunter participation rates and patterns) would examine whether nominal fees could create sufficient revenues for wildlife management. If a fee program were implemented, the fees may deter some hunter use of the BMGR, particularly in years when there is a marginal abundance of game. While potential decreases in hunter participation may have correlated impacts on target species and species interrelationships (e.g., higher prey populations and predator-prey relationships), the assessment of such effects would be speculative and inappropriate herein given the programmatic nature of this EIS.

A second provision of the proposed action would evaluate the effects of non-game species collection on wildlife and habitat, and if needed, impose limits to restrict these collection activities within the authority of state law. This action could also benefit wildlife and wildlife habitats because it would evaluate the need for the restriction and impose the restriction if it is needed. Concerns have been raised about the effects of non-game species collection on wildlife populations and habitats on the BMGR, particularly herpetofauna and the Sonoran population of the desert tortoise (Hall and others 2001). However, no specific data are available to understand the type and magnitude of these effects on wildlife and wildlife habitat and the AGFD, which regulates this activity, has not assessed a threat or imposed restrictions on this activity on the BMGR.

### **5.6.8.2 Alternative Actions (Strategy C and Strategy D)**

Management Strategy D, if applied range-wide, would potentially be more protective of wildlife and wildlife habitats than the proposed action because a petition to close the BMGR to non-game species collection would be submitted to the Arizona Game and Fish Commission.

Management Strategy C is the same as the proposed action and the effects would be the same as with the proposed action.

### **5.6.8.3 No-Action Alternative (Strategy A)**

The range-wide application of Strategy A for hunting would have fewer potential benefits for wildlife resources than the proposed action. With Strategy A, no changes in current policy for non-game species collection would be implemented beyond current state law and no evaluation of the effects of non-game species on wildlife and wildlife habitats would be prescribed.

## **5.6.9 Recreational Shooting**

### **5.6.9.1 Proposed Action (Strategy C)**

The primary adverse effect that recreational shooting has on wildlife is noise pollution; otherwise, this pastime has many of the same adverse effects on wildlife and wildlife habitats as camping. Excessive noise associated with shooting has the potential to affect wildlife in a variety of ways, including disrupting communication, frightening wildlife away from potentially important resources (water, food, etc.), and disrupting wildlife behavior. These effects are considered to be minor and short-term.

The proposed action, Management Strategy C, would incorporate a system of adaptive management that would first assess the need for the activity itself, and then assess the need to restrict such activities to specific areas, times, and type of firearms, should it be justified. It would also implement certain restrictions, such as requiring a special use permit for recreational shooting at night or using fully automatic weapons. Therefore, although continuing to allow recreational shooting may have some minor and short-term adverse effects on wildlife and wildlife habitat, these new management objectives may be expected to somewhat reduce and/or localize these impacts.

### **5.6.9.2 Alternative Actions (Strategy D and Strategy B)**

Management Strategy D, if applied range-wide, may be more protective of wildlife and wildlife habitats than the proposed action because it would initially prohibit recreational shooting on the range. Like the proposed action, Strategy D would consider the appropriateness of allowing the activity to occur in designated areas.

The application of Management Strategy B would allow recreational shooting to continue under existing regulations without any further restrictions as long as no significant resource issues are identified, and it remains compatible with military use and public safety. This may be less beneficial to wildlife and wildlife habitats than the proposed action because it would not provide opportunities for designating specific areas for this activity that could avoid sensitive habitat areas. Effects on wildlife and wildlife habitat are expected to be minor.

### **5.6.9.3 No-Action Alternative (Strategy A)**

The range-wide application of Strategy A for recreational shooting would have less potential benefit for wildlife resources than the proposed action. Current provisions for recreational shooting under this alternative would allow it to occur as long as it remains compatible with military use and public safety. This alternative would not account for effects on wildlife or wildlife habitat, which are considered to be minor.

## **5.6.10 Utility/Transportation Corridors**

### **5.6.10.1 Proposed Action (Strategy C)**

The proposed action, Management Strategy C, would restrict all future utility/transportation corridor development to the existing corridor, except for applications filed prior to 6 November 2001. If adopted, the Yuma ASH, would be allowed to be constructed as planned. Although the potential effects of the Yuma ASH are being evaluated in detail in separate NEPA documentation, potential adverse impacts to wildlife resources include the elimination of wildlife habitat in association with the construction, increased wildlife mortality, increased noise and human activity, habitat fragmentation, and restriction of wildlife movement. Of particular concern is the potential for mortality to reptiles (including the protected flat-tailed horned lizards), which can be killed by traffic because they are attracted to the blacktop of roads for basking. Additional details on the potential impacts of the Yuma ASH action, in combination with the proposed INRMP, on wildlife and wildlife habitat are provided in Chapter 6, Cumulative Effects.

Otherwise continuing to limit development of overhead and underground utilities within the State Route 85 transportation/utility corridor and prohibiting all other transportation/utility corridor development would continue to have beneficial effects on wildlife and wildlife habitat by reducing/limiting the effects of development (i.e., elimination of wildlife habitat, increased wildlife mortality, increased noise and human activity, habitat fragmentation, and restriction of wildlife movement).

#### **5.6.10.2 Alternative Actions (Strategy B and Strategy D)**

Strategy D, which would restrict all future developments of this kind to existing corridors, would be more protective of wildlife and habitat than the proposed action because it would not allow clearing of wildlife habitat in undisturbed areas and the associated effects. This includes the Yuma ASH and associated effects to wildlife and wildlife habitat, which would be assessed in detail in separate NEPA documentation.

Management Strategy B, which would evaluate proposals to build new utility/transportation corridors on a case-by-case basis, has the potential to allow such clearing and associated effects (in addition to the proposed Yuma ASH). Because such new corridors would need to be compatible with the military mission, it is regarded as unlikely that many new corridors would be developed on the BMGR. Thus, this distinction between the proposed action and this alternative would probably have a low magnitude of effect on wildlife and wildlife habitat.

#### **5.6.10.3 No-Action Alternative (Strategy A)**

The no-action alternative is similar to the proposed action. Although DoD would assume a greater role in reviewing/approving proposed actions within existing corridors, the Secretary of the Interior must be consulted before using the lands for non-military purposes (Section 3031(a)(5) of the MLWA of 1999). A new protocol would be established for the review and approval process, but would continue to satisfy regulatory requirements. The no-action alternative would allow for consideration of new corridor proposals. However, because of the general incompatibilities between utilities and the military mission (e.g., overhead power lines where aircraft have clearance to fly from the ground surface to 80,000 feet MSL) few corridors would be likely to be approved. Consequently, the effects would likely be very similar to the proposed action.

## **5.6.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

### **5.6.11.1 Proposed Action (Strategy C)**

Management Strategy C, the proposed action for this resource management element, would likely have an overall beneficial effect on wildlife and wildlife habitats. Due to the relevance of each management objective to the subject resource, each is evaluated individually:

- The proposed evaluation of cumulative impacts of land disturbance on wildlife habitat would provide new information to land managers on the extent and level of impacts on BMGR wildlife habitat that have never before been evaluated comprehensively (including effects from recreation, Border Patrol, and UDAs). Based on this information, criteria would be established for protection of important habitat. If such protective measures were effective, wildlife and wildlife habitat would benefit; the level of effect cannot be foreseen.
- To the extent that the proposed objective to update vegetation maps with newly gathered botanical information would relate to any habitat-protecting management actions, this objective would benefit wildlife habitat.
- The proposed program that would be developed to control trespass grazing by livestock and feral burros would potentially benefit wildlife and wildlife habitat. As explained in Section 5.5.11, this is current policy, but this policy has not historically been implemented consistently. Low levels of trespass grazing occur, particularly within the East TAC portion of BMGR—East. With the proposed action, the program to control trespass grazing would presumably be more effectively implemented than the existing program since there are also objectives to monitor the quantity of livestock permitted on perimeter grazing allotments and maintain a list of names, addresses, and brands of permittees to be able to respond to trespass grazing. Trespass cattle and feral burros may be stressed by this action, but deleterious effects are not expected as the current intent is that these species would be rounded up and returned to their rightful owners. The elimination of livestock from the BMGR would be beneficial to other native wildlife habitat and wildlife because grazing animals may compete with native wildlife, and can alter wildlife habitat and the natural function of ecological communities.
- The objective to conduct surveys for, establish control priorities for, prevent the introduction of, and monitor populations of invasive species and develop coordinated strategies to locally eradicate and/or control the spread of these species commensurate with the threats they pose to natural resources on the BMGR and within the greater Sonoran Desert Ecoregion could benefit wildlife and wildlife habitat. Other invasive wildlife species besides livestock and feral burros could be evaluated, including the rock dove, European starling and house sparrow, Africanized honey bee, and possibly other

non-native insects. Where applied to vegetative resources, benefits to wildlife habitat could occur.

- The objective to identify sensitive wildlife areas (e.g., pronghorn concentration areas, fawning grounds, wildlife corridors) and implement restrictions on activities as needed to protect and conserve habitat, ecosystems, and biodiversity would potentially benefit targeted wildlife resources. The level of impact would depend on the need for and effectiveness of any restrictions that would be implemented.
- The objective to implement vegetation and wildlife habitat restoration efforts for areas that have been damaged by previous military, agency, or intensive public use would potentially benefit wildlife resources in the affected localized areas.
- The projected near- and long-term effects to wildlife and wildlife habitat related to the objective to allow the implementation of up to six high-priority water development projects described by the Lechuguilla-Mohawk and Draft Barry M. Goldwater East HMPs during the first five years of the INRMP are difficult to fully assess given the lack of definitive information on the potential benefits and adverse effects of wildlife waters. As outlined in Section 4.6.4, there continue to be questions regarding the benefits and adverse effects of existing and future wildlife water developments within the BMGR. The proposed action reflects a course of action that attempts to address some areas of management controversy through additional research and evaluations, while allowing development of six high-priority waters to occur as needed to support target wildlife populations.

The preponderance of current scientific evidence indicates that (1) wildlife water developments in the southwestern United States have not had a demonstrated negative impact on native flora and fauna, and (2) some targeted and non-targeted wildlife species have benefited from increased availability of free-standing water (Rosenstock and others 1999). There is evidence that some wildlife water developments have benefited each of the species targeted in the HMPs as well as non-targeted mammalian predators, small mammals (including bats), game and non-game birds, and herpetofauna. Negative impacts of water developments on wildlife resulting from predation, competition, direct mortality, and disease could occur, but these impacts are not well understood or supported by data and remain largely speculative (Rosenstock and others 1999).

On the BMGR, long-term monitoring has not occurred for most wildlife populations; however, AGFD does conduct surveys and estimates for desert bighorn sheep and the Sonoran Pronghorn Recovery Team monitors the Sonoran pronghorn population. In most areas of the BMGR, the bighorn sheep population has remained stable relative to other areas outside of the BMGR. While some managers and scientists believe that the available research and management evidence demonstrates that most of the

approximately 40 existing wildlife water developments that are currently available to these species within the range may at least be partially responsible for the stability of their populations, others find that no definitive evidence of such a connection is available yet. The bighorn sheep population in the Sand Tank and Saucedo mountains, for example, has continued to decline despite the addition of transplanted sheep to the area in 1993 and the provision of natural and artificial waters throughout this area. As stated in Section 4.6.4, study of the effects of permanent water on the productivity and recruitment of desert bighorn sheep in the Cabeza Prieta and Sierra Pinta mountain ranges within Cabeza Prieta NWR is currently underway. Early evidence from this study shows waters to be beneficial. During the 2002 drought, this desert bighorn sheep population, which has been provided with water supplied by managers, was reduced by only an estimated seven to ten percent, with an estimated ten percent loss of lambs at a time when forage conditions were generally poor. This preliminary, unpublished information (Hervert 2002), along with other and further studies, may provide a better understanding as to the prioritization of wildlife water development projects for desert bighorn sheep and other species.

Although the proposed action would authorize the development of only six wildlife waters during the first five years of the INRMP, it is unlikely that more than six water developments typically would be implemented during this time frame even if all 17 developments identified in the HMPs were authorized. Thus, this element of the proposed action, as it relates to wildlife waters, represents little change from the existing condition during the first five years of the INRMP. One distinction is that the proposed action emphasizes that the six developments to be authorized are to be of high priority. The waters that remain to be implemented from the Lechuguilla-Mohawk HMP are the Ultima Catchment, sited in the southern Gila Mountains, and Raven Butte Catchment, sited at the northern end of the Tinajas Altas Mountains. These waters were sited primarily for the benefit of desert bighorn sheep. The 16 wildlife waters sited in the Draft Barry M. Goldwater—East HMP include three high-elevation and three low-elevation tanks in the Sand Tank Mountains, four high-elevation waters and one low-elevation water in the Saucedo Mountains, two high-elevation waters in the Crater Range, one high-elevation water in the Mohawk Mountains, and two high-elevation waters in the Aguila/Granite Mountains. These high-elevation waters are intended primarily for the benefit of desert bighorn sheep (and white-tailed deer in the Sand Tank and Saucedo mountains), while the low-elevation waters are intended primarily for the benefit of mule deer (and javelina in the Sand Tank and Saucedo mountains). One low-elevation water is proposed within Sonoran pronghorn range for the benefit of Sonoran pronghorn.

Some criteria that may be used to determine high-priority waters include placement in occupied or suitable habitat exhibiting lightly used forage resources for the targeted species. For desert bighorn sheep, waters are recommended to be located near foraging areas and shade, but in locations with unobstructed views (Gunn 2000). Few studies have

assessed the effectiveness of water developments; however, lessons may be learned from Krausman and Etchberger (1995) efforts, which involved monitoring two catchments in the Harquahala Mountains of Arizona constructed for the benefit of desert bighorn sheep. These waters were not effective, but one was poorly designed and effectively nonfunctional, while the other was rarely used (Krausman and Czech 1998, Gunn 2000).

During and for a short time period following construction, wildlife water developments would be expected to potentially have localized and minor deleterious effects on wildlife and wildlife habitat due to activities such as limited earth moving, access road grading (if needed), and erection of the materials that would comprise each development. Traffic on roadways associated with transportation of equipment and work crews potentially could injure or kill wildlife through collision. During the period of construction, noise and human activity could temporarily disrupt species in that habitat. These effects would vary based on the site-specific conditions of each of the six chosen locations, which are unknown at this time. The potential effects of these projects cannot be further assessed at this time, but further analysis would be prepared for each water development in accordance with NEPA when site-specific proposals are prepared.

- The objectives of the proposed action related to the detailed review of the beneficial and adverse effects of water developments on the BMGR include (1) thoroughly reviewing literature and implementing studies in the first five years of the INRMP to determine benefits and adverse effects of wildlife waters with the intent of providing information to be used in determining the value of developing, maintaining, or removing water developments, (2) continuing wildlife water research as needed after the first five years of the INRMP, and (3) establishing a panel of experts to review available data and make recommendations to the respective installation commanders by the first five-year review regarding whether sufficient evidence exists to suspend planned water developments, remove existing developments, or add new developments.

Regardless of the results of these studies, these objectives would be of benefit from a wildlife management perspective and the results would also benefit wildlife if they further the understanding of how wildlife waters should be managed. The proposed action is consistent with the suggestion of the latest research on wildlife waters, including Rosenstock and others (1999) and Rosenstock and Rabe (2002). A five-year period of study (and continuing study after the five years as needed) is appropriate because, as asserted in Rosenstock and others (1999), studies of water developments needs to be long-term, capturing an adequate range of variation in climatic conditions and other temporal phenomena affecting wildlife populations. Studies greater than or equal to ten years in duration would likely be required to distinguish “natural” variation from treatment effects. Such studies also need to be conducted at a spatial scale appropriate to the research questions and species of interest. When water developments are properly built and sited in areas that exhibit healthy floral communities, it is a matter of three to

five years before substantial bighorn or other wildlife use can be documented during the dry portion of the summer (Gunn 2000).

- Lastly, the proposed action would allow for the maintenance and repair of existing water developments in the first five years of the INRMP; future maintenance and repair decisions would be pending the five-year review panel review. Continuing to allow for the maintenance and repair of existing water developments would have beneficial impacts on the species that use these waters in that such actions would ensure that the waters are functioning as planned.

### **5.6.11.2 Alternative Actions (Strategy B and Strategy D)**

Management Strategy D is the same as the proposed action and would have the same potential consequences as assessed for the proposed action, except that it would suspend the installation of wildlife water developments for the first five years of the INRMP. This would allow for the five years of results of detailed review of the beneficial and adverse effects of water developments on the BMGR to be accomplished before any new water developments were undertaken. In contrast, the proposed action would proceed with up to six high-priority water developments while the literature review and studies were being conducted, and before their conclusions were known. Although the preponderance of current scientific evidence indicates that such wildlife water developments have not had a demonstrated negative impact on native flora and fauna, and that some wildlife species have benefited from increased availability of free-standing water, there is the perception that negative effects may be occurring and concerns about lack of data for evaluating the potential for negative impacts (Rosenstock and others 1999).

Suspending rather than allowing wildlife water developments during the first five years of the INRMP may be less beneficial to targeted and non-targeted species that could benefit from the six waters. Although there are some 40 existing wildlife water developments that are currently available to these species throughout the BMGR, the new carefully considered water developments could be of benefit to some species that are potentially at risk of serious decline in the event of an extended drought. On the other hand, any negative impacts that could occur in association with the up to six wildlife water developments that could be implemented under the proposed action, including those related to construction activities and perceived negative impacts from predation, competition, direct mortality, and disease would not occur.

Strategy B includes many of the same wildlife management objectives and same potential for benefits to wildlife and wildlife habitat as the proposed action, including evaluating the cumulative effects of land disturbance, updating vegetative mapping, developing a program to control trespass grazing, and conducting invasive species assessments and developing eradication/control measures. One distinction between Strategy B and the proposed action is that this strategy does not include the objective to identify key areas (e.g., pronghorn concentration

areas, fawning grounds, wildlife corridors) and implement restrictions on activities as needed to protect and conserve habitat, ecosystems, and biodiversity. Benefits that could be gained for general wildlife and wildlife habitats as a result of this objective would not occur under this strategy. The other distinction is that for the 25-year term of the INRMP, Strategy B would authorize the construction of up to 17 new water developments; the maintenance, repair, redesign, or redevelopment of 16 existing water developments; and the consideration of additional wildlife water developments. It is difficult to assess whether Strategy B would have different impacts than the proposed action because, during the first five years of the INRMP, a similar number of developments would likely be implemented as with the proposed action and the same effects would occur. However, whereas under the proposed action it is unknown how many wildlife water developments would be implemented after the first five years, under Strategy B, the remaining authorized developments could be constructed. Strategy B would not include the management objectives of the proposed action to conduct in-depth research or establish a panel to review the pros and cons of installing more water developments in the future. In contrast to the proposed action, beyond the first five years of the INRMP, wildlife water developments would be implemented without the potential benefit of any knowledge that would be gained under the studies and evaluations included in the proposed action. To the extent that the studies and evaluations of the proposed action would provide new information that would lead to an adjustment in management to benefit general wildlife and wildlife habitat, this strategy could be less beneficial than the proposed action. A common, and perhaps equalizing, factor that would affect the implementation of Strategy B, the proposed action, and the other alternatives, would be the requirement for a site-specific analysis for each proposed water development in accordance with the NEPA.

### **5.6.11.3 No-Action Alternative (Strategy A)**

If the no-action alternative were implemented, wildlife and wildlife habitats would benefit from continued efforts to control trespass grazing, update vegetative mapping, and evaluate the cumulative effects of land disturbance. The potential benefits of these management objectives would be the same as assessed for the proposed action. Compared to the proposed action and alternatives, the no-action alternative would not include management objectives related to restoration efforts, identification of key areas where restrictions on activities may be needed to protect habitat, or monitoring and control of invasive species. The potential benefits of these management objectives, as assessed for the proposed action, would not occur. Not implementing the invasive species management objective could have a negative impact upon wildlife because some invasive plants (red brome, Sahara mustard, and buffelgrass, in particular) can become a fire hazard and fire can damage wildlife and wildlife habitat. Like Strategy B, Strategy A would allow up to 17 new water developments and the repair, redesign, or redevelopment of 16 existing water developments, but would not include management objectives to study and evaluate the beneficial and adverse effects of wildlife water developments. Thus, relative to wildlife water developments, this strategy would have the same effects as assessed for Strategy B. One

distinction is that under Strategy B the implementation of additional wildlife water developments would be considered beyond those identified in the HMPs, but Strategy A would not.

## **5.6.12 Special Status Species**

### **5.6.12.1 Proposed Action (Strategy C)**

The primary effect that implementation of Management Strategy C would have on wildlife and wildlife habitats would be to improve the information available on special status wildlife species. The surveys being proposed would provide up-to-date information on the distribution and abundance of wildlife species as further discussed in Section 5.7. Other benefits of the proposed action include supporting endangered species recovery plans and providing resources for predator control if needed to protect a special status species (although common predator species could clearly be negatively affected by predator control).

### **5.6.12.2 Alternative Actions (Strategy B and Strategy D)**

Management Strategy D is identical to the proposed action and would have the same effects.

Strategy B would only differ from the proposed action in that it would not provide resources for predator control to protect a special status species, and it would not initiate or continue surveys to determine the distribution and abundance of special status species. Consequences for general wildlife and wildlife habitat would be similar to that of the proposed action, without the potential for negative impacts to predators.

### **5.6.12.3 No-Action Alternative (Strategy A)**

If the no-action alternative were implemented, special status species would be managed according to a more species-specific and compliance-driven approach compared to the other management strategies. Support for Sonoran pronghorn recovery efforts would continue to include avoiding new surface disturbing activities within 6 miles of permanent water sources within the range of Sonoran pronghorn. Other general wildlife and wildlife habitat within the six miles of water sources in Sonoran pronghorn habitat would also potentially benefit from this objective, which is not specifically included in the other management strategies. However, overall, Strategy A for this resource element provides fewer potential benefits for wildlife and wildlife habitat than the proposed action.

### **5.6.13 Soil and Water Resources**

#### **5.6.13.1 Proposed Action (Strategy D)**

The proposed action for soil and water resources (Management Strategy D) would have beneficial consequences for wildlife and wildlife habitats on the BMGR. Although excessive soil erosion is currently not a widespread problem within the BMGR, continuing to restrict activities that could accelerate natural rates of soil erosion could prevent degradation of habitat. In addition, the proposed action would also lead to a range-wide soil survey, which could provide valuable information about the relationship between wildlife habitats of interest and the soils on which they occur. Such information could aid in monitoring and adaptive management of wildlife and wildlife habitat. The proposed action would also lead to restoration of areas where vehicle use has caused excessive damage, which could have moderate to high benefits in localized areas.

#### **5.6.13.2 Alternative Actions (Strategy B and Strategy C)**

The alternative actions (Management Strategies B and C) would still provide many of the same potential benefits listed above for the proposed action; however, they would not involve the soil surveys or the restoration of damaged areas nor the associated benefits noted for the proposed action.

#### **5.6.13.3 No-Action Alternative (Strategy A)**

The no-action alternative has many of the same benefits for wildlife and wildlife habitats as the proposed action and the alternatives. Like the alternatives, it would not include the soil surveys or the restoration of damaged areas or result in any associated benefits to wildlife and wildlife habitat.

### **5.6.14 Air Resources**

#### **5.6.14.1 Proposed Action (Strategy A)**

The proposed action for air resources is Management Strategy A, which would continue to require the incorporation of dust control measures at construction sites and recreation activity areas, and the development of best management practices for activities that might potentially generate non-point source air pollution. The same minor benefits that the proposed action could have for general vegetation (see Section 5.5.14.1) also apply to general wildlife habitat quality in areas greatly affected by dust (microhabitats along frequently used roadsides).

#### **5.6.14.2 Alternative Actions (Strategy B, Strategy C, and Strategy D)**

Compared to the proposed action, Alternative Management Strategies C and D may provide some additional minor benefits to wildlife and wildlife habitats, while Management Strategy B would provide no special management objectives. Strategy C would promote the use of dust-palliatives to control excessive fugitive dust in heavily travel areas and evaluate the environmental impacts associated with this control measure. Management Strategy D builds upon Strategy C in that it includes an adaptive management provision to monitor air quality trends and avoid new activity in areas of deteriorated air quality. Dust control may indirectly benefit vegetation, and thus wildlife habitat, because it can reduce the accumulation of dust on leaves, which can interfere with photosynthesis.

#### **5.6.14.3 No-action Alternative (Strategy A)**

The no-action alternative is the proposed action and the effects would be the same.

#### **5.6.15 Visual Resources**

Management provisions for visual resources that result in new development to occur in previously disturbed areas benefit wildlife and wildlife habitats by minimizing habitat loss and helping to keep human disturbances to certain locations. Because all management strategies for visual resources include this provision, all provide an equal potential for benefit to wildlife and wildlife habitat. Other visual resource provisions would have no effect on wildlife and/or wildlife habitat.

#### **5.6.16 Wildfire Management**

##### **5.6.16.1 Proposed Action (Strategy B)**

Most of the vegetation and wildlife habitats on the BMGR are not fire-adapted. Wildfires can have serious consequences for the ecological health of such natural communities because the species composition can be drastically altered, often shifting from an assemblage of native species with high habitat value to a non-native dominated community of low value to both humans and wildlife. Wildlife relies upon vegetation for forage, cover, nest sites and perches. Less mobile species, such as reptiles, may experience population bottlenecks when subjected to infrequent, fast-moving, hot wildfires, and these can leave reptile populations in a precarious position near extinction.

Management Strategy B, the proposed action, would lead to the development of a range-wide fire management plan based on established practices that would incorporate fire prevention, suppression and possible mitigation measures.

#### **5.6.16.2 Alternative Actions (Strategy C and Strategy D)**

Management Strategies C and D are identical to the proposed action and, therefore, would have the same potential impacts on wildlife and wildlife habitat as assessed for the proposed action.

#### **5.6.16.3 No-Action Alternative (Strategy A)**

The policy regarding wildfire management currently in use focuses on suppressing wildfire in a cost effective and efficient manner that results in the least amount of fire damage. This policy would not necessarily have the positive effects of the proposed action, relative to the development of a range-wide fire management plan.

### **5.6.17 Perimeter Land Use, Encroachment, and Regional Planning**

#### **5.6.17.1 Proposed Action (Strategy D)**

The proposed action for this resource element, application of Management Strategy D range-wide, would provide more potential benefits to wildlife and wildlife habitats than the other alternatives. This strategy builds on all the other strategies and provides the most exhaustive list of actions to be performed. Beneficial wildlife resource-related actions include interaction and response to adjacent, off-range management policies; monitoring of adjacent land use changes, illegal immigration effects on BMGR natural resources, and adjacent cattle grazing policies; and participation and coordination in local and regional land-use planning and conservation efforts. In addition, this strategy includes identifying threats to off-range resources that may negatively affect BMGR resources, and determining the extent to which BMGR resources are interrelated or dependant on off-range resources. Management of wildlife and wildlife habitats on a regional scale as opposed to just a range-wide scale would provide greater opportunities to assure the longevity and health of BMGR wildlife and wildlife habitats.

#### **5.6.17.2 Alternative Actions (Strategy B and Strategy C)**

Management Strategy B provides the least number of actions and includes only assessing implications of adjacent land use plans and changes to BMGR resources, development and

implementation of management responses to adjacent land use plans, and interaction with off-range land managers as necessary to change or mitigate land use plans that have negative effects on wildlife resources.

Management Strategy C builds upon Strategy B and includes monitoring of off-range land-use related activities, participation in local and regional land use processes, coordination with agencies on conservation matters, and participation in the establishment of regional ecosystem management efforts.

Both of these management strategies provide fewer potential benefits to wildlife and wildlife habitats than the proposed action, but would still be positive.

### **5.6.17.3 No-Action Alternative (Strategy A)**

The no-action alternative would not necessarily result in any of the benefits described for the proposed action. No management strategies are currently in place regarding perimeter land use, encroachment, and regional planning.

## **5.6.18 Aggregate Effects on General Wildlife and Wildlife Habitats**

### **5.6.18.1 Proposed Action**

The comments that were made regarding the aggregate effects of the proposed action on vegetation (Section 5.5.18.1) are also generally applicable to wildlife habitat. As with vegetation, the additive beneficial effects of the proposed action on habitat result from a combination of the effects of use management and resource management objectives would be potentially greater than the effects assessed individually for each of the 17 resource management elements. The proposed road closures represent a 30 percent decrease from the existing BMGR road network or a decrease in terms of aggregate area occupied by the 1,733,921-acre range from 0.47 percent to 0.33 percent. The additive impacts of reducing redundant roads and eliminating associated vehicle-based activities along the closed routes would be greatest within the valley areas where the proliferation of roads and associated disturbance has been most pronounced. Potential disturbance would be further reduced by new provisions regulating camping, wood gathering, waste disposal, numbers of vehicles in a party, recreational shooting, length of visitor stays, etc. As a result, wildlife would generally benefit in localized areas where habitats are restored and intermittent noise and activity are less prevalent. Among the species that may benefit in these areas are Sonoran pronghorn, coyote, rodents, and species conservation elements including the valley bottom reptile guild, Le Conte's thrasher, and kit fox. Aggregate impacts could also benefit the relatively rich assemblage of wildlife species that are reliant on or make use of valley and mountain xeroriparian areas, as the number of roads that dissect these habitats would be

reduced and driving in washes that are not part of the designated road system would be expressly prohibited. The closure of roads near or within mountain passes could benefit large mammals that use these corridors for passage, particularly if there is denied access to a water source or other habitat that is important to individual species. On a range-wide basis, the magnitude of the collected beneficial effects is expected to be low, although moderate benefits may be realized in localized areas.

Some provisions of the proposed action that are particularly relevant to specific species include prohibiting entry to mines, which would protect bat species that roost there. Continuing range-wide prohibitions on wood cutting and removal of wood from the range and prohibiting wood gathering in Unit 1 could benefit small mammals, reptiles, and avian species that may use these wood resources. Funds from a special hunting permit program (if implemented) would be used for the protection, conservation, and management of wildlife and wildlife habitat and could benefit various species. Non-game species (potentially herpetofauna and desert tortoise) could benefit from evaluating non-game species collection and, if indicated, implementing limitations or restrictions on non-game collection activities within the authority of state law. In areas where habitat has been degraded by trespass grazing, habitat quality would be improved by controlling trespass livestock and feral burros; monitoring the quantity of livestock permitted on perimeter grazing allotments; and maintaining a list of names, addresses, and brands of permittees so that owners may be contacted to remove trespass animals when they graze on the BMGR. Implementing up to six high priority wildlife water developments in concert with conducting a thorough literature review and implementing studies of wildlife water developments to assess their effects would be expected to result in a higher potential for beneficial than adverse impacts on wildlife and wildlife habitats in general, and may have particular benefits to species that use the waters that are developed. The management objective to consider the interrelationship of wildlife on the BMGR with off-range resources and identifying threats to those resources has the potential to benefit those populations that cross BMGR boundaries, but are still somewhat localized (small mammals) to highly mobile species such as bighorn sheep, kit fox, and migratory birds and bats.

Various species could benefit from developing a limits of acceptable change resource monitoring and more adaptive, ecosystem management approach if this approach resulted in greater identification and understanding of impacts to wildlife and wildlife habitats and effective management actions were taken to lessen or eliminate such impacts. Other specific management objectives could benefit various species of wildlife including:

- restoring areas where vehicle use has caused excessive surface damage
- restricting utility/transportation corridor development to the development of the Yuma ASH and limited development of the State Route 85 corridor
- redesignating the expired ACECs as special natural/interest areas (and maintaining existing or establishing additional special management provisions, as needed)

- monitoring, surveying and mapping species and habitat to provide reliable and up-to-date scientific information about the status of resources and their response to ongoing military and civilian use of the BMGR
- controlling and/or locally eradicating invasive plant species
- developing a range-wide fire management plan
- increasing perimeter land use, encroachment, and regional planning efforts

### **5.6.18.2 Alternative Actions**

If Management Strategy B were implemented range-wide, there would be fewer potential aggregate beneficial effects and greater potential aggregate negative effects on wildlife and wildlife habitat as compared to the proposed action. Even in aggregate, the magnitude of these effects would be low range-wide, with moderate effects potentially occurring in localized areas. The aggregate effects of this strategy as discussed for vegetation (Section 5.5.18.2) would be similar for wildlife habitat.

Some provisions of Strategy B that have potential for greater adverse effects to wildlife and wildlife habitat as compared to the proposed action, but would not likely be distinguishable from the no-action alternative, include the following: retaining the existing road network (covering 2,229 miles [including the Cabeza Prieta NWR bypass roads] or a surface area of 8,105 acres or 0.47 percent of the total range acreage); allowing vehicle-based camping to occur within 100 feet of existing publicly accessible roads instead of 50 feet; evaluating the feasibility of allowing public entry to mines where such use is compatible with safety and resource protection requirements; and evaluating proposals to develop additional utility/transportation corridors. This alternative also would possibly allow ORV use in designated areas, and future motorized access to currently restricted areas, and building additional recreation use roads. These potential actions would be preceded by additional NEPA analysis, however, which would further evaluate means of reducing adverse effects of their implementation. Further, Strategy B includes a provision to close roads when resource protection requirements so warrant. Collectively, the magnitude of adverse effects from Strategy B would likely be minor on a range-wide basis, but could be slightly more pronounced in localized areas.

Along with this suite of potential adverse effects, Strategy B would have some of the same potential for the positive effects identified for the proposed action (e.g., controlling trespass grazing; surveying for and controlling invasive species; implementing restoration efforts in areas damaged by past military, agency, or intensive public use; conducting surveys of special status species and implementing habitat improvements in support of endangered species recovery plans; and developing a sound range-wide fire management plan). Like the aggregate negative impacts, the collective magnitude of such beneficial effects would likely be minor on a range-wide basis, but could be slightly more pronounced in localized areas.

This strategy would not, however, include other potentially beneficial wildlife management elements of the proposed action including monitoring ecological recovery and trends in high and low use areas; expanding public education programs; developing a limits of acceptable change ecosystem monitoring system and adaptive monitoring program within the context of the greater Sonoran Desert Ecoregion; identifying key areas (e.g., pronghorn concentration areas, fawning grounds, and wildlife corridors) and implementing restrictions needed to protect and conserve them and their habitat; and assessing the importance and character of recreational shooting as an activity/issue to determine the appropriateness of this activity on the BMGR and implement a decision based on the findings. The former ACECs, SRMAs, and the Backcountry Byway would not be redesignated as special/natural interest areas and would be managed without special provisions. With regard to wildlife management, one of the biggest differences between Strategy B and the proposed action concerns the approach to wildlife water developments. Unlike the proposed action, Strategy B would authorize the implementation of all prescribed wildlife water developments without conducting a thorough review of the literature that would assess their benefits and potential adverse effects. To the extent that the studies and evaluations of the proposed action would provide new information that would lead to an adjustment in management to benefit general wildlife and wildlife habitat, this strategy could be less beneficial than the proposed action.

For these reasons, when taken together the overall conclusion is that for wildlife and wildlife habitat, the range-wide implementation of Strategy B would be somewhat less beneficial than the proposed action. Relative to the no-action alternative, the aggregate effects of Strategy B would be similar.

The aggregate effects on wildlife and wildlife habitat that would occur if Management Strategy C were implemented range-wide would be similar to those for the proposed action, but with a few notable exceptions. The proposed action involves the development of an ecosystem monitoring system within the context of the greater Sonoran Desert Ecoregion whereas Strategy C does not. Strategy C does not include a provision to temporarily restrict vehicular and construction activities to prevent soil erosion or to promote restoration of areas where vehicle use has caused excessive surface damage, objectives that may offer benefits for the quality of affected habitats. Finally, this strategy would not determine the extent to which BMGR resources are interrelated or dependent upon off-range resources, or identify threats to off-range resources that might negatively affect wildlife on the BMGR. The aggregate effect of Strategy C may therefore not be quite as beneficial to wildlife or wildlife habitat as the proposed action, but would provide management improvements relative to the no-action alternative.

The aggregate effects of Strategy D as discussed for vegetation (Section 5.5.18.2) would be similar for wildlife habitat. The additive potential beneficial effects of implementing Strategy D range-wide may be minimally greater than those that would occur if the proposed action were implemented. There would be 107 more miles of roads closed, allowing natural or augmented revegetation for an estimated surface area of 390 acres. On a range-wide basis, the surface area

occupied by roads would be 0.31 percent of the range as compared to 0.33 percent under the proposed action and 0.47 percent under the existing condition. Vehicle-based camping would be limited to 7 consecutive days within a 28-day period before a special use permit was required, instead of a limit of 14 days, which could be of some short-term benefit to wildlife and wildlife habitat. Under Strategy D, a petition to close the BMGR to non-game species collection would be submitted to the Arizona Game and Fish Commission, rockhounding would be prohibited, and no future utility/transportation corridors would be permitted. Perhaps the biggest difference between Strategy D and the proposed action with regard to wildlife management practices concerns wildlife water developments, which (under Strategy D) would be suspended for the first five years of the INRMP in order to allow time for a literature review and further study of the issue. Under the proposed action, up to six high-priority water developments would be allowed during the first five years of the INRMP. Suspending rather than allowing wildlife developments during the first five years of the INRMP may be less beneficial to some targeted species and other species that could benefit from the six waters. Although there are some 40 existing wildlife water developments that are currently available to these species throughout the BMGR, the new carefully considered water developments could be of benefit to some species that are potentially at risk of serious decline in the event of an extended drought. On the other hand, any negative impacts that could occur in association with the up to six wildlife water developments that could be implemented under the proposed action, including those related to construction activities and perceived negative impacts from predation, competition, direct mortality, and disease would not occur.

When considered together, the conclusion that can be drawn for wildlife and wildlife habitat is the consequences of Strategy D would be similar to those of the proposed action.

### **5.6.18.3 No-Action Alternative**

The selection and implementation of the no-action alternative in place of the proposed action would result in the continued management of natural resources under guidance from the Goldwater Amendment, HMPs, and various compliance decisions. The provisions of these plans, as modified to comply with the requirements of the Sikes Act, would be adopted by DoD agencies. The aggregate effects of the no-action alternative would differ from those of the proposed action in terms of both public use and access, and resource management. These existing plans as they pertain to wildlife and wildlife resources, to a large extent, focus on single-species management (high priority species, such as Sonoran pronghorn and desert bighorn sheep), rather than biodiversity and ecosystem management principles. In terms of resource management, there would be less monitoring and adaptive management based on key indicators of environmental health than under the proposed action. All of the former special management areas would be redesignated as special natural/interest areas and applicable special management provisions would be retained. The need for a special hunting permit program that requires payment of nominal fees to be used for the protection, conservation, and management of wildlife

including habitat improvement and related activities on the BMGR would not be assessed nor would any related action be taken. The effects of non-game species collection on wildlife, habitat, and other resources would not be evaluated nor would any related action be taken. .

In terms of type of use, this alternative would have similar consequences as assessed for Strategy B, with a few exceptions. Road closures could eventually be implemented under this alternative, as a transportation plan is finalized and roads not meeting military, agency, or public needs are closed. The extent of the effects of this future action cannot be foreseen. Also, unlike Strategy B, the no-action alternative does not include an evaluation of and potential to designate ORV use areas or allow public entry to mines.

As compared to the proposed action in aggregate, the no-action alternative would not be as potentially beneficial to wildlife and wildlife habitat as the proposed action because those elements of the proposed action that may offer additional benefits are not included in this strategy. However, in aggregate, the no-action alternative is regarded as being generally protective of wildlife and wildlife habitats.

## **5.7 PROTECTED SPECIES**

### **5.7.1 Resource Inventory and Monitoring**

#### **5.7.1.1 Proposed Action (Strategy D)**

The proposed action for resource inventory and monitoring is to implement Management Strategy D range-wide. The discussion of the effects of the proposed action on general vegetation (Section 5.5.1.1) and general wildlife and wildlife habitats (Section 5.6.1.1) is also applicable to protected species.

In essence, the proposed action would provide better information about protected species on the BMGR and the elements important to their protection and preservation. In addition to implementing a system that sets limits of acceptable change and uses adaptive management, the proposed action also recommends development of a monitoring system that integrates with existing monitoring and management activities within the greater Sonoran Desert Ecoregion. This would allow for management of protected species in a landscape context, and provide a better basis for coordinating management with managers of lands adjacent to the BMGR.

Of the protected plant species in Arizona, four species that are considered “Highly Safeguarded” (including acuña cactus, Peirson’s milkvetch, sand food, individual crested saguaros) reportedly occur on the BMGR. Several others that occur on the range and are also protected from salvage or harvest by the Arizona Native Plant Law are listed in Section 4.7.1.3. Wildlife species that are protected by federal law and/or listed by the state as Wildlife of Special Concern in Arizona and

confirmed on the range include Sonoran pronghorn, lesser long-nosed bat, California leaf-nosed bat, peregrine falcon, flat-tailed horned lizard, Cowles fringe-toed lizard, and the Sonoran population of the desert tortoise (see Table 4-19 for other protected species potentially present on the BMGR). These protected species would benefit most directly from the proposed action because of the surveys and monitoring activities it would institute. The location and abundance of protected species (data that, for some of these species, are outdated or unavailable) would be determined, and that information could be used to update maps and databases. Besides focused surveys targeted at the more uncommon species, increased monitoring for ecological trends and recovery could benefit those species that are more common but vulnerable to salvage, poaching, or other sources of disturbance (e.g. cacti, ironwood, mesquites, and herpetofauna).

### **5.7.1.2 Alternative Actions (Strategy B and Strategy C)**

Strategy C is the same as the proposed action except that it does not promote the integration of monitoring and management plans for BMGR with those of the greater Sonoran Desert Ecoregion, and would not compare the ecological trends between low-use and high-use locations. For federally protected and state listed species, this implies that they would be viewed as isolated populations, instead of considering them in relation to populations in the surrounding region. This would have management implications because it could lead to an under-estimation of the population size of protected species, and misunderstanding of their range and distribution.

In contrast to the proposed action, Strategy B involves compliance-driven monitoring and an evaluation of the effectiveness of compliance actions. It would include wildlife inventories and monitoring for game and non-game species, as well as for rare, threatened or endangered plant and animal species. This would still provide up-to-date information about protected species, but would not consider the species in a broader, regional context. An example of one protected species that would likely benefit is the acuña cactus, because monitoring under this strategy would likely include areas where, during a 1997 study in BMGR-East, a single acuña cactus was reported, plus the two populations reported present one-third mile south of the BMGR boundary. Some protected wildlife species in the BMGR vicinity require large home ranges, and may include areas inside and outside the BMGR boundary. For example, California leaf-nosed bat individuals have been reported as having foraging areas ranging from 0.73 to 47.3 square kilometers (Dalton 2001) and migratory birds have much farther-reaching ranges. Such protected species would benefit from management in a regional context, and in ways that may be overlooked otherwise.

### **5.7.1.3 No-Action Alternative (Strategy A)**

The no-action alternative (Strategy A) is focused on single species, compliance-driven monitoring. Inventory and monitoring of biological resources would address the occurrence of

protected species on the BMGR and the potential effects on those species, as required by law or through consultation with the USFWS. While this information would still be valuable, it would be less comprehensive and potentially less beneficial than as would potentially be obtained through the proposed action.

## **5.7.2 Special Natural/Interest Areas**

### **5.7.2.1 Proposed Action (Strategy C)**

The proposed action (to apply Strategy C range-wide) would redesignate the three former ACECs and the Flat-tailed Horned Lizard HMA as “special natural/interest areas,” but allow the SRMAs and Backcountry Byway to expire without any special designation. The Gran Desierto Dunes have the following protected species associated with them: Peirson’s milkvetch, sand food, flat-tailed horned lizard, and Cowles fringe-toed lizard. The Mohawk Mountains and Sand Dunes have these protected species: sand food, California leaf-nosed bat, Cowles fringe-toed lizard, and Sonoran pronghorn. The Tinajas Altas Mountains ACEC contains populations of elephant tree, Bigelow beargrass, and Davis Plain ironwood, all of which are protected from salvage/harvest by the Arizona Native Plant Law. The redesignation of these ACECs and the Flat-tailed Horned Lizard HMA would be potentially beneficial to the species listed because it is expected that there would be less tolerance for deterioration or damage in the special natural/interest areas than in other areas of the BMGR. Presumably, the monitoring and adaptive management program would have increased attention focused on these areas that could be more effective in protecting federally protected and state listed species than existing programs for these areas. The proposed action would also evaluate the potential for altering existing or establishing additional special natural/interest areas, which would be beneficial if new populations of protected species were included in such new special natural/interest areas.

The two SMRAs that would be permitted to expire without being granted any special designation are not currently open to public access, and their current designation stems from the presence of geologically outstanding volcanic formations. The desert tortoise (Sonoran population), listed as Wildlife of Special Concern in Arizona, has been noted to occur within the Crater Range SRMA (Dames & Moore 1996a). Other state listed and/or federally protected species may occur within the SRMAs or along the Backcountry Byway, but none are known to occur in these areas.

### **5.7.2.2 Alternative Actions (Strategy B and Strategy D)**

The alternatives to the proposed action (Strategies D and B) both include the redesignation of the Flat-tailed Horned Lizard HMA, which would benefit not only the flat-tailed horned lizard but also the protected plant species associated with the dunes (sand food, and Peirson’s milkvetch). Strategy B would potentially be less protective of special-status species than the proposed action,

because it would allow the ACECs, SRMAs, and Backcountry Byway to expire without assigning them any special designation, leading to their management without any special provisions. Federally protected and state listed species in the Mohawk Mountains and Sand Dunes ACEC and the Tinajas Altas Mountains ACEC could be negatively affected in particular, because both areas are (at least in part) accessible for outdoor recreation but would not be afforded any special management attention or any additional protection that could be provided through specific management provisions for designated special natural/interest areas. However, management objectives under the other 16 resource categories would limit or restrict activities in a similar manner to the existing management prescriptions for these areas (e.g., with regard to motorized access and wood collection). Contrary to the proposed action, Strategy D could benefit protected species that may occur within the expired SRMAs and Backcountry Byway as they would potentially receive more management attention and special management provisions could be implemented under the special natural/interest area designation (although the only protected species currently identified as occurring within these areas is the desert tortoise).

### **5.7.2.3 No-action Alternative (Strategy A)**

Under Strategy A, the designations and applicable special management provisions of existing ACECs, SRMAs, the HMA, and the Backcountry Byway would be retained. Protected species on the BMGR would be treated as they are currently. As compared to the proposed action, the no-action alternative protects special-status species by limiting disturbance within the SRMAs and Backcountry Byway in addition to the ACECs and HMA. However, unlike the proposed action, the no-action alternative does not include a provision for altering existing or establishing additional special natural/interest areas.

## **5.7.3 Motorized Access and Unroaded Area Management**

### **5.7.3.1 Proposed Action (Strategy C)**

Protected species may be particularly vulnerable to some stressors, because their scarcity, habitat requirements, and declining numbers may make it difficult or impossible for them to successfully respond to changes in their environment. Roads, which tend to reduce the average size of undisturbed areas and introduce associated sources of disturbance (e.g., roadside vehicle-based camping, wood collection, etc.), may create the same set of challenges for protected species that were discussed in Sections 5.5.3.1 and 5.6.3.1 for wildlife and vegetation in general. Collision with vehicles, competition from non-native species, poaching and other illegal activities, habitat degradation, and the alteration of the natural fire regime all are threats that are potentially introduced or exacerbated by roads. The road closures and changes to the number of unroaded areas that would result from the proposed action have already been presented in detail under the other resource categories. To summarize, the result would be that 658 miles or 30 percent of

existing roads would be closed in total (or a decrease in terms of aggregate area occupied by the 1,733,921-acre range from 0.47 percent to 0.33 percent).

The impact that such changes to motorized access and unroaded area management would have on those species listed in Table 4-19 that have not been found and are not expected to be found on the BMGR are not assessed. It is difficult to predict the potential impact to other species listed in Table 4-19 that are highly mobile (e.g., peregrine falcon) and may occur within multiple management units and natural community types. For others that may be present on a seasonal basis, like the lesser long-nosed bat, impacts that are incurred off-range during the rest of the year would probably have more effect on their overall health than would the roads on the BMGR. In the case of some protected species (particularly plants like the acuña cactus or Peirson's milkvetch), only one or very few individuals have ever been found on the BMGR so more information about their range-wide distribution and occurrence is required before the effect of the proposed and alternative actions can be clearly understood. Of those protected species that have been reported on the BMGR, many would likely benefit somewhat from the changes to motorized access and unroaded area management that are inherent in the proposed action. The protected species that would potentially benefit most from the proposed action include the following:

- **Sonoran Pronghorn.** The proposed action for motorized access and unroaded areas would probably benefit these animals. It is estimated that 41 percent of the current Sonoran pronghorn range occurs on the BMGR, with 2 percent occurring in Management Unit 2, 11 percent occurring in Management Unit 3, 13 percent occurring in Management Unit 4, and 15 percent occurring in Management Unit 5. About 32 percent of the current Sonoran pronghorn range within the BMGR is in areas that are generally open to public access (that portion within Units 2 and 3 and the road open to the public in Unit 4); the remainder is within areas that are closed to public access.

With the proposed action, an estimated 125 miles of road within the current Sonoran pronghorn range would be closed. These road closures are generally consistent with the current biological opinions for the Air Force and Marine Corps for Sonoran pronghorn, which require appropriate road closures within Sonoran pronghorn range to be determined through the INRMP planning process. These road closures represent a 19 percent reduction within the current distribution of Sonoran pronghorn in the BMGR (the total road mileage would be reduced from about 650 miles to about 530 miles). The current distribution, shown in Figure 4-16, encompasses about half of the BMGR—East and the easternmost portion of the BMGR—West, not the location of the subject roads in relative terms of Sonoran pronghorn observations or the range of the remaining Sonoran pronghorn population (estimated at 21 animals in December 2002).

It is thought that only major highways like Interstate 8 or State Route 85 act as barriers to Sonoran pronghorn movement, because of their high traffic volume and higher vehicle

speeds (USFWS 1998a). Perimeter fencing, which is associated with both the Interstate 8 and State Route 85 corridors, may also impede movement. Most of the roads that are slated for closure under the proposed action, however, are used relatively infrequently, and are not regularly maintained. These types of roads are not likely to interfere with the movement of Sonoran pronghorn, except when individuals temporarily avoid a road when they encounter vehicles moving on it. Krausman and others (2001) found an association between ground stimuli (including the presence of vehicles or people in the vicinity of Sonoran pronghorn) and changes in the behavior of Sonoran pronghorn (instantaneous changes in behavior were observed with 39 percent of all ground stimuli events observed, with 2.6 of these involving a change to trotting or running). Although these changes were found to not likely influence animals in a detrimental manner, the closure of roads within the habitat types frequented by this protected species would potentially be beneficial because it would reduce encounters between humans and Sonoran pronghorn, and would help protect the habitat from any associated disturbance.

Sonoran pronghorn winter in the valley floors and bajadas and move upslope as far as the foothills in the summers (USFWS 1998a). They use creosotebush habitats for forage, particularly during the spring, and most of the road closures under the proposed action within Sonoran pronghorn range would be within this habitat type. During fawning, females move up into the bajadas where vegetation can better protect fawns from predation and if the proposed action were implemented, there would also be some roads closed within the Mohawk Mountains occurrence of this habitat type within the current area of distribution of Sonoran pronghorn. The relatively dense vegetation found within desert riparian habitats provides forage, shade, and cover while providing movement corridors. The entire occurrence of the valley bottom floodplain natural community on the BMGR is within the current distribution of Sonoran pronghorn. Within this habitat type, about 10 miles of roads would be closed, which represents a reduction of about one half. The proposed action would result in closure of approximately 8 miles of roads in the valley xeroriparian scrub range wide, which occurs with relative frequency in the current range of Sonoran pronghorn. This habitat is thought to provide important thermal cover for this species, particularly during the hot, dry summer months.

It is estimated that 19 unroaded areas greater than 3,000 acres in size would be within the current area of distribution of the Sonoran pronghorn, which would also contribute to the protection of Sonoran pronghorn because the maintenance and conservation of large tracts of undisturbed habitat would reduce the influence of disturbance on this species.

- **Desert Tortoise (Sonoran Population).** This species may be affected by roads if animals are killed by collisions with vehicles, if roads provide access for poachers, or if their habitat is degraded by a proliferation of non-native species or destroyed by physical disturbance or fire. The Sand Tank Mountains support a relatively large population of tortoises compared to the other BMGR mountain ranges surveyed, but less than one mile

of road closures are proposed in that habitat. The paloverde-mixed cacti-mixed scrub vegetation type found on bajadas and rocky slopes of the BMGR in some portions of the BMGR is frequented by desert tortoise, and there would be closure of 19 miles of roads in the bajadas (a decrease of less than 10 percent) under the proposed action. There are currently only about 4 miles of roads in the rocky slope portion of this natural community, and none of them are slated for closure under the proposed action or any of the alternatives. The proposed action is therefore likely to have minor, if any, beneficial effects on this species.

- **Lesser Long-Nosed Bat and California Leaf-Nosed Bat.** The lesser long-nosed bat is likely to use the BMGR for forage during the summer in the BMGR—East uplands. It frequents the same natural community types as the desert tortoise, so it may derive some minor benefit from the road closures planned therein. The California leaf-nosed bat is a year-round resident and is found throughout the BMGR, especially in the Fortuna Mine area of the Gila Mountains, northern Lechuguilla Desert, Copper Mountains, and Mohawk Mountains. These bats are likely to derive benefits from the proposed road closures, because they would improve the quality of their habitat and prevent motorized access and associated activities to their roost sites, which are subject to vandalism.
- **Flat-Tailed Horned Lizard and Cowles Fringe-Toed Lizard.** Like many of the other protected species mentioned above, lizards are most likely to be affected by roads through vehicle-caused mortality, and general degradation of their habitat caused by roads and associated uses. The flat-tailed horned lizard occurs in the extreme western portion of BMGR within Unit 1. Under the proposed action, an estimated 67 miles of road closures are within flat-tailed horned lizard habitat in the northwestern portion of the BMGR (a 28 percent reduction from the current estimated 240 miles of road within flat-tailed horned lizard habitat). Remaining roads within flat-tailed horned lizard range, but outside of a restricted military use area, would be restricted to government use only.

The Cowles fringe-toed lizard occurs in both the Mohawk and Gran Desierto dunes. There are currently only 3 miles of roads within these areas located along the international border in the southern U.S. extent of the Gran Desierto Dunes and across the southern Mohawk Dunes, extending eastward from Marine Corps Ground Support Area 67. Under the proposed action, these roads would be restricted to government use only. Maintenance of existing blocks of unroaded areas of 3,000 acres or more would provide some benefit to these lizards in both dune environments because both are located within sufficient unroaded areas that would be conserved under the proposed action as long as compatible with the military mission.

- **Protected Plant Species.** Roads may affect protected plant species in the same general ways that have been previously explained for other vegetation on the BMGR (Section 5.5.3.1). Plant species listed as salvage restricted, salvage assessed, or harvest restricted

in Section 4.7.1.3 are protected by the Arizona Native Plant Law, indicating that they have been shown to be vulnerable to harvest or salvage and roads can provide a means of access. Construction of new roads (which may occur in Unit 2 under the proposed action) would likely include clearing of vegetation and the introduction of road effects that were previously not experienced in that location. The locations of the four protected plant species listed in Table 4-19 have not all been determined with any certainty, however, roads are not currently considered to be a threat to sand food or acuña cactus and further information about the occurrence and distribution of Peirson's milkvetch and individual crested Saguaros would be necessary to understand in detail the potential impacts caused by the proposed action. In general, however, these protected plant species are likely to experience the same benefits from the proposed action that have been previously described.

### **5.7.3.2 Alternative Actions (Strategy B and Strategy D)**

Under Strategy B, some 652 miles of roads within the current distribution of the Sonoran pronghorn would remain open, without the proposed closure of 125 miles of roads. In addition to there being fewer benefits for this subspecies, the Air Force and Marine Corps would not be complying with the terms of the current Biological Opinion for Sonoran pronghorn. The flat-tailed horned lizard would not benefit from the 67 miles of road closures within this species' range in the northwestern corner of the BMGR or the restriction of roads within publicly accessible areas of flat-tailed horned lizard range to government use only. The California leaf-nosed bat would also not potentially benefit from the road closures in the vicinity of the Gila Mountains, northern Lechuguilla Desert, and Mohawk Mountains.

Strategy D would involve more restricted public access than Strategy D and, like the proposed action, includes a management objective to conserve unroaded areas of 3,000 acres or more. Within the current area of distribution of Sonoran pronghorn, an additional estimated 50 miles of road would be closed for a total of about 175 miles of road closures within this area (27 percent of all roads within Sonoran pronghorn range would be closed versus 19 percent under the proposed action). Within flat-tailed horned lizard habitat, an additional estimated 2 miles of road would be closed for a total of about 69 miles of road closures (a difference of one percentage point in comparison to percent of roads within this habitat that would be closed under the proposed action).

### **5.7.3.3 No-Action Alternative (Strategy A)**

The no-action alternative (Strategy A range-wide) would not necessarily provide the benefits to federally protected and/or state listed species that would occur under the proposed action, because the entire existing road network would be retained, and there would be no provision for

maintaining blocks of unroaded areas of 3,000 acres or more. However, in accordance with the Goldwater Amendment, the construction of new roads would be minimized and eventually the transportation plan would be finalized and implemented. If the biology of protected species were carefully considered in this process, some beneficial results similar to those described for the proposed action may be incurred.

#### **5.7.4 Camping and Visitor Stay Limits**

The same general principles regarding camping and visitor stay limits that are discussed in General Vegetation (Section 5.5.4) and General Wildlife and Wildlife Habitats (Section 5.6.4) apply here for federally protected and/or state listed species. The proposed action (Strategy C range-wide) would generally reduce the area affected by camping, and continue to limit the duration of any effects that may occur to protected species as a result of habitat disturbance that may be caused by vehicles and associated activity. Some protected species may be afforded specific protection under the proposed management objectives that would require all campsites to be more than ¼-mile away from designated natural resources that are sensitive to impacts arising from human-induced disturbance and similarly may restrict camping along certain road segments. Prohibiting camping near areas that either host protected species, or are important to them, would potentially benefit all affected protected species that occur in those areas in varying degrees. Moderate benefits could occur in some instances, such as restrictions in an area that support acuña cactus or near a roost site for lesser long-nosed bat and/or California leaf-nosed bat, or in the vicinity of a Sonoran pronghorn forage enhancement site. By comparison, Strategy A (the no-action alternative) and Strategy B (an alternative action) do not have either of these requirements, and therefore, the benefits that could be realized under this resource element are judged to be less beneficial to protected species. Strategy D would have the same benefits as the proposed action. It could also have minor additional benefits on protected species from limiting the maximum visitor stay to 7 consecutive days within a 28-day period, rather than 14 consecutive days.

#### **5.7.5 Recreation Services and Use Supervision**

##### **5.7.5.1 Proposed Action (Strategy C in Unit 2 and Strategy D in All Other Units)**

The same general principles regarding camping and visitor stay limits that are discussed in General Vegetation (Section 5.5.5) and General Wildlife and Wildlife Habitats (Section 5.6.5) apply to federally protected and state listed species. The proposed action is to apply Management Strategy D in all Management Units except Unit 2, which would adopt Strategy C. Both proposed actions continue to prohibit public ORV travel and on- and off-road racing. The continued preclusion of these intensive-use types of recreation would be protective of federally protected and state listed species and their habitat located throughout publicly accessible portions

of the BMGR. The proposed action would also restrict motorized public travel in all washes, except where the wash is a designated part of the road system open to the public and is dry. The result would be to reduce public access to valley xeroriparian scrub habitat, which includes plant species that are vulnerable to salvage or harvest and are therefore protected by the Arizona Native Plant Law (e.g. blue paloverde, ironwood, cacti, honey mesquite). Sonoran pronghorn are known to use washes for thermal cover, particularly during the hot, dry summer months. Xeroriparian areas are also important habitat for protected birds that may occur on the BMGR, including migratory birds. Requiring the retention of a minimum number of law enforcement officers would continue to ensure that there would be personnel to prevent/deter visitors from violating rules regarding federally protected and/or state listed species (e.g., more law-enforcement officers to prevent poaching of ironwood or desert tortoise). Both proposed actions also prohibit entry to mines, which here would help insure the protection of the federally endangered lesser long-nosed bat, and the state listed California leaf-nosed bat. Other minor benefits to federally protected and/or state listed species may be derived from the proposed increase in public education information programs, the assessment of the need for additional gates, fencing or signs, and the development and implementation of limits-of-acceptable change monitoring to guide recreation use management and protect natural resources.

#### **5.7.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

The general effects of adopting alternative actions for recreation services are listed in Sections 5.5.5.2 (General Vegetation) and 5.6.5.2 (General Wildlife and Wildlife Habitat) and many of those principles also apply to federally protected and state listed species, particularly with respect to the following:

- ORV travel
- Motorized public travel in washes
- Group size requirements for a special use permit
- Entry to mines

Ineffective enforcement of ORV travel prohibitions (which would be more likely to occur under the alternative actions than the proposed action due to a fewer minimum number of law enforcement positions and, with Strategy B, retaining existing signing and public education and recreation use information programs) and opening areas to ORV use (as is a potential with alternative Strategy B) have the potential to negatively affect federally protected and/or state listed species. Such effects could result from the direct physical damage that can be associated with ORV activities, and the indirect effects from increased invasion by non-native pest plant species (e.g. Sahara mustard) and/or disease-causing pathogens. The specific effects of such actions would be dependent upon the location of any designated or illicit ORV use area.

Some types of ORV travel in areas adjacent to the range are associated with sand dunes (e.g., Imperial Sand Dunes Recreation Area). The Yuma Dunes on the BMGR, which host federally protected species such as Peirson's milkvetch and state listed species such as flat-tailed horned lizard and sand food, are currently inaccessible to public use. The Cowles fringe-toed lizard, which is listed as a Wildlife of Special Concern in Arizona, occurs in the Mohawk Dunes, an area open to public use. Illicit ORV use in this area could have adverse effects on this species. The establishment of an ORV use area within these dunes would be unlikely under any alternative due to the environmental incompatibilities, including the occurrence of Cowles fringe-toed lizard. Similarly, outside of dune environments, ORV travel has been cited as a contributing cause for the decline in the desert tortoise (Sonoran population), which is listed as a Wildlife of Special Concern in Arizona.

Management Strategy B would also allow motorized public travel in dry, designated washes and potentially have negative impacts on federally protected and/or state listed species that occur in xeroriparian habitats (see Section 5.7.5.1). Under Strategy B, public entry to mines would be evaluated to determine if such entry would be compatible with safety and resource protection requirements. Because it is regarded as unlikely that use of mines would be allowed where federally protected and/or state listed species occur, impacts to species such as the lesser long-nosed and California leaf-nosed bats are not predicted.

The number of vehicles allowed in a single group before a special use permit is required varies from 10 (Strategy D), to 20 (Strategy C) to 30 (Strategy B). Although regarded as a minor distinction between the potential consequences of these strategies, the larger the number of vehicles per group, the greater the potential for damage to federally protected and/or state listed species and their habitat.

### **5.7.5.3 No-Action Alternative (Strategy A)**

The no-action alternative (Strategy A) would prohibit public on- and off-road racing as well as ORV travel, and that would be of general benefit to protected species for the reasons already discussed. It would, however, allow motorized public travel in dry streambeds and wash bottoms, which could negatively affect protected plants in the valley xeroriparian scrub habitat that are subject to salvage (e.g. paloverde, ironwood, cacti, mesquite). Protected wildlife species that frequent washes, such as the Sonoran population of the desert tortoise, Sonoran pronghorn (which seeks thermal cover in washes) and migratory birds are also at risk if vehicles are allowed to drive in washes. The no-action alternative would permit a single party to have as many as 50 vehicles before triggering the requirement for a special use permit, and this has the potential to create negative impacts upon protected species for the reasons discussed above. Compared to the other management strategies, the no-action alternative would also result in some reduced level of law enforcement, signs, fencing, gates, and environmental education, all of which could translate into reduced protection for federally protected and/or state listed species.

### **5.7.6 Rockhounding**

The same general principles regarding rockhounding that were discussed in General Vegetation (Section 5.5.6) and General Wildlife and Wildlife Habitats (Section 5.6.6) apply here for federally protected and state listed species. Rockhounding activity is unlikely to have much direct impact upon any federally protected or state listed species on the BMGR.

### **5.7.7 Wood Cutting, Gathering, and Firewood Use and Collection of Native Plants**

The same general principles regarding Wood Cutting, Gathering, and Firewood Use and Collection of Native Plants that were discussed in General Vegetation (Section 5.5.7) and General Wildlife and Wildlife Habitats (Section 5.6.7) apply here for federally protected and state listed species. Under all the Management Strategies, plants listed in the Arizona Native Plant Law (including plant parts, seeds, or fruit) would be prohibited from collection under this action (but not the use of dead wood for permissible campfires as is specifically exempted in the law). The main difference between the proposed action (Strategy D in Unit 1 and Strategy C within the remaining Units), and the alternatives centers around what kind of wood may be cut, collected, or burned. All management strategies would allow for wood for campfires, except that native wood fires would be prohibited within Unit 1. Wood (standing, or dead and downed) provides important habitat (e.g. refugia, nest sites, roosts) for insects, lizards, raptors, nesting birds, and small mammals, which may be federally protected or state listed species themselves, or which act as a food source for those higher up the food chain. The application of alternatives B or C to Unit 1 would permit wood collection (and wood cutting under Strategy B) in the former Tinajas Altas Mountains ACEC, where these actions are currently prohibited. This has the potential to negatively affect the Davis Plain ironwood population, which occurs in this former ACEC and has been subject to illegal over-harvesting in the past despite its protected status. However, under Strategy B wood cutting and collection could be restricted if a compliance issue arises, and under Strategy C native wood supplies would be monitored in high-use areas and wood collection would be restricted if resource conditions dictate. The no-action alternative would permit firewood collection in areas outside of ACECs, with no provision to monitor wood supplies in high-use areas and restrict wood collection if resource conditions dictate.

### **5.7.8 Hunting**

The discussion regarding hunting in General Vegetation (Section 5.5.8) and General Wildlife and Wildlife Habitats (Section 5.6.8) also applies for potential consequences to federally protected and/or state listed species. All the Management Strategies would continue existing game

management programs, and all strategies except the no-action alternative would assess the need for a special hunting permit program. Protected species on the BMGR would likely benefit to a minor degree from the special hunting permit program, if implemented, because it would potentially provide funding that would be used for general habitat protection, conservation, and management of wildlife, including habitat improvement and related activities. Under alternative Strategy D, the Arizona Game and Fish Commission may be petitioned to close the BMGR to non-game species collection, and this may directly benefit some federally protected and/or state listed species (e.g., herpetofauna including the Sonoran population of the desert tortoise) from collectors and trophy hunters. In contrast, Strategy B and C would first evaluate the effects of non-game species collection and limit or restrict collection activities within the authority of state law, which would provide similar benefits. Strategy A would not address this issue at all, so any associated effects to federally protected and/or state listed species would continue.

### **5.7.9 Recreational Shooting**

The discussion regarding recreational shooting in General Vegetation (Section 5.5.9) and General Wildlife and Wildlife Habitats (Section 5.6.9) is also relevant for protected species. It is important to emphasize that the proposed action (Strategy C) considers designating specific shooting areas within the range. This would potentially have minor benefits to any federally protected and/or state listed species that currently is being impacted by this activity, as long as dispersed recreational shooting was disallowed in place of providing for recreational shooting in designated areas and that the designated areas are not located where greater effects to federally protected and/or state listed species could occur.

### **5.7.10 Utility/Transportation Corridors**

The discussion of utility/transportation corridors in Section 5.5.10 (General Vegetation) and Section 5.6.10 (General Wildlife and Wildlife Habitats) also applies to protected species. The Yuma ASH, which would be built under all Management Strategies except Strategy D, has the potential to affect the flat-tailed horned lizard and its habitat because it passes through the western edge of the Flat-tailed horned lizard HMA. The fact that lizards are attracted to blacktop for basking places them at risk from vehicular traffic. These effects, however, are being addressed in detail in separate NEPA documentation. Strategy D would be most protective of special status species, because it would not allow clearing of vegetation in undisturbed areas for the establishment of new corridors, including the Yuma ASH.

## **5.7.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

### **5.7.11.1 Proposed Action (Strategy C)**

If Management Strategy C is implemented as the proposed action, it would likely have a beneficial effect on protected species. The development of a program to control all trespass grazing would potentially benefit all protected species, including acuña cactus, which can be trampled by livestock. Also, livestock grazing can alter vegetation and compete with/act as a deterrent to use for forage by Sonoran pronghorn. Livestock grazing is also associated with the spread of invasive species, which can spread and reach densities to carry fire, which could further harm protected species. The objectives to establish criteria for protection of important habitat; to implement restrictions in key areas to protect and conserve habitat; and to restore areas that have been damaged by a discontinued military, agency, or intensive public use would likely directly or indirectly benefit protected species. The identification and control of invasive species would generally benefit all protected species, as these species alter natural habitats and are a noted source of stress for listed species including the Sonoran population of the desert tortoise and Cowles fringed-toed lizard.

In addition, the proposed action would allow the implementation of up to six high-priority water development projects and thoroughly evaluate the need to establish more water developments in the future. Of the 17 remaining wildlife water development projects identified in the HMPs, only one was proposed in the draft Barry M. Goldwater East HMP for the benefit of Sonoran pronghorn. It is not known whether or not this water would be selected as one of the six high priority waters; however, if it were selected and implemented, Sonoran pronghorn would potentially benefit. Other waters are being established for the benefit of Sonoran pronghorn as part of a Sonoran pronghorn forage enhancement project and through the use of temporary waters, for which there was documented use during the summer of 2002. Under the forage enhancement program, which will be implemented independent of this IRNMP, feestanding water will be provided on a temporary basis at five of the test sites to evaluate the value of water in supporting Sonoran pronghorn survival and fawn recruitment. While some studies have suggested an increased predation rate associated with wildlife water development, data on predation rates on Sonoran pronghorn at water developments versus unwatered areas are lacking (Rosenstock and others 1999). According to the AGFD, none of the 17 documented mortalities of collared Sonoran pronghorn has occurred within three miles of a water source (U.S. DoD, MCAS Yuma 2001). Thus, the conclusion is that the development of the six new waters is likely to have no effect on this protected species. Regardless of where the up to six wildlife waters are located, federally protected and state listed bat species may also use wildlife water developments.

### **5.7.11.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would only differ from the proposed action in that it would not identify key areas for protection and conservation and not continue in-depth research to review the need to install more water developments in the future. In comparison to the proposed action, Strategy B would have similar potential for benefiting federally protected and state listed species with regards to objectives that would control trespass grazing and develop a system to deal with invasive species. Both alternative actions would generally be protective of federally protected and/or state listed species, although under Strategy B key areas for wildlife and wildlife habitats of particular significance (possibly including key areas for federally protected and/or state listed species) would not be afforded any special protection. Among the waters to be implemented would be the Sonoran pronghorn water development project identified in the draft Barry M. Goldwater East HMP, which would potentially benefit Sonoran pronghorn. In addition, the 17 wildlife waters that would be implemented with this Strategy B (over the 25-year term of the INRMP) would be based on existing planning documents without necessarily incorporating the findings of additional research and study that is called for under the proposed action. Thus, if there are beneficial or adverse impacts to a federally protected and/or state listed species from wildlife water developments, these effects might be less understood in comparison to the proposed action. However, as with any action a site-specific review of a proposed water development could provide further information about potential adverse impacts to protected species from the installation of up to 17 wildlife water developments and mitigation, as needed.

Management Strategy D is the same as the proposed action except that it would suspend the installation of wildlife water developments for the first five years of the INRMP. This would allow time for studies to be conducted, and for a review of literature on the benefits and/or adverse effects of wildlife waters to be completed by a panel before any new water developments were undertaken. In contrast, the proposed action would proceed with up to six water developments while the literature review and studies were being conducted, and before their conclusions were known. Based on current data, no determination can be reliably made as to whether Strategy D would be more or less protective of federally protected and/or state listed species.

### **5.7.11.3 No-Action Alternative (Strategy A)**

If the no-action alternative were implemented, federally protected and/or state listed species would potentially benefit much to the same extent as under the proposed action. The main difference would be the lack of any restoration effort, and a more species-specific and compliance-driven management approach compared to the other Management Strategies, which adopt an adaptive ecosystem management approach. In comparison to the proposed action, this would have less potential benefit for federally protected and/or state listed species since habitat would not be potentially restored. This strategy would allow up to 17 new water developments

and the repair, redesign, or redevelopment of 16 existing water developments, which would have the same potential impacts on federally protected and/or state species as discussed for Strategy B.

### **5.7.12 Special Status Species**

#### **5.7.12.1 Proposed Action (Strategy C)**

Management Strategy C (the proposed action) would potentially improve the available knowledge about special status species, some of which have never been formally surveyed for, and others that have not been the subject of surveys in recent years. In particular, the surveys being proposed could therefore provide up-to-date information on the distribution and abundance of four special status plant species reported on the BMGR: acuña cactus, Peirson's milkvetch, sand food, and individual crested saguaros, as well as several more species that are protected by the Arizona Native Plant Law (see Section 4.7.1.3 for a list of federally protected and state listed plant species). Only one acuña cactus was reported on BMGR in 1997, and Peirson's milkvetch has only been found once, in 1996, in the southern portion of BMGR-West. Information on the occurrence of sand food dates back to 1989 and 1996, and individual crested saguaros have not been surveyed on the BMGR to date. The Yuma puma is a mammal listed as a Wildlife of Special Concern in Arizona, but the taxonomic validity of this subspecies is currently unresolved. Although mountain lion occur on the BMGR, it is not known whether or not any of these animals are the notional Yuma puma subspecies. Other wildlife species that are federally and/or state listed with the potential to occur on the BMGR that would benefit from improved data-gathering in the proposed action might include the spotted bat, southern yellow bat, and the Great Plains narrow-mouthed toad. The federally endangered and state listed cactus ferruginous pygmy-owl (which used to occur throughout southern Arizona) nests in trees and columnar cacti and has been observed in saguaro-ironwood forests; therefore, it has the potential to occur on the BMGR but has not been observed there. Surveys for this species have been conducted in accordance with Biological Opinions and would continue on this basis regardless of the INRMP strategy implemented. Similarly, agencies would still be bound to obligations of the biological opinions independent of this EIS for a proposed INRMP, but those Biological Opinions only address some of the things proposed in the alternative strategies. The proposed action would also provide resources, as necessary, for control of predators (e.g., coyotes) to protect a special status species (e.g., Sonoran pronghorn).

#### **5.7.12.2 Alternative Actions (Strategy B and Strategy D)**

Management Strategy D is identical to the proposed action and would therefore have the same benefits for federally protected and/or state listed species. The other alternative (Strategy B) would not initiate or continue surveys for special status species, and would not provide resources

for predator control; therefore, it would have less potential benefit to this resource category than would the proposed action.

### **5.7.12.3 No-Action Alternative (Strategy A)**

If the no-action alternative were implemented, special status species would be managed according to a more species-specific and compliance-driven approach compared to the other Management Strategies, which adopt an adaptive ecosystem management approach. Current monitoring and recovery efforts for the Sonoran pronghorn would continue, and new surface-disturbing activities would be restricted within six miles of permanent water sources and within the range of the pronghorn. In addition, the desert tortoise (Sonoran population) would be inventoried, categorized, and managed consistent with the Desert Tortoise Habitat Management on the Public Lands: A Rangeland Plan. As a result, the no-action alternative would be beneficial for federally listed and/or state listed species, but may be slightly less protective than the proposed action as a whole, since it would primarily focus efforts on these two protected species and compliance requirements related to Biological Opinions or other consultations with the USFWS.

### **5.7.13 Soil and Water Resources**

The Management Strategies for soil and water resources do not have a direct impact on any individual federally protected and/or state listed species in particular; rather, the same general principles that were discussed in Sections 5.5.13 and 5.6.13 apply here for such species. Benefits to federally protected and/or state listed species would potentially be derived from the following: restricting vehicular traffic to established roads and previously impacted areas; minimizing soil/water contamination or erosion; restoring areas where vehicle use has caused excessive damage; updating soil maps; and conducting a range-wide soil survey using NRCS standards. The latter point would be particularly useful in determining the (potentially predictive) relationship between soil type and protected plant species, or between soils and habitat for federally protected and/or state listed wildlife. Such information could improve the understanding of special status species distribution, and aid in pinpointing where focused surveys for certain federally protected and/or state listed species should be undertaken.

### **5.7.14 Air Resources**

The various Management Strategies for air resources are unlikely to be directly relevant to protected species. In general, however, the same issues regarding air resources that were discussed in Sections 5.5.14 and 5.6.14 are also applicable to federally protected and/or state listed species.

### **5.7.15 Visual Resources**

Similar to air resources, federally protected and/or state listed species are most likely influenced by the same general principles that were discussed in Sections 5.5.15 and 5.6.15.

### **5.7.16 Wildfire Management**

Wildfires can have a detrimental impact on special status species either by causing direct mortality (particularly in those that are immobile, like plants) or by destroying wildlife habitat. Much of the general discussion regarding wildfire management presented in Section 5.6.16 is also applicable to protected species. The proposed action and alternative Management Strategies C and D would lead to the development of a range-wide fire management plan based upon the best scientific information available; therefore, each would have potential benefits for all federally protected and/or state listed species on the BMGR. Much of the vegetation on the BMGR is not fire-adapted, and yet the range supports or potentially supports federally protected and/or state listed plant species including blue and foothills paloverde, mesquites, and cacti. Additionally, these habitats provide forage (including plants, insects, and prey), cover, nest sites, and perches for special status wildlife and migratory birds. The Sonoran pronghorn, for example, consumes cholla, paloverde, honey mesquite, and ironwood among other plants, and uses vegetation to protect its young from predation, so this species would be adversely affected by fire. The lesser long-nosed bat feeds on fruit, including that of cacti, which are vulnerable to fire. The no-action alternative involves putting out fires as they occur, in order to achieve the lowest acreage loss in the most cost effective manner, therefore it would be less protective of special status species as compared to the proposed action.

### **5.7.17 Perimeter Land Use, Encroachment, and Regional Planning**

The proposed action (Strategy D applied range-wide) would provide the most potential benefits to federally protected and/or state listed species because it builds on all the other strategies and provides the most exhaustive list of actions to be performed. Many of the benefits of the proposed action that were discussed in Section 5.5.17 (General Vegetation) and 5.6.17 (General Wildlife) also apply to federally protected and/or state listed species. Some of the special status species on the BMGR are highly mobile and/or have populations that occur both on and off the BMGR (e.g., Sonoran pronghorn, lesser long-nosed bat, flat-tailed horned lizard, and peregrine falcon); therefore, actions that consider these species in a greater regional context would lead to better information about their ecology and also better management and decision-making. Issues such as groundwater management, soil or water quality, use of agricultural chemicals, trespass

grazing, and illegal immigration would all be considered, and their effect on the cultural and natural resources (including special-status species) of the BMGR would be assessed.

The alternative actions would not identify threats to off-range resources that may negatively affect BMGR resources (including special status species), and would not take advantage of opportunities to coordinate management with adjoining property owners. The no-action alternative would not result in any of the benefits described for the proposed action. While some individual management plans/policies address perimeter land use, encroachment, and regional planning on a formal and informal basis, no comprehensive management strategies addressing natural resource conservation and preservation are currently in place.

### **5.7.18 Aggregate Effects on Protected Species**

#### **5.7.18.1 Proposed Action**

The same general comments that were made regarding the aggregate effects of the proposed action on vegetation (Section 5.5.18.1) and general wildlife and wildlife habitats (Section 5.6.18.1) are also applicable to protected species. Some actions for federally protected and/or state listed species would occur independent of actions proposed in this EIS because they are based on the requirements of Biological Opinions or other forms of consultation or agreement with the USFWS, AGFD, or another agency (terms and conditions of the Sonoran pronghorn biological opinions, other Sonoran Pronghorn Recovery Actions such as the forage enhancement and semi-captive breeding initiatives, continued survey for cactus ferruginous pygmy owl, and other inventory and survey requirements, etc.). As appropriate, these independent actions are evaluated in Chapter 6, Cumulative Effects. However, some elements would occur only in association with the proposed action. While, at a programmatic level, the proposed action reflects a shift from single-species (federally protected species) management to ecosystem/biodiversity management, these actions would provide an overall greater protection to the overall ecosystem and, thus, this shift in focus may provide a greater benefit to the overall habitat of special status species.

There would be additive potential beneficial effects of the proposed action resulting from the combined effects of its resource management elements. The management objectives for motorized access and unroaded area management combined with the aggregate impacts of eliminating vehicle-based camping and other associated activity along these roads would be expected to most benefit the following federal or state listed species at low-levels on a range-wide basis, with moderate benefits possible in localized areas: Sonoran pronghorn, flat-tailed horned lizard, desert tortoise (Sonoran population), and California leaf-nosed bat. Some other provisions of the proposed action that are particularly relevant to protected species include the following: evaluating the potential for altering existing or establishing additional special natural/interest areas; establishing and conducting surveys to determine the status and abundance

of special status species; implementing increased public education, and assessing the need for additional gates, signs, and fencing; providing predator control, as necessary, to protect a special status species; determining the extent of interrelationship between on- and off-range resources, and identifying threats to those resources; and participating in opportunities to coordinate management activities with adjoining property owners, which could lead to better management of special status species that occur both on- and off-range. Each of these actions individually, and in concert with the other similar beneficial impacts on general vegetation and wildlife and wildlife habitats, would be beneficial for federally protected and state listed species.

Of course, potential adverse impacts to federally protected and/or listed species could also occur as the result of disturbance associated with any site-specific actions (e.g., wildlife water developments, designating camping or shooting areas, creating the Cabeza Prieta NWR bypass road, etc.) that are addressed here at a programmatic level. These effects are not expected to be major, but would be analyzed in detail separately pursuant to NEPA and the ESA and mitigated, as appropriate. The aggregate effects of the proposed action on protected species are therefore generally beneficial.

#### **5.7.18.2 Alternative Actions**

The range-wide implementation of Management Strategy B, C, or D would lead to the same aggregate effects, and therefore the same benefits for federally protected and/or state listed species as those that were discussed for general vegetation (Section 5.5.18.2) and wildlife and wildlife habitat (Section 5.6.18.2). Overall, Strategy B would, to a small degree, be the least protective of special status species on the BMGR because it generally offers no additional management objectives beyond compliance-driven requirements and favors slightly higher levels of public access and use opportunities. Strategy B would not fully support the conservation measures for road closures within Sonoran pronghorn habitat identified in the Biological Opinions for the Air Force and Marine Corps. Strategy D would potentially provide additional benefits as compared to the proposed action because it would adopt a broader and more regional approach, includes resource protection and conservation management practices beyond those of the proposed action, and would impose greater restrictions or limitations on some public access and use opportunities that could have minor impacts on special status species. Strategy C would have similar impacts on special status species as described for the proposed action. Additional protection for federally protected and/or state listed species associated with those resource elements for which Strategy D was selected as the proposed action (resource inventory and monitoring; soil and water resources; perimeter land use, encroachment, and regional planning; and wood cutting, collection, and gathering and collection of native plants in Unit 1) would not occur, but any such differences are not measurable.

### **5.7.18.3 No-Action Alternative**

The selection and implementation of the no-action alternative in place of the proposed action would result in the continued management of federally protected and state listed species under guidance from the Goldwater Amendment, HMPs, and various compliance decisions. The provisions of these plans, as modified to comply with the requirements of the Sikes Act, would be adopted by DoD agencies. Specifically, this alternative would differ from the proposed action because it would focus efforts on such actions as supporting monitoring and recovery of Sonoran pronghorn, and managing the Sonoran population of the desert tortoise consistent with the desert tortoise habitat management plan, instead of management actions that are more widely based on concepts of biodiversity and ecosystem management. Under this alternative, all the existing and future compliance requirements for special status species would have to be met, so these species would be afforded a similar level of protection as they would under the proposed action. However, any additional indirect benefits for federally protected and/or state listed that could be gained from the new management objectives included in the proposed action would not necessarily be realized.

## **5.8 WILDFIRE MANAGEMENT**

### **5.8.1 Resource Inventory and Monitoring**

#### **5.8.1.1 Proposed Action (Strategy D)**

Under the proposed action for this resource management element (Strategy D), the increase in ecological monitoring and vegetation surveys would provide BMGR natural resource managers with a better understanding of ecological conditions on the range. This information could benefit natural resource managers in fighting wildfires because it could provide a better understanding of vegetation density, which affects wildfire potential on the range.

#### **5.8.1.2 Alternative Actions (Strategy B and Strategy C)**

Like the proposed action, Strategy C provides for expanding ecological monitoring and vegetation surveys on the range, but to a lesser extent. This strategy would still benefit wildfire management by providing a better picture of which areas of the range are at a higher risk for wildfire.

Unlike the proposed action and Strategy C, Strategy B would not establish vegetation surveys or additional ecological monitoring beyond monitoring for effectiveness of compliance actions. Therefore, this strategy would not be expected to have an effect on wildfire management.

### **5.8.1.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, monitoring programs for vegetation are not included and would therefore not have an impact on wildfire management.

### **5.8.2 Special Natural/Interest Areas**

The existing management provisions for the former ACECs, SRMAs, HMA, and backcountry byway do not specify actions for wildfire management. While wood cutting and the taking of dead and downed wood is prohibited within the former ACECs and within 150 feet of the backcountry byway, there is not enough dead wood in these areas to appreciably change the fuel load for wildfires through a management provision that would eliminate this prohibition. Consequently, the management strategy selection affecting the treatment of these formerly designated special management areas would not influence wildfire management.

The proposed action (Strategy C) and Alternative Strategy D, however, include the opportunity to develop special management provisions for resource protection. If these provisions included vegetative management actions that could influence fuel loads, these strategies could potentially influence wildfire management.

### **5.8.3 Motorized Access and Unroaded Area Management**

#### **5.8.3.1 Proposed Action (Strategy C)**

Access restrictions on redundant roads in localized areas and the closure of roads not meeting military or agency needs, as is presented under Strategy C, could affect BMGR wildfire management. The proliferation of invasive vegetation species can increase the risk of wildfire (see Section 4.8 for more information). Because the spread of invasive species can be influenced by roads, road closures (which would be most prevalent within BMGR—West) could potentially decrease the potential spread of invasive plant species within the BMGR.

State Route 85, which carries large volumes of traffic through BMGR—East, could increase the likelihood that some of those vehicles are carrying non-native seed in wheel wells that could then fall within the BMGR. State Route 85 could also provide fire ignition sources from carelessly tossed burning cigarettes and from hot vehicle parts, particularly if vehicles are pulled off the road and into areas with dry vegetation as shoulder areas along this highway are often minimal. These same types of ignition sources could also start wildfires along other roads on the BMGR, although the risk would be commensurate with the volume of traffic.

Conversely, roads can serve as fuel breaks that prevent fires from spreading beyond the roads. Wider roads are generally more effective in serving as fuel breaks. Many of the redundant roads proposed to be closed with the proposed action are relatively narrow in width and many of these are two-track roads that have vegetation growing within the roadbed; these types of roads are rarely effective fuel breaks.

If a wildfire were to break out on the BMGR, the road closures could potentially limit access for fire fighters. However, because most of the roads to be closed are redundant roads and alternate access is provided to nearby locations, the change in fire-fighting access would be minimal. Additionally, if needed, closed roads would be used in emergency situations as a priority to a new cross-country route.

Consequently, while the reduction of approximately 658 miles of road could eliminate some fuel breaks that would prevent the spread of wildfire and potentially reduce access for fire suppression efforts, the closures could also prevent the proliferation of invasive species that could spread fire.

### **5.8.3.2 Alternative Actions (Strategy B and Strategy D)**

Implementing Strategy D would have essentially the same effects as the proposed action, although 107 more miles of road would be closed with Strategy D.

The existing road network would be retained under Strategy B and access would remain the same unless a resource protection issue arises. Compared to the proposed action, this could increase the potential risk for the spread of invasive species, but would retain roads that could potentially serve as fuel breaks or provide access for fire suppression.

### **5.8.3.3 No-Action Alternative (Strategy A)**

Changes in the BMGR road network would not occur in the short-term and effects would be similar to Strategy B. However, if a transportation plan were developed in the future, the effects of the no-action alternative would likely be similar to the proposed action in the long term.

## **5.8.4 Camping and Visitor Stay Limits**

### **5.8.4.1 Proposed Action (Strategy C)**

Allowing dispersed self-contained camping in all areas open to the public on the range would continue the risk of wildfires from improperly attended campfires or cigarettes. On the other

hand, the proposed action (Strategy C) would assess the benefits and effects of establishing designated camping areas on the range as well. If such areas were established and if dispersed camping became more concentrated, it would benefit the fight against wildfires. It is important to note, however, that wildfires resulting from campfires have not been a reported problem on the range in the past.

#### **5.8.4.2 Alternative Actions (Strategy B and Strategy D)**

Because it is very similar to the proposed action (the length of camping stays are different), Management Strategy D would have the same impacts on wildfire management.

Assessing the benefits of establishing designated camping areas on the range is not an objective under Strategy B. As such, the only effect would be the continued minimal risk of wildfires from unattended campfires across the range.

#### **5.8.4.3 No-Action Alternative (Strategy A)**

As with Strategy B, the only risk associated with the no-action alternative would be the minimal risk of wildfires from unattended campfires on the range.

### **5.8.5 Recreation Services and Use Supervision**

#### **5.8.5.1 Proposed Action (Strategy C in Unit 2 and Strategy D in All Other Units)**

Implementation of the proposed action (Strategy C within Unit 2 and Strategy D within all other management units) could result in beneficial effects to wildfire management. Management objectives that could influence wildfire management include:

- Continue to prohibit ORV travel and on- and off-road racing, and restrict motorized public travel in all washes (except where the wash is a designated part of the road system open to the public and is dry). ORV travel, including travel in washes, has been suspected to serve as a means for invasive plant species introduction. Because of this, prohibiting ORV travel and on- and off-road racing would continue to help prevent the spread of invasive species and their associated influence on the spread of wildfires.
- Implement increased public education and recreation use information programs, particularly to inform the public about road restrictions and resource sensitivities. Wildfire management would be improved by this objective as visitors would be informed

of the ecological risks associated with ORV travel and the spread of invasive plant species as well as the importance of controlling and extinguishing campfires.

- Retain a minimum number of full-time law enforcement positions dedicated to the BMGR. Maintaining a minimum number of law enforcement positions (six with the proposed action) would benefit wildfire management in that the presence of BMGR law enforcement personnel would likely help to identify wildfires, as well as identify visitor activities that could cause wildfire, such as improper disposal of smoking materials or poor campfire management.

#### **5.8.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

In contrast to the proposed action, under Management Strategy B there would not be as many objectives to benefit wildfire management as follows:

- **Evaluate the need for and effects of allowing public ORV travel in designated areas.** Rather than prohibiting ORV travel like the existing condition and proposed action, the need for and effects of allowing public ORV travel in designated areas would be evaluated. If such use were allowed to occur, there could be increased risk of wildfire commensurate with the risk of invasive plant species proliferation.
- **Allow motorized public travel in designated washes (when dry).** Rather than limiting motorized public travel in washes to those washes that are a designated part of the road system open to the public like the existing condition and proposed action, travel in dry washes would be allowed with Strategy B. To the extent that this might result in the proliferation of non-native plant species or introduce fire ignition sources from burning cigarette, poor campfire management, etc., this could increase the risk of wildfire.
- **Retain existing public education and use information programs.** As current education programs contain adequate information about potential hazards present on the BMGR, this management objective would generally have the same potential effects on wildfire management as the proposed action. However, the proposed action is slightly more beneficial as it includes additional measures to inform the public about road closures, which could inform visitors about the potential ecological risks associated with ORV travel and the spread of invasive plant species.
- **Retain a minimum of two full-time law enforcement officers.** As compared to the proposed action, Strategy B would have a lower minimum number of full-time law enforcement positions. Thus, if there were budget cuts that reduced the funding available

for these positions, there would be commensurately less law enforcement personnel present to enforce visitors' use of campfires and smoking materials.

Because there is little difference between Strategies C and D, consequences would not differ between the proposed action for wildfire management and these alternative strategies, regardless of the unit to which they are applied.

### **5.8.5.3 No-Action Alternative (Strategy A)**

Changes from the existing conditions would not occur under the application of Management Strategy A, but would continue to benefit wildfire management with implementation of existing recreation services and use supervision objectives. The distinctions in potential consequence of the no-action alternative as compared to the proposed action are as follows:

- **Establish an environmental education program.** Although the proposed action may provide additional benefits in that it focuses on informing the public about road closures, the effects of this management objective to wildfire management would otherwise be similar to those of the proposed action.
- **Develop an action plan for interagency law enforcement.** Most of the benefits to wildfire management from these management objectives versus the proposed action objectives would be similar. However, no minimum number of full-time law enforcement positions dedicated to the BMGR would be required with the no-action alternative. If funding cuts occur, there would be no assurance that law enforcement positions would not be eliminated. The less law enforcement presence, the more likely that infractions could occur, which would increase potential for wildfire due to poor campfire management, etc.

### **5.8.6 Rockhounding**

None of the objectives for this resource management element would be expected to have impacts on wildfire management.

### **5.8.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

None of the management strategies for this resource category would be expected to have an impact on wildfire management. Although native wood campfires would be restricted in Unit 1 under the proposed action and range-wide under Strategy D, campfires using off-range wood would still be sanctioned. Therefore, the number of campfires would not likely decline; however

even if a decline were to occur, campfires have not reportedly been a problematic source of wildfires on the BMGR in the past.

### **5.8.8 Hunting**

Regardless of the alternative management strategy for this resource management element, impacts to wildfire management are not expected.

### **5.8.9 Recreational Shooting**

The objectives presented in the management strategy alternatives for recreational shooting are not expected to have a measurable potential to impact wildfire management. In general, only automatic weapons with tracers would likely have the potential to create sparks that could ignite a fire. Also, fuel loads on the BMGR are typically small, as demonstrated by the relative infrequency of fires resulting from military munitions use on the BMGR and the limited acreage burned when such fires have occurred.

### **5.8.10 Utility/Transportation Corridors**

#### **5.8.10.1 Proposed Action (Strategy C)**

Under the proposed action (Strategy C), the construction of future overhead transmission lines would continue to be restricted to alignments immediately parallel to the existing Gila Bend to Ajo transmission line. Vegetative clearing for utility corridors provides a greater opportunity for invasive plant species to grow because they do not need to compete with the existing vegetative cover. Overhead transmission lines can also create an obstacle for aircraft, potentially increasing the risk of a crash that could start a fire. Therefore, restricting future development of overhead utility lines would be beneficial for wildfire management over the long term.

The construction of the Yuma ASH would be allowed with the proposed action. If developed, this new corridor could have similar effects as described for State Route 85 in Section 5.8.3.1.

#### **5.8.10.2 Alternative Actions (Strategy B and Strategy D)**

Strategy D would have the same effects as the proposed action for utility/transportation corridors except that the Yuma ASH would not be allowed on the BMGR, thus eliminating a travel route that could contribute to the proliferation of invasive species and introduce factors that could be a fire ignition source.

Strategy B does not contain the objective that would restrict new utilities to existing corridors, thereby providing a greater risk of a wildfire.

### **5.8.10.3 No-Action Alternative (Strategy A)**

As with the proposed action, the no-action alternative would also restrict the future utilities to existing corridors and would also likely allow the construction of part of the Yuma ASH on the BMGR. Therefore, the no-action alternative would have the same effect on wildfire management as the proposed action.

## **5.8.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

### **5.8.11.1 Proposed Action (Strategy C)**

Several objectives under the proposed action would benefit wildfire management on the BMGR. First, updating a vegetation map with newly gathered botanical information would better equip natural resource managers with information regarding vegetation density and associated wildfire risk.

Eliminating all trespass grazing by livestock could also lower the wildfire risk. Trespass livestock has been considered a way in which non-native invasive weed species have been introduced onto the range so eliminating livestock would help minimize this risk.

The objective that would have the most benefit to wildfire management is the provision to conduct surveys for, establish control priorities for, prevent the introduction of, and monitor populations of invasive species and develop coordinated strategies to locally eradicate and/or control the spread of these species commensurate with the threats they pose to natural resources on the BMGR and within the greater Sonoran Desert ecoregion. As described in Section 4.8.4, additional information about the increased hazard for wildfire as a result of invasive, fire propagating plant species is needed. The proposed surveys for the occurrence of invasive plant species could benefit wildlife management by providing this information.

### **5.8.11.2 Alternative Actions (Strategy B and Strategy D)**

Management Strategies D and B include the same objectives that could influence wildfire management as discussed in the proposed action for this management element so the effects would be the same.

### **5.8.11.3 No-Action Alternative (Strategy A)**

Strategy A would update the vegetation map and also develop procedures to control all trespass grazing by livestock and feral burros. These two objectives would continue to benefit wildfire management. However, this strategy does not provide for conducting additional surveys, monitoring or control of invasive plant species. As compared to the proposed action, this management strategy would not have as much of a benefit on wildfire management.

### **5.8.12 Special Status Species**

None of the objectives presented in the alternatives for this resource category would be expected to impact wildfire management.

### **5.8.13 Soil and Water Resources**

The management strategies for soil and water resources would not affect wildfire management, although a better understanding of soil resources could be useful to control erosion potential following a fire. Soil resource information may also help to determine the plant and soil relationships, including the potential for the non-native species growth following a fire.

### **5.8.14 Air Resources**

None of the management strategy alternatives for air resources are expected to impact wildfire management.

### **5.8.15 Visual Resources**

The visual resources management strategies would not be expected to affect wildfire management.

### **5.8.16 Wildfire Management**

All of the wildfire management alternatives, especially Strategies B, C, and D, would benefit wildfire management on the range. As discussed in Section 4.8.4, a BMGR-wide fire management plan, developed in cooperation among the BMGR agencies, is needed to outline protocols for reporting and responding to fires and to make fire-suppression decisions on the

basis of the threat to human life, property, and natural and cultural resources. Strategy B, C, and D would developed such a range-wide management plan based on the indications of the best known science and management practices that establishes fire prevention, suppression, recovery, mapping, monitoring, and possible mitigation protocols for both human and non-human caused fires.

Although the no-action alternative (Strategy A) would not develop a range-wide fire management plan and the benefits would not be as great, it would still continue to provide for the suppression of wildfires with the lowest acreage loss and in the most cost-effective and efficient manner.

### **5.8.17 Perimeter Land Use, Encroachment, and Regional Planning**

Alternative Management Strategies B, C, and D would promote coordination and communication with adjacent land owners and managers, which could lead to a more regional effort in managing wildfire. Should this coordination extend to include local fire-fighting departments in the towns along the BMGR perimeter, it could lead to a protocol on the response to wildfires both within the range and on the perimeter lands. Such planning would be in support of that part of the MLWA of 1999, which dictates that the DoD is responsible for fires occurring within the boundaries of the BMGR, as well as brush and range fires occurring outside the boundaries of the BMGR resulting from military activities. Because the no-action alternative does not include regional coordination efforts, this strategy would lack this potential opportunity.

### **5.8.18 Aggregate Effects on Wildfire Management**

#### **5.8.18.1 Proposed Action**

As discussed in Section 4.8, wildfires on the BMGR are rare. However, in terms of wildfire prevention, the range-wide application of the proposed action would result in two types of beneficial effects on wildfire management: (1) studies, surveys, evaluations, plans, and coordination that focus on vegetative communities, which in turn, influence wildfire management and (2) resource management activities that would have a secondary wildfire management effect.

Increased surveys/studies, plans, and coordination that would be proposed under objectives for resource inventory and monitoring; special natural/interest areas; general vegetation, wildlife, wildlife habitat, and wildlife waters; wildfire management; and perimeter land use, encroachment, and regional planning would all benefit wildfire management by providing resource managers with the most up-to-date information about ecological conditions of the range, which is needed to fight wildfires. The most beneficial objective for wildfire management

would be the proposed provision for developing a range-wide fire management plan based on the indications of the best known science and management practices that establishes fire prevention, suppression, recovery, mapping, monitoring, and possible mitigation protocols for both human and non-human caused fires in accordance with the threat to human life, property, and natural and cultural resources.

Additional surveys and vegetative mapping efforts would produce knowledge regarding ecological health and the presence of certain invasive plant species on the BMGR. Specifically, the surveys proposed for invasive plant species would directly benefit wildfire prevention because they would pinpoint problem areas that are of particular risk for wildfire. Increased coordination and communication between BMGR resource managers and adjacent land managers and owners would also be beneficial in the fight against future fires and loss of personal property.

Resource management activities that would have a secondary wildfire management effect include provisions for restricting public access on redundant roads, designating specific camping areas, prohibiting ORV travel, limiting motorized public travel in washes, increasing public education, maintaining law enforcement positions, restricting utilities to existing corridors, and eliminating trespass cattle grazing. These effects are expected to benefit wildfire management because they would:

- decrease opportunities for invasive plant species proliferation
- decrease the potential for wildfires to occur due to improperly maintained campfires
- reduce the locations in which human-related fire ignition sources could occur

In aggregate, the management practices under the proposed action would have a favorable effect on the prevention of and fight against wildfires on the range as opposed to the current level of wildfire management.

### **5.8.18.2 Alternative Actions**

#### **Management Strategy B**

As compared with the proposed action, Management Strategy B would result in a fewer studies/surveys, eliminate evaluations for potential designated camping areas, allow for new utility/transportation corridors to the extent compatible with the military mission, and retain the existing road network. These would minimize the potential for effective wildfire management. However, benefits over the current level of wildfire protection would include implementation of a wildfire management plan; surveys for the presence and proliferation of invasive plant species; potential increased coordination with local, non-BMGR firefighting departments; and the maintenance of at least two full-time law enforcement positions on the BMGR.

### Management Strategy C

The range-wide effects on wildfire management from Strategy C would be very similar to those of the proposed action. Resource management categories that would experience somewhat less of a degree of resource protection would include resource monitoring, law enforcement positions, and coordination with adjacent land managers and land owners.

### Management Strategy D

The range-wide application of Management Strategy D would result in a similar level of implemented studies, assessments, evaluations, and management activities that would be beneficial to the prevention and/or suppression of wildfires as the proposed action. Management Strategy D would also close about 107 more miles of road than the proposed action and eliminate the potential development of the Yuma ASH on the BMGR. While Management Strategy D would have the most favorable effect on the prevention and suppression of wildfires on the range in the BMGR region, the overall effects would not be appreciably different than the proposed action.

#### **5.8.18.3 No-Action Alternative**

The range-wide application of Management Strategy A would differ from the proposed action in that there would be fewer studies, evaluations, and actions than called for with the proposed action. Existing wildfire management would continue to focus on the suppression of wildfires with the lowest acreage loss and in the most cost-effective and efficient manner. In some cases, the most cost effective manner could include allowing the fire to burn itself out, particularly if the fire occurs in areas of low fuel load. However, without gaining a more complete knowledge base of the current vegetative condition, and without restricting activities that could potentially lead to future wildfire risk, this management strategy would not provide for the same level of resource protection as the proposed action.

## **5.9 GROUND MAINTENANCE**

### **5.9.1 Resource Inventory and Monitoring**

#### **5.9.1.1 Proposed Action (Strategy D)**

If additional environmental monitoring determines that a pest management problem exists or that there is an issue about pest management practices and natural resource management at one of the two developed areas on the BMGR (i.e., Gila Bend AFAF or Cannon Air Defense Center), the adaptive management approach included as part of the proposed action may trigger a change in the way grounds maintenance is conducted at these sites. Baseline inventories have already been conducted for these areas, indicating what types of vegetation are present; therefore, future studies would most likely focus on specific monitoring. Considerations for water conservation and aesthetics may lead to the replacement of palm trees and other exotics from the Gila Bend AFAF with native vegetative species such as paloverde, ironwood, and mesquite.

#### **5.9.1.2 Alternative Actions (Strategy B and Strategy C)**

Management Strategy C for resource inventory and monitoring also includes provisions for adaptive management in response to inventory and monitoring findings and would have the same effects as the proposed action.

An adaptive management approach that could potentially influence grounds maintenance procedures is not prescribed for Management Strategy B and would therefore not be expected to have an effect on grounds maintenance.

#### **5.9.1.3 No-Action Alternative (Strategy A)**

Strategy A does not include any inventory or monitoring objectives that would be applicable to the developed areas of the range. Existing grounds maintenance practices would continue and no adverse effects are anticipated. However, Strategy A would not include an adaptive management approach so management practices and policies may not change in response to any new resource issues that might emerge.

### **5.9.2 Special Natural/Interest Areas**

The only existing special management designation that coincides with one of the developed areas is the flat-tailed horned lizard HMA. Each of the alternative management strategies includes

redesignating the flat-tailed horned lizard HMA as a special natural/interest area and retaining the existing management provisions established for the HMA. Consequently, the effects of special natural/interest areas on grounds maintenance would be the same regardless of which strategy is implemented.

Management of the redesignated flat-tailed horned lizard HMA would continue with existing management provisions, although addition special management provisions could be developed as needed for resource protection. Should it be determined that ongoing pest management procedures at the Cannon Air Defense Complex are negatively affecting the flat-tailed horned lizard, management provisions could be implemented to alter grounds maintenance procedures to reduce, eliminate, or mitigate the adverse effects. However, the ongoing pest management practices have not historically been known to affect the flat-tailed horned lizard, so the potential for future effects is expected to be low or non-existent.

### **5.9.3 Motorized Access and Unroaded Area Management**

There would be no change in motorized access to Gila Bend AFAF, the Cannon Air Defense Complex, and other maintained areas of the BMGR with implementation of any of the alternative management strategies. Therefore, none of the alternatives for motorized access and unroaded area management would have an effect on grounds maintenance activities in these developed areas.

### **5.9.4 Camping and Visitor Stay Limits**

Gila Bend AFAF is the only area on the BMGR in which both military grounds maintenance activities and camping for active and former DoD personnel occur. The recreational vehicle type campsites are routinely occupied between October and March every year. The visitor stay limits that are proposed for the rest of the BMGR would not apply to these fee only campsites within Gila Bend AFAF.

On-site sewage disposal is available at each allotted RV camping space for those staying at Gila Bend AFAF (Mendez 2002). There is also an additional location at the auxiliary field, aside from the individual sewage disposal, where RV campers can dispose of their sewage. However, these disposal practices are already regulated under applicable sanitation permits maintained through Gila Bend AFAF; therefore, changes in protocol to ground maintenance as a result of any of the proposed and alternative strategies for this resource element would not be expected.

### **5.9.5 Recreation Services and Use Supervision**

Regardless of which management strategy is implemented for recreation services and use supervision, impacts to or changes in protocol with regard to grounds maintenance at Gila Bend AFAF, Cannon Air Defense Complex, or other developed military use areas on the BMGR would not be expected.

### **5.9.6 Rockhounding**

Recreational rockhounding is not considered an activity at the Gila Bend AFAF or the Cannon Air Defense Complex and the action alternatives for rockhounding are not applicable to these developed areas.

### **5.9.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

Wood cutting, gathering, and firewood use is not allowed at the RV campground of Gila Bend AFAF or Cannon Air Force Complex. Therefore, none of the alternatives, when implemented, would have an effect on grounds maintenance protocol.

### **5.9.8 Hunting**

Hunting is not allowed within the grounds of Gila Bend AFAF or Cannon Air Defense Complex. Regardless of which management strategy alternative is implemented for hunting, no impacts on or changes to grounds maintenance would occur.

### **5.9.9 Recreational Shooting**

Recreational shooting is not sanctioned at the various developed sites on the BMGR, and as such, none of the alternative management strategies, when implemented, would have an impact on grounds maintenance.

### **5.9.10 Utility/Transportation Corridors**

Grounds maintenance within the existing (and proposed future) utility/transportation corridors present on the BMGR (e.g., control of roadside weeds) is not the management responsibility of the military. The entities owning or managing the utility itself manage and maintain the corridor

for their respective needs. Therefore, none of the management strategy alternatives for utility/transportation corridors evaluated in this EIS would impact the grounds maintenance protocol for BMGR utility/transportation corridors.

## **5.9.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

### **5.9.11.1 Proposed Action (Strategy C)**

Strategy C proposes to conduct surveys for, establish control priorities for, prevent the introduction of, and monitor populations of invasive species. Although some non-native landscaping species are present at the developed sites (i.e. grass lawns, palm trees, etc.), they are not invasive species that would be likely to spread. Regardless of which alternative management strategy is implemented, Gila Bend AFAF and Cannon Air Defense Complex must comply with their respective pest management plans, which are based on Integrated Pest Management (see Section 4.9.1 for more information) when spraying for common weed species.

Vegetation habitat restoration efforts are proposed with Strategy C for areas that have been damaged by a discontinued military, agency, or intensive public use. Should such areas be identified at the Gila Bend AFAF or Cannon Air Defense Complex, restoration efforts could influence future grounds maintenance activities for these areas. To the extent that native vegetation is restored, grounds maintenance might be simplified. However, with the relatively greater amount of activity at these developed sites, there may be a greater likelihood of invasive plant species growing within discontinued intensive use areas, so grounds maintenance may be more intense initially until invasive species can be eradicated from the site.

### **5.9.11.2 Alternative Actions (Strategy B and Strategy D)**

Strategies B and D both include the same objectives regarding the study of and control of invasive species as well as habitat restoration efforts for former use areas as are proposed with Strategy C. Therefore, the effects on ground maintenance activities would be the same as described for the proposed action.

### **5.9.11.3 No-Action Alternative (Strategy A)**

Unlike the proposed action and the action alternatives, Strategy A does not provide for invasive species monitoring and control, nor does it provide for habitat restoration for areas that have been damaged in the past and are no longer used. However, with the ongoing pest management programs and other grounds maintenance activities in place at the developed sites,

implementation of this alternative would still not be expected to result in much change from existing grounds maintenance practices.

#### **5.9.12 Special Status Species**

As discussed in Section 4.7.1.3, special status species such as the lesser long-nosed bat (federally listed) and the California leaf-nosed bat (listed as a Wildlife of Special Concern in Arizona) could potentially forage at Gila Bend AFAF due to the types of vegetation available in the vicinity. None of the management strategy alternatives, however, would change the types of vegetation at Gila Bend AFAF that could result in an increased presence of a special status species. Regardless of which special status species alternative is implemented, however, DoD activities on the BMGR, including grounds maintenance activities, must comply with the federal endangered species regulations. Overall, however, the likelihood that an endangered or threatened species would forage at the Gila Bend AFAF is considered low.

The same holds true for the Cannon Air Defense Complex in BMGR—West. The Complex is located within flat-tailed horned lizard (not federally listed, but listed as a Wildlife of Concern in Arizona) habitat and DoD must comply with the current USFWS biological opinion for this species and the Endangered Species Act in general for all activities, including grounds maintenance, regardless of which special status species management strategy is selected.

#### **5.9.13 Soil and Water Resources**

None of the alternative management strategies would be expected to alter the manner in which grounds maintenance, including pest control, is conducted at Gila Bend AFAF or the Cannon Air Defense Complex.

#### **5.9.14 Air Resources**

None of the alternative air resources management strategies would be expected to impact the manner in which grounds maintenance, including pest control, is conducted at Gila Bend AFAF or the Cannon Air Defense Complex.

#### **5.9.15 Visual Resources**

The areas in which grounds maintenance activities occur are considered developed areas of the BMGR. Therefore, any manmade modifications that would occur at the sites would be a

continued modification in an already developed area. None of the alternative management strategies for visual resources would be expected to have an impact on existing or future grounds maintenance activities.

## **5.9.16 Wildfire Management**

### **5.9.16.1 Proposed Action (Strategy B)**

Strategy B would include the development of a range-wide fire management plan. This could affect the grounds maintenance protocols for Gila Bend AFAF and Cannon Air Defense Complex in that such a plan could create certain criteria for the placement of trees, landscaping, and for the overall basic maintenance concepts (such as mowing or weed control) in order to reduce fuel loads and protect buildings from potential fire damage.

### **5.9.16.2 Alternative Actions (Strategy C and Strategy D)**

Because Strategy C and Strategy D are identical to the proposed action, implementation of these alternative management strategies would have the same effects as the proposed action.

### **5.9.16.3 No-Action Alternative (Strategy A)**

Management Strategy A does not provide for the development of a range-wide fire management plan. Although wildfires are to be combated with this alternative, this strategy would not likely encourage alterations to the grounds maintenance protocol at developed sites in order to proactively prevent or limit fire potential.

## **5.9.17 Perimeter Land Use, Encroachment, and Regional Planning**

None of the alternative management strategies would be expected to have an effect on how the grounds are managed at the developed BMGR sites. However, efforts to improve coordination with off-range managers and to participate in regional planning efforts could help to avoid potential problems (such as pesticide drift from aerial spraying of agricultural land or the spread of invasive plants species) that could affect grounds maintenance at the developed areas of the BMGR.

## **5.9.18 Aggregate Effects on Grounds Maintenance**

### **5.9.18.1 Proposed Action**

By implementing the proposed action, grounds maintenance procedures could be affected by some of the objectives identified for resource inventory and monitoring, special natural/interest areas, and wildfire management. Some of these effects could be interactive. For example, increased inventory and monitoring efforts might identify that grounds maintenance activities at the Cannon Air Defense Complex are affecting flat-tailed horned lizards. Implementing the proposed action is unlikely to result in the need for any change in grounds maintenance procedures; therefore, any aggregate effects that might occur would likely be financial in nature. A fire management plan and invasive species control procedures, for instance, could both potentially result in some changes in ground maintenance procedures and both might require funding beyond existing grounds maintenance budgets.

### **5.9.18.2 Alternative Actions**

#### **Management Strategy B**

This management strategy would have similar aggregate effects as the proposed action, except that the reduced inventory and monitoring efforts might result in fewer problem areas being identified. The objectives for special natural/interest areas and wildfire management would both still have the potential to change the manner in which grounds maintenance is conducted at Gila Bend AFAF and Cannon Air Defense Complex.

#### **Management Strategy C**

There are no changes in the aggregate effects on grounds maintenance between the proposed action and those of Management Strategy C.

#### **Management Strategy D**

Like Strategy C, there are no changes in aggregate effects on ground maintenance between the proposed action and those of Management Strategy D.

### **5.9.18.3 No-Action Alternative**

Management objectives under the no-action alternative would not result in aggregate impacts on grounds maintenance protocol, but the lack of monitoring efforts could mean that potential problem areas are not being identified. The one individual impact of the no-action alternative under special natural/interest areas would involve the potential for changes to grounds maintenance at Cannon Air Defense Complex that may be more readily implemented under the proposed action if pest management activities were determined to be affecting the flat-tailed horned lizard within the flat-tailed horned lizard HMA (since the no-action alternative does not include an objective to establish additional special management provisions as needed for resource protection).

## **5.10 PUBLIC UTILITIES AND TRANSPORTATION CORRIDORS**

### **5.10.1 Resource Inventory and Monitoring**

Regardless of the alternative, the resource inventory and monitoring management strategies are not expected to have an impact on existing or future public utility and transportation corridors.

### **5.10.2 Special Natural/Interest Areas**

#### **5.10.2.1 Proposed Action (Strategy C)**

Redesignating the ACECs and flat-tailed horned lizard HMA as special natural/interest areas (while retaining the existing management provisions in the HMA only) would likely limit or preclude the development of transportation/utility corridors in these designated areas. While the special management provisions for the ACECs could potentially change in designating them as special natural/interest areas, any new provisions are unlikely to allow for new corridors because the intent of the redesignation is to continue the established legacy of providing special protection to these areas.

The SRMA and Backcountry Byway designations would be allowed to expire without any new special designation. This could potentially make these areas more vulnerable to corridor development. However, with regard to all special management areas (redesignated or not), the primary driving force would be the management strategy selected for the utility/transportation corridor management element (see Section 5.10.10).

### **5.10.2.2 Alternative Actions (Strategy B and Strategy D)**

With the exception of the flat-tailed horned lizard HMA, Management Strategy B would terminate all other existing special resource management areas, without providing for future special management provisions. While this could potentially open the former ACECs, SRMAs, and Backcountry Byway to transportation/utility corridor consideration, new corridor development would first and primarily be subject to the utility/transportation corridor management strategy chosen for the proposed INRMP (see Section 5.10.10).

Strategy D would include redesignating the SRMAs and Backcountry Byway as special natural/interest areas as well as the ACECs and HMA. The effect on the SRMAs and Backcountry Byway would be the same as described for ACECs with the proposed action; transportation/utility corridors would likely continue to be limited or precluded from these special designation areas consistent with the guidelines of the Goldwater Amendment.

### **5.10.2.3 No-Action Alternative (Strategy A)**

Retaining the existing special management provisions for the ACECs, SRMAs, and Backcountry Byways would maintain the existing criteria for allowable utility/transportation corridor development. The existing Goldwater Amendment restricts new corridor development from the Tinajas Altas Mountains ACEC and the Gran Desierto Dunes ACEC. Specific corridor development guidelines are also outlined for the Mohawk Mountains and Sand Dunes ACECs, the Yuma Desert and Sand Dunes HMAs, and the Sentinel Plain Lava Flow and Crater Range SRMAs. The future development of utility or transportation corridors would continue to be limited to these development guidelines within these specially designated areas.

## **5.10.3 Motorized Access and Unroaded Area Management**

### **5.10.3.1 Proposed Action (Strategy C)**

Road closures that would occur under Management Strategy C would not affect access to the existing utility/transportation corridor or the proposed Yuma ASH so there would be no effect on utilities.

Road closures under Management Strategy C would also have the effect of reducing the multiple public entry points that currently exist at several locations along the northern boundary of the BMGR in Management Units 2 and 3, where there are redundant local road networks on both sides of the boundary, to one or two routes (see Figure 3-2). More specifically, the closures in Management Units 2 and 3 would affect multiple unimproved vehicle trails that enter the range

in the vicinity of the Fortuna Foothills, at several locations south of the towns of Wellton and Tacna, in an area north of the Baker Tanks on the west side of the Baker Peaks, and at a site at the northern end of the expired Mohawk Mountains and Sand Dunes ACEC. These closures could potentially affect traffic circulation patterns within the off-range, unimproved road networks that are the counterparts of the on-range networks by concentrating traffic towards the approved BMGR entry roads. Given the relatively low volumes of recreation traffic flow to and from the BMGR, however, this impact is regarded as minimal. These closures would not impact traffic on Interstate 8 or local Yuma County roads. The closures would also eliminate two inactive entry points to Management Unit 6 from State Route 85 (see Figure 3-1). Traffic on State Route 85 would not be affected by these closures.

### **5.10.3.2 Alternative Actions (Strategy B and Strategy D)**

The range-wide application of Management Strategy D would have the same anticipated impacts on public utility and transportation corridors as the proposed action, with Strategy D having slightly more of an impact than Strategy C because its provisions would result in two additional public entry road closures to Management Unit 2 and one in Management Unit 3.

Under Management Strategy B the anticipated impacts on public utility and transportation corridors that could occur with the proposed action, would not occur, as the existing road network would remain open.

### **5.10.3.3 No-Action Alternative (Strategy A)**

The no-action alternative could potentially have impacts on public utility and transportation corridors similar to the other alternatives if a future transportation plan determines that road closures are needed on the BMGR.

### **5.10.4 Camping and Visitor Stay Limits**

Regardless of the alternative implemented, the management strategy chosen for camping and visitor stay limits is not expected to have an impact on public utility and transportation corridors.

### **5.10.5 Recreation Services and Use Supervision**

None of the provisions for recreation services and use supervision would affect transportation or utility corridors.

### **5.10.6 Rockhounding**

Regardless of the alternative selected, no associated public utility or transportation corridor effects associated with rockhounding are anticipated.

### **5.10.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

There are no public utility or transportation corridor impacts anticipated for wood cutting, wood gathering, and firewood use, and collection of native plants with any of the alternatives. Salvage of native plants associated with the vegetative clearing that would be required for the construction of the Yuma ASH would be required to comply with the Arizona Native Plant Law regardless of this management strategy.

### **5.10.8 Hunting**

No associated public utility or transportation corridor effects related to hunting are anticipated under the proposed action or any of the alternatives.

### **5.10.9 Recreational Shooting**

Regardless of the alternative, there would not be an anticipated impact on public utility or transportation corridors with recreational shooting on the BMGR. Management Strategy D would prohibit recreational shooting activities on the BMGR altogether, which would avoid impacts on utility or transportation corridors. Management Strategy B is very similar to the no-action alternative in that recreational shooting would be allowed to occur under existing conditions (unless a significant resource issue is identified). Impacts to utility and/or transportation corridors have not been identified thus far with recreational shooting on the range and would not be expected to in the future either. Although it may seem that the proposed action, Management Strategy C, could have an impact on existing corridors due to the potential establishment of designated recreational shooting area(s), DoD would be required to consider and assess any potential impacts on corridors in selecting a designated location; therefore, no impact is predicted.

### **5.10.10 Utility/Transportation Corridors**

#### **5.10.10.1 Proposed Action (Strategy C)**

The proposed action would restrict all future utility/transportation corridor development to projects in which the applications were filed prior to 6 November 2001. There is only one such project: the Yuma ASH. No other utility or transportation project would be allowed within this corridor besides the Yuma ASH.

Future needs for a utility/transportation corridor that traverses the BMGR are unknown at this time, but required compatibility with the military mission requirements would likely preclude any future corridor proposals to a great extent. Because the least expensive way to build a road or utility line is typically the straightest line between two points, there could be cost restrictions incurred by future projects if they are required to be established within a sub-optimum route outside of the BMGR.

The management objective to establish a protocol consistent with NEPA and other regulatory requirements for reviewing/approving proposed actions within the existing corridors would provide a roadmap for land managers that is consistent with the transfer of non-military land management responsibility from the BLM to the DoD with the MLWA of 1999. The DoD requirements for utility/transportation corridor development would be required to be consistent with U.S.C. 2668 for easement rights-of-way grants on military lands (see Section 4.10.3 for more information). Previously, applications and review were processed through BLM, but subject to the approval of the military. Now, applications would be processed based on the military protocol, with the BLM functioning in more of an advisory capacity.

The existing restrictions on further development of underground and overhead facilities within the State Route 85 corridor would remain in place. Specifically, overhead transmission lines would be restricted to alignments immediately parallel to the existing Gila Bend to Ajo 69 kV transmission line and underground facilities would be restricted to west of and parallel to the Tucson Cornelia and Gila Bend Railroad.

#### **5.10.10.2 Alternative Actions (Strategy B and Strategy D)**

Implementing Strategy D range-wide, which would restrict all future utility/transportation development to existing corridors, would negatively affect plans for construction of the Yuma ASH within a newly designated corridor along the western boundary of the BMGR. Restricting its development would cause an increase in costs associated with the need to establish a different route for the transportation corridor. This would also have the potential to cause major delays in the Yuma ASH construction as much of the planning work for this highway has already been

completed. Otherwise, this strategy would have the same consequences on transportation/utility corridors as the proposed action.

Management Strategy B differs from the proposed action in that additional utility/transportation corridor proposals would be evaluated on a case-by-case basis and in that restrictions on development of overhead and underground facilities in the State Route 85 corridor (as outlined in the Goldwater Amendment) would be lifted. Nonetheless, requirements for utility/transportation corridor development would be required to be consistent with U.S.C. 2668 for easement rights-of-way grants on military lands (see Section 4.10.3 for more information). Because additional corridors would not be restricted under this alternative, there would be less of a negative impact on future projects as opposed to the implementation of Strategy C or Strategy D.

### **5.10.10.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, utility/transportation corridor projects and corridor development would be managed by the DoD under the BLM's existing Goldwater Amendment. This alternative does not differ from the proposed action in that the same restrictions on construction of any overhead transmission lines in the State Route 85 corridor and underground facilities west of the Tucson Cornelia and Gila Bend Railroad would still apply. However, proposals for additional utility/transportation corridor projects through the BMGR would not be restricted under this alternative, with the only requirement being to conduct appropriate field examinations and/or environmental assessments. This management strategy would limit the location, but not necessarily prohibit future utility or transportation projects.

## **5.10.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

### **5.10.11.1 Proposed Action (Strategy C)**

If the proposed wildlife and vegetation surveys determine that a sensitive species habitat is located within an existing utility/transportation corridor, it could potentially result in the restriction of future development or change in management practices for the existing corridor. In addition, if the proposed studies determine that the State Route 85 transportation and utility corridor or the proposed Yuma ASH, assuming that this highway is constructed, contributes to the spread of invasive vegetative species on the range, the end result could potentially be a restriction of or a change to management measures for the affected corridor. Although responsibility for management of this issue would ultimately belong to an entity other than the DoD, cooperative measures regarding such issues would likely be initiated, as has already been recognized with respect to the State Route 85 corridor and the BEC Cooperative Weed Management Area Steering Committee (Faltisco 2002a).

### **5.10.11.2 Alternative Actions (Strategy B and Strategy D)**

Because the alternative actions for this resource management element, Management Strategies B and D, also involve the implementation of additional survey and monitoring work and the management objective regarding invasive species, these activities could potentially create the same impacts on utility/transportation development and management as the proposed action.

### **5.10.11.3 No-Action Alternative (Strategy A)**

Although additional wildlife and vegetation studies (including invasive weeds) are not included in Strategy A, the potential would still exist for restrictions to future utility/transportation development or changes to management of existing and future projects to meet regulatory requirements, including coordination with other land managers for better control of the spread of invasive weed species.

### **5.10.12 Special Status Species**

Each of the alternatives could potentially affect the construction of future utility or transportation projects (within the allowed corridors) if a special status species is determined to be in the area of influence of the project. It should be noted, however, that whatever associated impacts would occur, they would result from implementing other compliance activities, regardless of implementing the alternatives addressed in this EIS.

### **5.10.13 Soil and Water Resources**

#### **5.10.13.1 Proposed Action (Strategy D)**

The proposed action for soil and water resources, Strategy D, includes temporarily restricting vehicular and construction activities when soils are at a heightened risk of erosion, such as following heavy rain. This could temporarily affect construction schedules for any new utility or transportation project within the State Route 85 transportation and utility corridor. However, emergency utility maintenance (such as restoring power following storm damage) could potentially require access to the utility infrastructure even if soils are prone to erosion. While such emergency access would not be precluded, excessive surface damage done as a result of such access would require restoration under the proposed action.

### **5.10.13.2 Alternative Actions (Strategy B and Strategy C)**

Neither Strategies B nor C for soil and water resources would affect utilities or transportation corridors other than by the ways they are currently affected by other laws and regulations, such as the Clean Water Act, which may require sediment control, pollution prevention, and erosion control that might result from storm-water runoff.

### **5.10.13.3 No-action Alternative (Strategy A)**

Like Strategies B and C, utilities and transportation corridor development and maintenance would primarily be affected by other laws and regulations, such as the Clean Water Act, rather than the provisions of the no-action alternative for this resource management element.

## **5.10.14 Air Resources**

### **5.10.14.1 Proposed Action (Strategy A)**

With the proposed action for air resources, Management Strategy A, utility/transportation corridors development or maintenance would continue to be required to control excessive fugitive dust and develop and implement Best Management Practices to control non-point source pollution. These same objectives are typically required to comply with federal, state, or local standards to control dust at construction sites.

### **5.10.14.2 Alternative Actions (Strategy B, Strategy C, and Strategy D)**

Because no special air quality management objectives are provided under Management Strategy B, no impacts on utility/transportation corridors would occur.

Management Strategies C and D could positively affect motorists' viewing abilities along major transportation corridors, such as State Route 85, if dust palliatives are used and/or air quality monitoring is implemented. However, most air quality impacts in the region that may affect visibility are short-term, typically associated with natural dust storms and stabilize over time so these minor benefits might be infrequent.

### **5.10.14.3 No-Action Alternative (Strategy A)**

For air resources, the no-action alternative is identical to the proposed action and would have the same effects.

### **5.10.15 Visual Resources**

#### **5.10.15.1 Proposed Action (Strategy B)**

Strategy B visual resource objectives would require an assessment of the effects of new actions on visual resources. Proposals for any new utility or transportation developments, if allowed, would be subject to separate NEPA documentation that would include an assessment of the visual effects. Existing facilities would not be affected.

#### **5.10.15.2 Alternative Actions (Strategy C and Strategy D)**

Because Strategies C and D for visual resources would apply BLM's visual resource management criteria to visual resources management, any transportation corridor that occurs within BMGR boundaries—namely, State Route 85, would become a sensitive viewpoint looking onto range lands. This could affect management of these areas whereas they were not necessarily managed as such previously.

#### **5.10.15.3 No-Action Alternative (Strategy A)**

Although Strategy A for this resource element provides for the protection of visual resources, this management alternative would not be expected to alter the existing policy for maintenance of utility or transportation corridors. Establishment of additional corridors would not likely be affected with this management alternative either, because most restrictions on corridor development would not result solely from the effects of corridor development on visual resources.

### **5.10.16 Wildfire Management**

#### **5.10.16.1 Proposed Action (Strategy B)**

The proposed action for wildfire management could change the way major transportation corridors are managed on the BMGR in terms of roadway vegetation. Fire risks associated with

motorists traveling on highways include cigarettes thrown from car windows and car fires, which could potentially spread to BMGR lands away from the highway. Although the potential always existed for this type of fire, it has not been reported as an issue in the past. The proposed range-wide fire management plan would assess this risk and could potentially result in recommendations for management measures to reduce the risk (e.g., weed management following the spring wildflower cycle to eliminate vegetation that could carry fire).

#### **5.10.16.2 Alternative Actions (Strategy C and Strategy D)**

Management Strategies C and D for wildfire management are identical to the proposed action and would have the same effects on transportation corridor management.

#### **5.10.16.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, wildfire management suppression would continue to be managed under the existing objective. No changes in corridor maintenance would be expected and thus, no effects would be expected.

#### **5.10.17 Perimeter Land Use, Encroachment, and Regional Planning**

No special management prescriptions are provided for in Management Strategy A. However, Alternative Management Strategies B, C, and D for perimeter land use, encroachment, and regional planning could potentially affect off-range utility/transportation corridors through increased coordination between the Marine Corps and Air Force and adjacent communities, land managers/owners, and state, tribal, and local governments. The Marine Corps and Air Force may be able to persuade utility/transportation managers, regulatory agencies, or private or government project proponents that a proposed utility or transportation corridor or project adjacent to the BMGR would adversely affect the BMGR in some way and influence an outcome more favorable to the range environment. Furthermore, increased coordination could provide early reinforcement of the difficulties and likely potential incompatibilities of proposed utility/transportation projects through the range with BMGR military operations and resource management priorities.

### **5.10.18 Aggregate Effects on Public Utilities and Transportation Corridors**

#### **5.10.18.1 Proposed Action**

Considered in aggregate, the 17 resource management elements of the proposed action would have some additive impacts affecting the management of public utility and transportation corridors through the BMGR. Most importantly, the proposed management objectives for utility/transportation corridors would restrict all future utility/transportation corridor development to existing corridors, except for the Yuma ASH; continue to limit development of the State Route 85 corridor to current restrictions; and establish a protocol consistent with NEPA and other regulatory requirements for reviewing/approving proposed actions within existing corridors. Other potential consequences are minor and may include restriction of future development or change in management practices for existing corridors if the proposed wildlife and vegetation surveys determine that a sensitive species habitat is located within an existing utility/transportation corridor, if invasive species management protocols lead to a change in existing management measures for the affected corridor (e.g., roadside weed control), or if erosion control policies affect maintenance activities within the future utility and/or transportation projects within the State Route 85 or proposed Yuma ASH corridors. Proposed management provisions for perimeter land use, encroachment, and regional planning would also create a potential to affect off-range utility/transportation corridor development and projects but this effect would not be additive or interactive with the effects of the other elements of the proposed action.

#### **5.10.18.2 Alternative Actions**

##### **Management Strategy B**

Objectives provided under Alternative Management Strategy B for the following resource management elements could result in aggregate effects on the future management or potential development of utility or transportation corridors: utilities/transportation; general vegetation, wildlife, wildlife habitat, and wildlife waters; special status species; and perimeter land use, encroachment, and regional planning. Alternative Management Strategy B provides an option for considering the siting of additional utility/transportation corridors, other than the Yuma ASH, within the BMGR. Given the current and foreseeable ongoing military use of the range, however, the potential that any further corridor alignments through the BMGR would be found to be compatible with its military purposes would appear to be unlikely. Although Strategy B focuses mainly on regulatory compliance and does not outline the same level of natural resource protection as the proposed action, the difficulty of siting a new corridor within the range would still be compounded by provisions of Strategy B, which call for the protection and conservation of vegetation communities, wildlife and wildlife habitat, and special status species. In addition,

the provisions for perimeter land use, encroachment, and regional planning coordination would increase the probability that range managers would provide input on the constraints that utility/transportation corridor proposals through the BMGR would face early in the planning process for those proposals. Early involvement in corridor proposals would likely be effective for influencing the direction of these types of projects away from the BMGR.

### Management Strategy C

Alternative Management Strategy C would not permit the siting of additional utility/transportation corridors, other than the Yuma ASH, within the BMGR. This strategy would have minimal differences in the aggregate effects compared to the proposed action. In terms of restricting future development of utility and/or transportation corridors, the management objectives outlined under vegetation, wildlife, and wildlife habitat; special status species; and visual resources for this strategy could have additive impacts that would potentially compound the constraints imposed on future utility or transportation projects in the existing and proposed Yuma ASH corridors.

### Management Strategy D

No new utility or transportation corridors (including the Yuma ASH) would be permitted within the BMGR under Alternative Management Strategy D. This would negatively affect plans for construction of the Yuma ASH within a newly designated corridor along the western boundary of the BMGR. Restricting its development would cause an increase in costs associated with the need to establish a different route for the transportation corridor and have the potential to cause major delays in the Yuma ASH construction because much of the planning work for this highway has already been completed. Otherwise, this management strategy would have similar, but somewhat more pronounced, aggregate impacts as identified for the proposed action principally because additional visual resource management objectives would impose an additional constraint on future utility or transportation projects in the existing State Route 85 corridor.

#### **5.10.18.3 No-Action Alternative**

The no-action alternative would continue existing management of the State Route 85 corridor and provide an option for considering the siting of additional utility/transportation corridors, other than the Yuma ASH, within the BMGR. The aggregate effects of the no action alternative would not differ measurably from those of Alternative Management Strategy B.

## **5.11 SPECIAL MANAGEMENT AREAS**

### **5.11.1 Resource Inventory and Monitoring**

#### **5.11.1.1 Proposed Action (Strategy D)**

Because the potential special management areas (the expired ACECs, SRMAs, HMA, and Backcountry Byway) have been assigned special land management designations in recognition of certain resource or recreation values, the additional resource inventory and monitoring, as presented under Strategy D, would have potential beneficial effects on the resources that make these areas unique. In areas designated as special/natural interest areas, it is expected that there would be less tolerance for deterioration or damage than in other locations and, presumably, the monitoring and adaptive management program would have increased attention focused on them. A more intensive schedule of monitoring would provide a tool for monitoring change in the overall ecological health of the area. Selection and implementation of this strategy would be considered proactive in that it would establish a snapshot of the overall ecological health of an area before a negative impact occurs. Through continued monitoring, appropriate adaptive management responses could be implemented more expeditiously and effectively than under the current, primarily reactive management.

#### **5.11.1.2 Alternative Actions (Strategy B and Strategy C)**

Strategy C would have the same overall beneficial effect on special natural/interest areas as the proposed action. In general, implementing a more intensive schedule of natural and cultural resource inventory and monitoring would help detect a potential change in the sensitive resources of the areas before it becomes detrimental to the ecological health of the area.

Strategy B does not provide for the same level of proactive resource inventory and monitoring as the proposed action, as its primary focus is on implementing inventory and monitoring activities to comply with federal, state, and DoD regulations. Therefore, this strategy would not provide the same amount of benefit to the resources in the special natural/interest areas.

#### **5.11.1.3 No-Action Alternative (Strategy A)**

The no-action alternative would continue with existing monitoring programs. While it would not be expected that it would have a detrimental effect on the resources of the special natural/interest areas, in comparison to the proposed action, it would not have the same beneficial effect as the increased inventory and monitoring.

## **5.11.2 Special Natural/Interest Areas**

### **5.11.2.1 Proposed Action (Strategy C)**

The proposed action (Strategy C) would redesignate ACECs as special natural/interest areas, but would allow the SRMAs and Backcountry Byway to expire. By redesignating the ACECs as special/natural interest areas, it is expected that there would be less tolerance for deterioration or damage in these areas than in other locations and, presumably, the monitoring and adaptive management program would have increased attention focused on these areas that could be more effective in protecting special resources than existing programs. While they would no longer be managed as special management areas, the former SRMAs and Backcountry Byway would be subject to the management provisions established in the proposed INRMP for the management units in which they are located. For some management issues, this could mean the same or even greater restrictions or limitation on use than was prescribed with the SRMA or Backcountry Byway standard. However, the management standards could also be reduced. Some of the management provisions for the ACECs could change as well, but special management provisions in the form of additional restrictions or limitations on use could be established for special natural/interest areas and the intent would be to retain much of the protective legacy for the ACECs.

Redesignating the flat-tailed horned lizard HMA as a special natural/interest area and retaining its existing management provisions would continue to benefit the resources for which this area was specially designated.

The potential for altering existing or establishing additional special natural/interest areas would be evaluated based, at least in part, on the natural communities and plant and wildlife species that are identified as conservation elements for the BMGR. Opportunities to better manage special geologic, scenic, cultural or other resource areas by designating them as special natural/interest areas would also be considered.

### **5.11.2.2 Alternative Actions (Strategy B and Strategy D)**

Strategy D is very similar to Strategy C in that ACECs and HMA would be redesignated as special natural/interest areas. However, Strategy D would also redesignate the SRMAs and the Backcountry Byway as special natural/interest areas. As described for the proposed action for the ACECs, the management prescriptions for the SRMAs and Backcountry Byway as defined in the Goldwater Amendment could be changed, but the intent would be to hold these areas to a higher

standard of management for increased protection. Like the proposed action, potential for altering existing or establishing additional special natural/interest areas would be evaluated.

Strategy B would not redesignate the expired ACECs, SRMAs, and the Backcountry Byway as special natural/interest areas. Unlike Strategies C and D, this strategy does not allow for development of special management provisions as needed for resource protection. As a result, the areas formerly protected through their designations would be managed according to the selected management strategies for the resource elements in the INRMP (see Section 4.11.1 for more information about the special management provisions of the ACECs, SRMAs, and the Backcountry Byway).

Strategy B would, however, redesignate the flat-tailed horned lizard HMA as a special natural/interest area and retain its existing management provisions, which would continue to benefit the resources for which this area was specially designated.

### **5.11.2.3 No-Action Alternative (Strategy A)**

Implementing Strategy A would continue to benefit the ACECs, SRMAs, the Backcountry Byway and the HMA through retention of both the designations and the special management provisions.

## **5.11.3 Motorized Access and Unroaded Area Management**

### **5.11.3.1 Proposed Action (Strategy C)**

The proposed action for this resource category would implement Strategy C. This strategy would reduce the roads in all of the ACECs combined by a total of about 87 miles, in the SRMAs combined by about 54 miles, and in the HMA by about 48 miles. Most of the mileage of road closures would occur within the Tinajas Altas Mountains ACEC, Mohawk Mountains and Sand Dunes ACEC, and Sentinel Plain Lava Flow SRMA. Few roads would be closed within the Crater Range SRMA or the Gran Desierto Dunes ACEC (see Figures 3-1 and 3-2). For most areas of the SRMAs, any change in motorized access would not affect the public because public access in these areas is already restricted for safety reasons. No roads within the publicly accessible portions of the Crater Range SRMA would be closed.

The road closures under Strategy C, as compared to the existing conditions, would reduce the number of small, fragmented areas of land, increasing the unroaded area acreage within most of the special management areas, which may benefit the sensitive resources contained within each

of the areas (refer to Figure 3-3 and Figure 3-4 for a comparison of unroaded areas under each of the management strategies for BMGR—West and BMGR—East, respectively).

### **5.11.3.2 Alternative Actions (Strategy B and Strategy D)**

Under the range-wide application of Management Strategy B, all of the existing roads within each of the SRMAs, ACECs, and the HMA would be maintained. For the ACECs combined, the total existing road mileage is estimated at about 263 miles; for the SRMAs combined, the total existing road mileage is estimated at 80 miles; and for the HMA, the total existing road mileage is estimated at about 182 miles. Motorized access and unroaded area management within each of the areas would remain unchanged and could therefore potentially have some negative affect on resources as compared to the proposed action, including those resources for which the special management areas were created. New roads could be established with Strategy B, including a proposal for bypass roads just outside of the Cabeza Prieta NWR boundary; if built, a portion of the bypass road would be near the Tinaja Altas ACEC southeastern boundary.

Implementing Strategy D would collectively result in the closure of an additional about 26 miles of road in the ACECs, but the same mileage of road closures within the SRMAs and HMA. Therefore, Strategy D would have the same effects as the proposed action in the SRMAs and HMA. Cumulatively, the ACECs would, however, experience a greater reduction in the road mileage with implementation of Strategy D.

### **5.11.3.3 No-Action Alternative (Strategy A)**

The no-action alternative would not create or close roads on the BMGR in the short term. Strategy A does provide for the possible development of a transportation plan that could potentially result in future road closures, although the magnitude of those closures cannot be determined. However, it is likely that at least some road closures would occur within the former ACECs, SRMAs, and/or HMA.

## **5.11.4 Camping and Visitor Stay Limits**

### **5.11.4.1 Proposed Action (Strategy C)**

The HMA, the Gran Desierto Dunes ACEC, part of the Mohawk Mountains and Sand Dunes, and most portions of the SRMAs are not accessible to the public. Therefore, management strategies for camping and visitor stay limits would not be applicable in these areas.

Public access is allowed within the portion of the Crater Range SRMA that is east of State Route 85, generally west of the Mohawk Mountains within the Mohawk Mountains and Sand Dunes ACEC, within the Tinajas Altas Mountains ACEC, and along the Backcountry Byway. In these areas, Strategy C would benefit the sensitive natural and cultural resources because camping along certain road segments could be restricted if there were a resource protection issue and camping would be prohibited within ¼-mile of designated natural and cultural resources. Because of the number of cultural resource sites within the Tinajas Altas Mountains ACEC, this could be especially beneficial to protect those resources. Defining and prescribing reasonable rules for the disposal of human sewage and solid waste would also help to prevent degradation of these areas.

#### **5.11.4.2 Alternative Actions (Strategy B and Strategy D)**

Management objectives for Strategy D are the same as for Strategy C except that the vehicle-based camping stays would be limited to 7 consecutive days within a 28-day period except by a special use permit, as opposed to a 14-consecutive-day limit with Strategy C. Repeated use of the same camp site in a short time period can lead to resource damage. However, few campers tend to stay for even 7 days so the effects of Strategy D would likely be very similar to the proposed action.

Strategy B would allow vehicles to be pulled up to 100 feet off a road for vehicle-based camping, rather than 50 feet for Strategies A, C, and D. This could result in damage to sensitive resources within the special natural/interest areas. Unlike the proposed action, camping would not be restricted near resources that are sensitive to human-induced disturbances, but Strategy B would include the beneficial objective of prescribing rules for human sewage and solid waste disposal.

#### **5.11.4.3 No-Action Alternative (Strategy A)**

The no-action alternative would not change the manner in which camping is managed within any of the special natural/interest areas so effects would not change from existing conditions. However, as compared to the proposed action, the potential for increased protection from camping-related disturbances of sensitive resources within the special management areas would not exist.

#### **5.11.5 Recreation Services and Use Supervision**

The effects of the alternative management strategies for recreation services and use supervision within special natural/interest areas (and former specially designated areas such as SRMAs, etc.)

would be the same as those described for general outdoor recreation. These effects are presented in Section 5.12.5.

### **5.11.6 Rockhounding**

#### **5.11.6.1 Proposed Action (Strategy C in Units 2 and 3 and Strategy D in All Other Units)**

With the proposed action, rockhounding would be restricted from occurring within special natural/interest areas. If the ACECs were redesignated as special natural/interest areas, as proposed (see Section 5.11.2.1), no rockhounding would be allowed within the ACECs, SRMAs, or HMA. If the ACECs were not redesignated as special natural/interest areas, rockhounding would be allowed within the publicly accessible portions of the former Mohawk Mountains and Sand Dunes ACEC and in the northernmost part of the Tinajas Altas Mountains ACEC. While large quantities of rock would not be expected to be removed from these areas, rockhounding activities could potentially damage other resources, including inadvertent damage of cultural resource sites. Rockhounding would be prohibited in Management Units 1, 4, 5, 6, and 7 where the other specially designated management areas occur.

#### **5.11.6.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

If Strategy D were applied to Management Units 2 or 3, rockhounding would be prohibited from the publicly accessible portions of the Mohawk Mountains and Sand Dunes ACEC and the northernmost portion of the Tinajas Altas Mountains ACEC, thus better providing protection for the resources within these areas.

If Strategy C were applied to Management Units 1, 4, 5, 6, or 7, rockhounding would be allowed in the publicly accessible portion of the Crater Range SRMA east of State Route 85 and could be allowed within a small portion of the Mohawk Mountains and Sand Dunes ACEC unless the ACECs are redesignated as special natural/interest areas.

If Strategy B were implemented, rockhounding would be allowed in all publicly accessible portions of the ACECs and SRMAs that are within the management unit in which Strategy B were applied.

### **5.11.6.3 No-Action Alternative (Strategy A)**

With the no-action alternative, rockhounding would be allowed within the publicly accessible portions of the former ACECs and SRMAs. The HMA is not accessible to the public and would not be affected regardless of the management strategy selected.

## **5.11.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

### **5.11.7.1 Proposed Action (Strategy D in Unit 1 and Strategy C in All Other Units)**

With the proposed action, the use of dead and downed wood for campfires would be prohibited within Unit 1, but allowed in the other management units. Campfires would still be allowed in Unit 1 if the wood used was not native to the BMGR; in other areas of the range, native BMGR wood could be used for campfires. Rather than managing wood supplies by special management area, the proposed action would manage wood supplies according to the new management units, with monitoring to occur in high use areas and restricted if resource conditions dictate. Consequently, wood gathering for campfires would be allowed in the publicly accessible portions of the Crater Range SRMA, Mohawk Mountains and Sand Dunes ACEC, the northernmost portion of the Tinajas Altas Mountains ACEC, and along the portion of El Camino del Diablo Backcountry Byway within Unit 2. Current policies in accordance with the Goldwater Amendment do not allow wood collection within these ACECs or within 150 feet of the Backcountry Byway. Wood collection within the SRMAs was not prohibited in the Goldwater Amendment so the proposed action would not change the policy within the portion of the Crater Range SRMA east of State Route 85.

### **5.11.7.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

If Strategy D were applied to Units 2, 3, 4, 5, 6, or 7, all forms of wood cutting and wood gathering would be prohibited in those units. This would continue to preserve the wood supplies within the Mohawk Mountains and Sand Dunes ACEC and the northernmost portion of the Tinajas Altas Mountains ACEC, and within 150 feet of el Camino del Diablo Backcountry Byway within Unit 2.

The application of Strategy C to Unit 1 would allow for the introduction of wood consumption (allowing the use of dead and downed wood) in the Gran Desierto Dunes ACEC, the Tinajas Altas Mountains ACEC, and within 150 feet of the portion of El Camino del Diablo Backcountry Byway in Unit 1. This would primarily affect the Tinajas Altas Mountains ACEC and the

Backcountry Byway as these areas are accessible to the public. Wood resources in high use areas would be monitored and use restricted as resource conditions dictated.

Allowing the use of dead and downed wood, but prohibiting woodcutting within the flat-tailed horned lizard HMA with Strategy C would continue the existing provision for wood consumption in this area. However, public recreation is not allowed in this area for safety reasons.

Strategy B would allow for wood cutting, gathering, and firewood use as long as wood is used at a sustainable rate and no regulatory compliance issue arises. This would primarily affect the ACECs and within 150 feet of the Backcountry Byway where wood cutting and the taking of dead or downed wood has been prohibited by the Goldwater Amendment.

### **5.11.7.3 No-Action Alternative (Strategy A)**

The no-action alternative would continue to prohibit collection of firewood in ACECs and within 150 feet of the Backcountry Byway. Wood cutting for commercial or domestic use would continue to be prohibited within the HMA (although this area is restricted to public access).

## **5.11.8 Hunting**

### **5.11.8.1 Proposed Action (Strategy B)**

For the most part, the range-wide application of Strategy B for this resource category would have an impact on the resources for which the specially managed areas were created. The proposed evaluation of the effects of non-game species collection on wildlife, habitat, and other resources could have an effect if it leads to limitations or restriction of collection activities (within the authority of state law). The Mohawk Mountains and Sand Dunes ACEC, which is known habitat for a wide range of herpetofauna (e.g., rosy boa snakes and fringed-toed lizards), would potentially benefit from both the evaluation and any indicated limitations or restrictions.

### **5.11.8.2 Alternative Actions (Strategy C and Strategy D)**

The range-wide implementation of Strategy D may benefit specially designated areas because this strategy would potentially close the BMGR to non-game species collection (subject to Arizona Game and Fish Commission approval of the proposed petition). As with the proposed action, the Mohawk Mountains and Sand Dunes ACEC would most likely benefit from such a prohibition because it is known habitat for a wide range of herpetofauna. However, unlike the

proposed action, there would not be the potential benefit from any knowledge that could be gained through the evaluation included in the proposed action.

The objectives outlined for Strategy C are identical to those of the proposed action and would therefore have the same potential impacts on the special management areas as defined for the proposed action.

### **5.11.8.3 No-Action Alternative (Strategy A)**

The no-action alternative would continue existing game management programs and no impacts from implementation of this strategy to special management areas are expected.

### **5.11.9 Recreational Shooting**

The differences in the types of effects associated with the alternative management strategies for recreational shooting are described for general outdoor recreation and presented in Section 5.12.9. While the proposed action (Strategy C) and Strategy D would include an assessment of the appropriateness of designating recreational shooting areas on the BMGR, it is unlikely that any such areas would be located within the areas that have historically had special management designations. The only potential effect on special natural/interest areas would likely be noise if a shooting area were designated near a special natural/interest area, and this effect would be considered in the assessment.

### **5.11.10 Utility/Transportation Corridors**

#### **5.11.10.1 Proposed Action (Strategy C)**

Strategy C would restrict all future utility/transportation corridor development except for the projects whose applications were filed prior to 6 November 2001 (the Yuma ASH project). If the final alignment for the Yuma ASH were to pass through the HMA, the effects would be addressed in the separate NEPA documentation being prepared for this proposed action. Highway widening or new utilities could occur within the State Route 85 corridor, which passes through the Crater Range SRMA, but the effects would likely be minimal in that the transportation/utility corridor was established prior to the SRMA designation and limitations on what type of development can occur in the corridor would continue.

### **5.11.10.2 Alternative Actions (Strategy B and Strategy D)**

Strategy D would prohibit any new utility/transportation corridors from being established on the BMGR in the future. Consequently, there would be no effect on special land designations.

Evaluating the development of additional utility/transportation corridors on a case-by-case basis under Strategy B could have a negative effect on specially designated areas because of the potential for the construction of a new corridor through one of the former ACECs, SRMAs, HMA, or Backcountry Byway or a future special natural/interest area. Without a specific proposal for an additional corridor, the level of effect cannot be evaluated at this time. However, it is not likely that new utility/transportation corridors would be considered compatible with the military mission and the location of special natural/interest areas would likely be considered in the evaluation of any proposals for a new corridor.

### **5.11.10.3 No-Action Alternative (Strategy A)**

Because it is unlikely that new corridors would be compatible with the military mission, the no-action alternative would have essentially the same effect as the proposed action, even though Strategy A would consider new corridor proposals in addition to the Yuma ASH.

## **5.11.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

### **5.11.11.1 Proposed Action (Strategy C)**

The proposed action for this resource management element (Strategy C) would allow the implementation of up to six high-priority wildlife water developments prescribed by the Lechuguilla-Mohawk and Draft Barry M. Goldwater East HMPs. An environmental analysis would be conducted for the site-specific locations, when selected, which would include consideration of any effects on special natural/interest areas.

A beneficial management prescription of Strategy C would be the provision to conduct surveys and establish control priorities for invasive species, which would benefit native species within specially managed areas. For example, the exotic Sahara mustard is an invasive species found to inhabit the Mohawk Dunes and Mountains area of the BMGR. Implementing a proactive program through the proposed INRMP to establish control priorities for, prevent the introduction of, and monitor populations of invasive species and develop coordinated strategies to locally eradicate and/or control the spread of these species commensurate with the threats they pose to natural resources would benefit the vegetative resources of the Mohawk Mountains and Sand Dunes ACEC.

### **5.11.11.2 Alternative Actions (Strategy B and Strategy D)**

Strategy D would suspend the implementation of wildlife water developments for the first five-year term of the INRMP until a more thorough review of literature and studies could be implemented to determine the benefits and adverse effects of wildlife waters. Therefore, no special natural/interest areas would be affected by new wildlife water developments, at least in the short term. Like the proposed action, this strategy would also provide for conducting surveys and establish control priorities for invasive species, which would benefit native species within specially managed areas.

While Strategy B would allow for the implementation of the wildlife water developments described by the Lechuguilla-Mohawk and Draft Barry M. Goldwater East HMPs as well as consider additional wildlife waters, any effects on special natural/interest areas would be evaluated in the siting studies for these developments. Like the proposed action, Strategy B would provide for conducting surveys and establishing control priorities for invasive species, which would benefit the native vegetation within special natural/interest areas.

### **5.11.11.3 No-Action Alternative (Strategy A)**

Strategy A would have similar effects to Strategy B with regard to wildlife water developments. This strategy would not provide for any additional surveys and research of invasive species.

### **5.11.12 Special Status Species**

Impacts on special natural/interest areas would not be expected with implementation of any of the management strategies for this resource management element.

### **5.11.13 Soil and Water Resources**

#### **5.11.13.1 Proposed Action (Strategy D)**

While all of the alternatives provide for some amount of soil protection, the proposed action, Strategy D would provide for the most. Under Strategy D, restrictions would be placed on vehicular access on roads when soils are particularly susceptible to erosion, such as after a heavy rain. In addition, this alternative would be a higher priority candidate for restoring the soil in certain areas where vehicle use has caused excessive surface damage. Although there are no

areas within the expired SRMAs, ACECs, the HMA, or the Backcountry Byway where soil erosion is of particular concern, these provisions could only have a beneficial effect on the protection of soil resources of the various areas.

#### **5.11.13.2 Alternative Actions (Strategy B and Strategy D)**

Strategies B and C both add to the existing soil and water resource management provisions, with Strategy C offering increased erosion control measures. Both strategies would benefit soil and water resources within the special management areas, which are integral elements within sensitive natural ecosystems of the expired SRMAs, ACECs, and the HMA.

#### **5.11.13.3 No-Action Alternative (Strategy A)**

Although the other alternatives, especially the proposed action, provide for a greater number of management prescriptions that would help protect and restore soil resources, the soil and water resource objectives under the no-action alternative would have a continued benefit for special management areas.

### **5.11.14 Air Resources**

#### **5.11.14.1 Proposed Action (Strategy A)**

The range-wide application of Management Strategy A would continue to minimize impacts to the air resources through the control of fugitive dust emissions at construction and recreational sites, including any sites within special natural/interest areas.

#### **5.11.14.2 Alternative Actions (Strategy B, Strategy C, and Strategy D)**

Of the alternative management strategies, Strategy D may be the most effective at reducing impacts to the air resources by monitoring air quality trends, avoiding activities in areas of deteriorating air quality, and using dust palliatives on heavily traveled roads. Using dust palliatives to control excessive fugitive dust generated on roads could reduce the amount of dust created on certain drag roads that are traveled by the Border Patrol within the Tinajas Altas Mountains ACEC and along the El Camino del Diablo Backcountry Byway. Although no need for dust abatement activities have been identified for these areas in the past, if a future problem were to arise, this strategy could have positive impact.

Compared to the proposed action, Strategy C would be better at controlling fugitive dust through the use of dust palliatives on heavily traveled roads as well as at construction sites.

Strategy B would have more adverse impact than any of the other alternatives because it offers no management objectives to control dust.

#### **5.11.14.3 No-Action Alternative (Strategy A)**

The proposed action for air resources is the no-action alternative. The effects would be the same as described for the proposed action.

#### **5.11.15 Visual Resources**

The visual quality of each of the special management areas is one of the many reasons for establishing special designations for the areas. The management strategy alternatives for this resource category should not differentiate effects on the various areas, as they all specifically provide for the protection of visual resources. The proposed action, Strategy B, would continue to manage visual resources in a similar manner as they are under the existing condition. In comparison, however, Strategies C and D would provide for the greatest amount of visual resource protection through the incremental increase in visual resource protection objectives.

#### **5.11.16 Wildfire Management**

Strategies B, C, and D could all potentially benefit special natural/interest areas because they would all develop a range-wide fire management plan, which could provide added protection for the special qualities within any special management areas.

The no-action alternative would be less proactive in fire management, but includes fire suppression.

#### **5.11.17 Perimeter Land Use, Encroachment, and Regional Planning**

All of the management strategy alternatives for this resource category would provide for better coordination and communication with the land owners and land managers for lands adjacent to the BMGR. This would have a particular benefit for the expired Mohawk Mountains and Sand Dunes ACEC, as it is located just south of Interstate 8, between the communities of Tacna and Dateland. Increased coordination with land owners in the area could provide for a proactive

approach to identifying potential land use or natural and cultural resource issues that may affect the area. The expired Tinajas Altas Mountains ACEC, Gran Desierto Dunes ACEC, and the flat-tailed horned lizard HMA are all contiguous with Mexico and could also benefit from increased communication regarding land management issues.

Strategy D provides for the greatest degree of coordination and would have the greatest potential benefits. Strategy C and B would also result in benefits commensurate with the level of coordination included in the strategy provisions.

### **5.11.18 Aggregate Effects on Special Natural/Interest Areas**

#### **5.11.18.1 Proposed Action**

The two major types of aggregate effects that could potentially occur within special management areas include (1) changes to natural resources that would have a direct impact within the special management areas, and (2) changes in resource management policy that would have secondary effects on the resources within the special management areas.

Redesignating the expired ACECs as special natural/interest areas, but not redesignating the expired SRMAs and Backcountry Byway as special natural/interest areas could potentially have an adverse impact on how the natural resources within the SRMAs and Backcountry Byway are managed if special management provisions are not developed for the areas. However, this impact could be balanced by the actions proposed in this EIS for the other resource management elements. In particular, the proposal to close roads (and create larger unroaded areas), implement stricter rules for recreation services and use supervision, restrict or prohibit rockhounding, and protect resources from camper damage would together reinforce the protection and preservation of special resources, regardless of whether they are within a specially designated management area. The potential for altering existing or establishing additional special natural/interest areas would be based, at least in part, on the natural communities and plant and wildlife species that are identified as conservation elements for the BMGR. Opportunities to better manage special geologic, scenic, cultural or other resource areas also would be evaluated.

Changes in resource management policy that would have a potential secondary effect on special management areas include provisions for resource monitoring, increased law enforcement, use of dead and downed wood, designating recreational shooting areas, development of wildlife waters, erosion management, best management practices to reduce particulates, wildfire management, and perimeter land use coordination. While allowing use of dead and downed wood and noise from designated recreational shooting areas could potentially result in negative impacts on sensitive resources within special management areas, the proposed additional resource inventory and monitoring could determine if one of these activities were significantly affecting sensitive

natural and/or cultural resources. In addition, erosion control measures, best management practices to reduce particulates, wildfire management, and increased perimeter land use coordination would benefit management of the former SRMAs, ACECs, the HMA, and the Backcountry Byway. Finally, the proposal to develop a limits-of-acceptable-change system and to develop adaptive management responses to emerging resource conservation and protection problems provides the opportunity to make any adjustments that might be necessary to protect the resources both within and outside of specially designated areas.

### **5.11.18.2 Alternative Actions (Strategy B and Strategy C)**

#### Management Strategy B

Under the range-wide application of Management Strategy B, although most ongoing natural and cultural resource management practices would be continued, resource protection and conservation measures would typically be limited to those necessary to achieve basic regulatory compliance. While application of this management strategy would not be expected to cause any measurable degradation of the sensitive resources within the special resource management areas, the effects would be expected to be more adverse than those associated with the proposed action. As with the proposed action, the two types of aggregate effects that were identified include: (1) changes to natural resources that would have a direct impact within the special management areas, and (2) changes in resource management policy that would have secondary effects on the resources within the special management areas.

If Strategy B were selected for this resource management element, the INRMP would state that the former ACECs, SRMAs, and the Backcountry Byway would be managed without special management provisions. In addition, application of this management strategy would allow public access and use opportunities to increase, compatible with sustaining a healthy natural environment. As opposed to the proposed action, the existing road network would be retained and thus, unroaded area acreage would stay the same.

Changes in resource management policy that would have a secondary beneficial effect on special management areas include provisions for resource monitoring, regulations for disposal of human sewage and waste, erosion management, wildfire management, and perimeter land use coordination. Unlike the proposed action, allowing wood cutting and firewood use range-wide, expanding the footprint for vehicle-based camping, potentially allowing for new transportation/utility corridors, and not taking action to control dust could potentially result in adverse aggregate effects for the special resource management areas.

### Management Strategy C

Under Management Strategy C, as with the proposed action, the expired ACECs and the HMA would be redesignated as special natural/interest areas, but not the SRMAs or the Backcountry Byway. For the most part, resource management elements would be similar to the proposed action, but there would be a somewhat lesser degree of resource protection with regard to resource inventory and monitoring and soil and water resource management objectives and additional protection as compared to the proposed action for air and visual resources. The range-wide use of dead and downed wood for campfires would be allowed under Strategy C (including within Unit 1), which would introduce a consumptive activity that was previously prohibited within special resource management areas, although use would be monitored in high-use areas and restrictions implemented as dictated by resource conditions. Overall, however, Strategy C was applied to most management units accessible to the public under the proposed action and would therefore have similar effects on special resource management areas as the proposed action.

### Management Strategy D

In aggregate, the effects of selection and implementation of Management Strategy D would have an overall beneficial impact on special resource management areas within the BMGR. The SRMAs and Backcountry Byway would be redesignated as special natural/interest areas in addition to the ACEC and HMA. Approximately 107 more miles of road would be closed, which would allow for additional large-size unroaded areas, including some within and near special management areas. Like the proposed action, the potential for altering existing or establishing additional special natural/interest areas would be evaluated.

As compared to the proposed action, the range-wide application of Management Strategy D would result in additional air and visual resources management objectives and additional rules and regulations for recreational users would be implemented for camping, vehicle party size, rockhounding, wood collection and firewood use, hunting (if the BMGR were closed to non-game species collection as a result of the proposed petition to the Arizona Game and Fish Commission), and recreational shooting. In addition, new utility and/or transportation corridors would not be granted and additional wildlife waters would be suspended for five years. Like the proposed action, resource inventory and monitoring, soil and water resource management objectives, a wildfire management plan, and increased perimeter land use coordination would be implemented.

In aggregate, the management practices proposed under Management Strategy D would have a favorable effect on the protection of the existing special resource management areas designations and the resources within these areas.

### **5.11.18.3 No-Action Alternative (Strategy A)**

The range-wide application of Management Strategy A for each of the resource management elements would differ from the proposed action in that there would be fewer studies, evaluations, and assessments than with the proposed action. However, the existing (but expired) designations for the ACECs, SRMAs, HMA, and Backcountry Byway would all be retained along with their management provisions. This would not necessarily be the same as the proposed action because of the various changes in objectives for the other resource management elements. However, this would assure that the qualities for which the special management designations were given would not be degraded or changed to the same degree as under current management.

## **5.12 OUTDOOR RECREATION**

### **5.12.1 Resource Inventory and Monitoring**

#### **5.12.1.1 Proposed Action (Strategy D)**

The proposed action for this resource category (Strategy D range-wide) may have indirect effects on recreation. The proposed resource inventory and monitoring objectives are based on a limits of acceptable change management system to monitor key indicators of environmental effects of ongoing uses of the BMGR, including recreation. If the findings of the inventory and monitoring efforts reveal that deleterious effects are occurring as a result of recreation use, the Air Force and Marine Corps could adapt their management to address the issue or issues. Adaptive management responses could modify, limit, or restrict recreational access or activities to address identified resource conservation and protection problems. In the event that a monitoring program reveals that deleterious effects on natural or cultural resources are resulting from the combined effects of recreation and military uses, limitations could be placed on recreation use; although the Sikes Act and MLWA of 1999 provide for recreational use, that use must be environmentally sustainable and consistent with the military purposes of the range. On the other hand, monitoring the effectiveness of management actions could determine that some restrictions on recreation are unnecessary and may be removed (e.g. it may be that there are so few large groups with multiple vehicles using the BMGR that the requirement for a special use permit is found to be unnecessary).

Given the subject matter and the potential ever-changing consequences on recreation, the level of effect of the proposed action on recreation cannot be specifically predicted. Programmatically, however, any impacts are expected to be relatively minimal and localized to specific areas or types of use on the BMGR and not affect overall recreation use, opportunities, or trends on the BMGR or in the greater recreation study area.

#### **5.12.1.2 Alternative Actions (Strategy B and Strategy C)**

Resource inventory and monitoring under Alternative Management Strategy C would have similar potential to indirectly affect recreation as the proposed action. Strategy B would lack the adaptive management provisions and the limits of acceptable change system included in the proposed action. Instead of using inventory and monitoring and thresholds or indicators that would define the limits of acceptable change and the initiation of management action, management could be based on assumed effects. Oftentimes, this management approach can lead to limitation or restrictions on recreation that may be unnecessary or unproven or that are applied in an ill-timed, reactionary approach that is late in terms of arresting resource damage while the problem is still small. Strategy B, however, does include the monitoring of the effectiveness of compliance actions, which could be used for the cessation or alteration of ineffective restrictions on recreation.

#### **5.12.1.3 No-Action Alternative (Strategy A)**

Strategy A for this resource category would have less potential for effects on recreation use than the proposed action because restrictions or limitation on recreation are less likely to be prescribed based on the results of monitoring or the use of the limits of acceptable change management system. However, if resource conservation and protection problems arise, there could be more restrictive limitations on recreation use because managers would not have the benefit of the scientific findings from inventory and monitoring to better understand the relationship between recreation use and resource conservation or protection problems.

### **5.12.2 Special Natural/Interest Areas**

#### **5.12.2.1 Proposed Action (Strategy C)**

The proposed action for special natural/interest areas (Strategy C range-wide) may have minor effects on recreation in that the redesignation of the expired ACECs as special natural/interest areas could bring renewed attention and interest in these areas. DoD guidance allows and, in some ways, encourages installations to engage in public awareness and outreach programs to educate the public regarding the resources on military lands and DoD efforts to conserve those

resources. The redesignation of the special natural/interest areas may provide an opportunity for such public relations, if deemed appropriate. Depending on how the redesignation is communicated to the public, this could lead to a slight temporary increase in visitation to those areas that are generally open to public access (the proposed Tinajas Altas Mountains and most of that portion of the Mohawk Mountains and Sand Dunes special natural/interest areas west of the Mohawk Mountains). As most of the HMA (that which is located within Management Unit 1) is not open to general public access, its redesignation as a special/natural area would have no predicted consequences on recreation (see Figure 3-2).

Additional effects on recreation could result from the development of special management provisions as needed for resource protection, which could translate into limitations or restrictions on recreation use or access opportunities. However, the major elements that might contribute to such management provisions are being addressed by the other resource management elements that are under examination in this EIS. The proposed action would also allow for the potential alteration of existing or establishment of additional special natural/interest areas based on the proposed evaluation. If existing special natural/interest areas are altered or additional special natural/interest areas are created within areas accessible to the public, effects on recreation could be similar to those discussed for the publicly accessible portions of the expired Tinajas Altas Mountains and the western Mohawk Mountains and Sand Dunes ACECs, which would be redesignated as special natural/interest areas.

No effect on recreation is expected to result from not designating the expired SRMAs as special natural/interest areas. With the exception of that portion of the Crater Range SRMA located east of State Route 85, the expired SRMAs are located in areas that are not open to general public access. The SRMA designation is actually a carry-over from prior recognition of these areas as unique in the State Natural Area program and Luke Air Force Range Natural Resources Management Plan. When they were evaluated in the Goldwater Amendment effort, they were not provided with ACEC designations because they were in conflict with ongoing military activities at Manned Ranges 1, 2, and 4. The SRMA designation was applied instead to provide recognition to the special resource values found in the expired SRMA areas. The SRMA designation can be customized to enhance, promote, or limit recreation in the designated area depending on resource-based recreational opportunities or resource protection constraints. The use of the expired BMGR SRMAs for recreation was never appropriate because of access restrictions necessary to protect public safety. Although both areas have qualities that would otherwise support recreation use, the recognized values of these areas are their scenic and geologic qualities.

Not redesignating the now expired El Camino del Diablo Backcountry Byway would potentially have minor effects on recreation. Certain management provisions that were included when the Goldwater Amendment designated the backcountry byway are not being given consideration under the proposed action. Most relevant for recreation are the now expired policies to prohibit firewood collection within 150 feet of the corridor, allow no new surface-disturbing activities

within one-quarter mile of the road, and reclaim military use areas that are identified as non-essential to current or future military mission. Each of these is primarily protective of the scenic qualities and recreational character of this roadway. Under the proposed action, this corridor would be managed the same as all other roads on the BMGR. The road would nonetheless retain recognition for its historical significance and the interpretive signs erected along the corridor would remain. Recreation use of the road would also probably be unchanged, as the route would remain one of the primary recreation use roads on the BMGR, providing access to much of the publicly accessible portions of BMGR—West and to the Cabeza Prieta NWR-portion of El Camino del Diablo, which has been listed in the National Register of Historic Places.

### **5.12.2.2 Alternative Actions (Strategy B and Strategy D)**

In comparison to the proposed action for special natural/interest areas, Strategy B differs in that, in addition to the expired SRMAs and expired Backcountry Byway, the expired ACECs would be managed without special provisions. There is no difference in impacts between the proposed action and this strategy relative to recreation from the redesignation of the HMA. The potential effects of redesignating the expired ACECs as special natural/interest areas, as assessed for the proposed action, would not occur. Rather than allowing for the development of special management provisions for these areas, these areas would be managed based on the unit-by-unit selection of the other resource management elements that are being addressed in this EIS. The effects of not redesignating the expired SRMAs and expired Backcountry Byway as special natural/interest areas would be the same as described for the proposed action. One other distinction between this strategy and the proposed action is that under the proposed action, new special natural/interest areas might be established (and possibly for recreational purposes) based on a proposed evaluation thereof, whereas this strategy does not call for such an evaluation.

Strategy D for this resource element differs from the proposed action in that, in addition to the HMA and expired ACECs, the expired SRMAs and Backcountry Byway would also be redesignated as special natural/interest areas. Depending on how the public is informed of the redesignation, there could be temporary increased recreation interest/use of the publicly accessible portions of these special management areas. Like stated for the proposed action relative to the expired ACEC redesignation, special management provisions could be applied to the SRMAs and Backcountry Byway as necessary, but most items that would be addressed in such provisions may already be addressed in the other resource management elements under consideration in this EIS. Also, as with the proposed action, Strategy D calls for the evaluation of the potential for altering existing or establishing additional special natural/interest areas, including those in public use areas appropriate for or recognized as having beneficial qualities for recreation use.

### **5.12.2.3 No-Action Alternative (Strategy A)**

The no-action alternative for special natural/interest areas differs from the proposed action in that the expired special management area designations (ACECs, SRMAs, Backcountry Byway, and HMA) and applicable special management provisions would be redesignated. The SRMA designation would continue to be largely inappropriate as these areas are generally closed to public access, except for that part of the Crater Range SRMA located east of State Route 85. While most special management provisions for these areas proposed in the Goldwater Amendment RMP would not be applicable, recreation facilities could potentially be established in the publicly accessible part of the Crater Range SRMA as proposed in the RMP including a point-of-interest interpretive kiosk (regarding the geology of the area and Sonoran Desert plants, animals, and ecosystems) and picnic area. Similarly, a few actions from the Goldwater Amendment that relate to preservation of the scenic quality in the State Route 85 transportation and utility corridor portion of this SRMA could be implemented; however, because DoD does not have the same visual resource management mandate as the BLM, implementation of these provisions is regarded as unlikely.

Similarly, the applicable policies for El Camino del Diablo Backcountry Byway management would probably remain in effect rather than expire as they would under the proposed action. These management prescriptions (to prohibit firewood collection within 150 feet of the corridor, allow no new surface-disturbing activities within one-quarter mile of the road, and reclaim military use areas that are identified as non-essential to current or future military mission) are regarded as beneficial to recreation in that they protect the scenic and recreational character of this road.

## **5.12.3 Motorized Access and Unroaded Area Management**

### **5.12.3.1 Proposed Action (Strategy C)**

The proposed action for motorized access and unroaded area management (Strategy C) would affect recreational access opportunities in that the use of redundant roads in localized areas for recreational driving and motorized access to certain localized areas would be precluded (see Figures 3-1 and 3-2). The principal road management objective of the proposed action is the elimination of redundant routes, but to retain a realistic level of road access. Overall, the road network available for public use would decrease by about 36 percent, from 973 miles to 621 miles (a difference of 352 miles). Most of the reduction in available public use road mileage would occur in BMGR—West where almost 91 percent (or 320 miles) of the decrease would occur, whereas 32 miles of road currently available for public use would be closed in BMGR—East as a result of the proposed action (see Table 3-6). The concentration of use on roads that would remain open could result in an increase in encounters between users, thereby lessening the sense of seclusion in the affected areas. Conversely, the closure of roads and natural or assisted

reclamation of these areas would enhance the natural setting and related recreational character in these areas. A unit-by-unit assessment of potential effects on outdoor recreation follows:

### Management Unit 1

Within this management unit, about 117 miles of roads would be closed. Of the 223 miles of roads that would remain, those within restricted military use areas that are not open to public use would comprise 124 miles, a decrease from 177 miles. The roads within military use areas that would be closed are redundant roads that are concentrated in the northwest corner of the BMGR. Roads outside of restricted military use areas but which would be restricted to government use only would remain unchanged at 21 miles. Outside of restricted military use areas in that portion of this unit that is generally open to public, roads would be reduced by about 45 percent (from 142 miles to 78 miles of roads or from 42 percent to 35 percent of the total roads in this unit) (see Table 3-7).

Most of the roads that would be closed are redundant routes located in the area surrounding the Tinajas Altas Mountains, which are primarily recreation use roads (see Figure 3-2). Access to all of the main recreational interest areas in the unit— including El Camino del Diablo, the foot of the natural rock tanks at Tinajas Altas (high tanks), Cipriano Pass, Tinajas Altas Pass, and popular informal camping sites in the area—would be retained. The route leading from El Camino del Diablo to the foot of the high tanks would continue to be restricted to one route from the north and one route from the east. The longest road that would be closed is an alternate route through Tinajas Altas Pass north and roughly parallel to the main pass road that provides access through the Tinajas Altas Mountains, which totals about 6 miles. An about 3-mile alternative route south of Cipriano Pass would also be closed. Extensive recreational driving opportunity would remain, but some spur roads that provide access to the base of the mountains would be closed and multiple routes within localized areas would be reduced to one or two primary routes. For those that value the current level of recreational driving available, such road closures would likely be viewed as negative. For those that value a scenic and natural setting over multiple recreational driving routes, the closure and restoration of roads would enhance the recreational character in this area. With the closure of roads, there would be fewer options for vehicle-based camping. This could result in higher rates of interaction between visitors, which is undesirable for those recreational users seeking solitude. Views of the landscape from the remaining roads and from available camp site, however, would likely be improved by the closure and restoration of roads, which can detract from the natural setting and recreational character of this area.

### Management Unit 2

Within Management Unit 2, about 237 miles of roads would be closed, leaving 310 miles available for public and government use. This represents a 43 percent reduction in the road

network. Of the remaining road network, most (294 miles or 95 percent) would remain generally open to public access and the remaining 16 miles of road would remain restricted to government use only, and not be available for public use (see Table 3-8). If the Cabeza Prieta NWR bypass roads were constructed, then an additional seven miles of road would be open for governmental use only, for a total of 23 miles. Most roads to be closed are redundant roads or spur roads leading to the base of the Gila or Copper mountains. Five main localized areas with closely spaced redundant road networks would be affected by these closures: (1) redundant roads in the western Gila Mountain foothills area near the northern BMGR boundary, many of which were created by unauthorized ORV travel; (2) redundant roads east of the Gila Mountains and west of El Camino del Diablo in the vicinity of the TACTS Range laser hazard area; (3) redundant roads and roads leading to various points at the base of the Copper Mountains; (4) a redundant road network near the northern BMGR boundary east of the Gila Mountains; and (5) redundant roads near the northern BMGR boundary west of Baker Peaks (see Figure 3-2). Motorized access to most recreational interest sites in this unit, including the Baker Tanks and Fortuna Mine, would not be affected. The road to Betty Lee Mine would be closed at a point where the road condition has deteriorated and become unsafe for vehicle use; however, the site could still be accessed on foot. As described for Management Unit 1, these road closures would change the recreational character in favor of those users who value a natural setting, but not in favor of those who value maximum recreational driving opportunity.

Also within Management Unit 2, site-specific planning would be implemented for the two Cabeza Prieta NWR bypass roads, which total an estimated 7 miles. This would have the effect of establishing new roads, but they would not be open to recreation use. The bypass roads would serve as an alternate to the roads within the refuge/wilderness that are administrative use roads currently used by the Border Patrol during ground surveillance. As this portion of the refuge is also Wilderness, routine use of these roads by Border Patrol is not favorable to the wilderness setting. The bypass roads would relieve much of the requirement for Border Patrol use of the administrative roads in the refuge/wilderness but some search or rescue operations would still require the use of the roads inside the refuge.

### Management Unit 3

Within this management unit about 21 miles of roads would be closed, 19 miles of which are public use roads located in areas generally open to the public and 2 miles of which are within restricted military use areas that are not open to general public access (see Table 3-9 and Figure 3-2). This represents about a 20 percent decrease in public use roads. The roads to be closed are primarily located in the vicinity of the Mohawk Mountains and Sand Dunes, including about 5 miles of roads that provide northerly access to the base of the Mohawk Mountains and about a 10-mile segment of the road that defined the southwestern boundary of the former ACEC (see Figure 3-2). There are relatively few roads within this management unit and the proposed road closures would limit recreational driving opportunities in relatively few areas. The roads that

would remain open offer highly scenic views of the expired Mohawk Mountains and Sand Dunes ACEC and Mohawk Valley, an area that has retained most of its natural qualities.

#### Management Unit 4

Within this management unit, about 49 miles of road would be closed, but there would be no change to the 6 miles of road located in the Mohawk Sand Dunes that is currently accessible to the public (see Table 3-10 and Figure 3-1); thus, there would be no impact on recreation.

#### Management Unit 5

About 164 miles of roads would be closed in this management unit, but this unit is entirely closed to general public access (see Table 3-11 and Figure 3-1). Thus, the proposed action would have no consequence on recreation within this management unit.

#### Management Unit 6

Within Management Unit 6, an estimated 32 miles would be closed, all of which are principally public use roads (see Table 3-12). This would represent about a 16 percent reduction in public use roads in this unit. These roads include redundant roads and multiple spur roads in localized areas. An additional 10 to 15 miles of roads that serve as run-in lines to guide attacking aircraft on air-to-ground training strikes to Manned Ranges 1 and 2 have recently been deemed as incompatible for recreation use. Access to recreational interest sites and adequate hunter access would be retained within this management unit (see Figure 3-1).

#### Management Unit 7

Within Management Unit 7, 38 miles of roads would be closed. Public access within this unit is limited to certain road segments in two areas, one is contiguous with the adjacent Unit 6 and the other has road linkages with the Sonoran Desert NM to the north (known as the Bender Springs area) (see Figure 3-1). The only road that would be closed where recreation use would be affected is a 1-mile road located in the Bender Springs area in the northeast corner of this management unit (see Table 3-13). Remaining motorized access within this area of Management Unit 7 would be restricted to one road (see Figure 3-1).

As a result of the overall reduced road network, some recreational users that currently visit the BMGR for the recreational driving opportunities available with the current road network or for direct vehicle access to selected personally favored sites that would no longer be provided with

this form of access may choose to no longer visit the range. Such users may prefer vehicle access in other areas in the BMGR region. While motorized access is limited in most preservation-based recreational lands in the BMGR region (Cabeza Prieta NWR, Organ Pipe Cactus NM, Kofa NWR, etc.), additional backcountry recreational driving opportunities are available near the BMGR on BLM-managed lands that are managed for limited ORV use (meaning that vehicles must remain on established roads). The Imperial Sand Dunes Recreation Area offers diverse recreational driving and ORV use opportunities, although the recreational character and environmental setting differ from the BMGR.

### **5.12.3.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Management Strategy B for motorized access and unroaded area management, applied range-wide, would retain the entire existing road network. Including the Cabeza Prieta NWR bypass roads, there would be 973 miles of roads open to public use rather than the 621 miles of road per the proposed action (see Table 3-6). Additional roads could be constructed for public access needs, which would be of a general benefit in terms of recreational motorized access, but would also potentially change the recreational character of some areas. Proposals for construction of such roads and their effects, including impacts on outdoor recreation, would be reviewed in detail in accordance with the NEPA and other regulatory requirements on a case-by-case and site-specific basis. Similarly, Strategy B could also include additional future motorized public access to currently restricted locations if changes in military activities eliminate safety or security restrictions in those locations. The potential for opening these areas to future motorized access is generally viewed as a positive effect in that it would provide new opportunities for compatible recreational use.

With alternative Strategy D recreational driving opportunities would be reduced further, in comparison to the proposed action, as there would 107 more miles of roads closed, 67 miles (63 percent) of which are public use roads (see Table 3-6 and Figure 3-2). Of these, more than half (35 miles or 52 percent) of these roads would be within Management Unit 2, about one-third (22 miles or 33 percent) would be within Management Unit 1, and the remaining 10 miles occur mostly in Unit 3 (7 miles), but also within Unit 6 (2 miles) and Unit 7 (1 mile) (see Tables 3-7 through 3-13). Recreational driving opportunities would be reduced further, particularly in the Gila and Tinajas Altas mountain foothill areas including about 7 miles of alternative roads leading to the Fortuna Mine vicinity along the western flank of the Gila Mountains, about 7 to 8 miles of roads along the eastern side of the Wellton Hills and near Coyote Wash, an approximate 6-mile road extending southward from Marine Corps Ground Support Area 50 that provides access to the northern base of Sheep Mountain, a 6-mile alternate route through Tinajas Altas Pass northward and roughly parallel to the main Tinajas Altas Pass road, and an approximately 5-mile redundant road near the northern BMGR boundary east of the Mohawk Dunes and west of the Mohawk Mountains. As compared to the proposed action, about 15 additional miles of roads within BMGR—West would be restricted to government use only (see Table 3-6 and

Figure 3-2). Strategy D would not include development of the Cabeza Prieta bypass roads, which would result in undiminished Border Patrol vehicle incursions within the refuge/wilderness. Strategy D would have the potential to lead to concentration of use on roads that would remain open, to a slightly greater degree than the proposed action. As compared to the proposed action, this could result in a slight increase in encounters between users, thereby lessening the sense of seclusion in the affected areas. Conversely, the closure of the additional roads that would be closed under this strategy and natural or assisted reclamation of these areas would enhance the natural setting and related recreational character in these areas, which cover a slightly greater area than the roads to be closed under the proposed action.

### **5.12.3.3 No-Action Alternative (Strategy A)**

The no-action alternative for this resource management element would result in the retention of the existing estimated 2,222-mile road network and 1,203 miles of this network would remain open to the public, pending the completion and implementation of a transportation plan (see Table 3-6 and Figures 3-1 and 3-2). The results of the transportation plan cannot be predicted at this time; however, roads not meeting land management, public, or military needs could be closed. Generally, resultant impacts on recreation would likely be similar to those of the proposed action, although they could differ in magnitude.

### **5.12.4 Camping and Visitor Stay Limits**

#### **5.12.4.1 Proposed Action (Strategy C)**

The proposed action for camping and visitor stay limits (Strategy C range-wide) would have direct impacts on recreation, which overall would be minimal and not expected to affect recreational use patterns or opportunity. Most of what is proposed for this resource management element is a continuation of existing policy for camping and visitor stay limits. For the most part, camping would be allowed to continue in the same fashion: dispersed self-contained camping in all areas open to the public and vehicle-based camping within 50 feet of most existing roads designated as open to public use, with vehicle-based camping stays limited to 14 consecutive days within a 28-day period except by special use permit. For example, desert bighorn sheep hunters intending to camp more than 14 consecutive days on the BMGR during the annual bighorn sheep hunting season (typically, the month of December) would continue to be required to apply for a special use permit. Overall, the recreational setting for camping would continue to be relatively primitive (i.e., remote and undeveloped areas with no services provided). The provisions for restricting camping along certain road segments and requiring all campsites to be more than ¼-mile away from designated areas when needed for resource protection purposes would have similar impacts in that opportunity for camping, in particular vehicle-based camping, may be lessened in some areas. While current opportunities for dispersed self-contained and

vehicle-based camping would remain intact in unaffected areas, these restrictions could have the impact of concentrating camping use to levels that may be noticeable, particularly in popular recreation use areas during the highest periods of use. This could have minor effects on recreational character in terms of increasing encounters between users and reducing the sense of seclusion and wildness in the affected areas. The proposed closing of public use roads would reduce opportunities available for vehicle-based camping; this combined effect is further addressed in the aggregate effects analysis (see Section 5.12.18.1).

If the proposed assessment of the benefits and effects of establishing designated camping areas results in a decision to designate camping areas, however, there would be a more pronounced change in recreational character in the vicinity of these camping areas. Although the camping areas, as currently envisioned, would be undeveloped, the evidence of other users would be more prominent and interaction with other users would be more likely within and near these camping areas, which would result in a less primitive and secluded recreational experience. Those recreational users seeking a recreational experience with opportunity for solitude and a sense of wildness would be less likely to use designated camping areas. These users could choose to camp in other areas of the BMGR or other off-range locations (e.g., designated Wilderness areas), whereas other users may be attracted to using these designated camping areas because of their convenience (previously cleared of rocky matter and vegetation, leftover campfire rings, capability to support larger groups, etc.).

Lastly, the proposed rules for the disposal of human sewage and solid waste would have little impact on recreation, but would add to the current visitor rules and regulations that recreation users would be required to comply with. Although recreation use waste has not been a widespread or common problem on the BMGR, better management of waste provides benefits to the recreation environment in that there is less chance of encountering litter.

#### **5.12.4.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B for this resource element differs from the proposed action in that (1) vehicle-based camping would be allowed within 100 feet of roads open to public use, (2) there would be no restrictions on camping along certain road segments for resource protection purposes, and (3) there would be no assessment and decision regarding the establishment of designated camping areas. The first two of these provisions would have the effect of further dispersing vehicle-based camping opportunities throughout greater portions of the range that are generally open to the public than would occur under the proposed action. Because there is plentiful area available for camping and the relatively low rates of recreational camping within the publicly accessible portions of the range, there would be minimal differences regarding vehicle-based camping along roadways between Strategy B and the proposed action. However, vehicle-based campsites could be further secluded from road traffic, dust generated from those roads, and other

recreation and government BMGR users as vehicles could be located as far as 100 feet from the roadway, increasing the likelihood that campsites would also be located farther from the road.

The only difference between Strategy C and Strategy D in this resource management element is the limits on vehicle-based camping stays that would be allowed within a 28-day period without a special use permit. With Strategy C, the proposed action, the limitation is 14 consecutive days, whereas with Strategy D it is 7 consecutive days. Those recreational users desiring a vehicle-based camping stay longer than 7 consecutive days would need to obtain a special use permit. Based on the limited recreational use data available, such use accounted for about 3 percent of all recorded BMGR—East visitation during calendar year 2000 (the duration of most stays was from one to four days) (Barry 2002a). Thus, the impact of alternative Strategy D on recreational users is expected to be minimal, particularly considering longer-term vehicle-based camping would still potentially be allowed with a special use permit.

#### **5.12.4.3 No-Action Alternative (Strategy A)**

The no-action alternative for camping and visitor stay limits would result in effects similar to those described for Strategy B, with the exception that vehicle-based camping would be required to be within 50-feet rather than 100-feet of all roads in areas open to the public.

### **5.12.5 Recreation Services and Use Supervision**

#### **5.12.5.1 Proposed Action**

The proposed action for this resource element (Strategy C in Unit 2 and Strategy D in all other units) would have a multitude of potential consequence on recreation as follows:

- **Continuing to prohibit ORV travel.** This management objective would continue to prohibit recreational ORV travel on the BMGR. Off-road travel has been expressly prohibited on the BMGR since implementation of the Goldwater Amendment and prior thereto by Air Force and Marine Corps regulations. Nonetheless, some unauthorized off-road travel has occurred on the BMGR. An increase in frequency of unauthorized off-road travel was noted during BLM road surveys in the late 1990s, particularly in the northern portions of Management Units 2 and 3, where suburban residential communities in the Yuma area have been established, and between El Camino del Diablo and Tinajas Altas. Some management actions were taken to designate a single route of travel between El Camino del Diablo and Tinajas Altas and to increase the law enforcement presence in these areas. As a result, the occurrence of unauthorized off-road travel has apparently been reduced in recent years (U.S. Air Force 1999).

As noted in Section 4.12.1, recreational trends indicated that off-road travel has recently grown in popularity and continues to be a popular form of recreation in Arizona (Arizona State Parks 1999, AGFD 2002a). While areas that are open to off-road travel are located within the study area, areas available for such use are decreasing. For example, off-road use areas within the Imperial Sand Dunes Recreation Area have been recently closed for resource protection purposes and access to private lands is becoming increasingly difficult due to various factors including transfer of ownership, changes in land use, and land development. During scoping for this EIS, there were a relatively large number of public comments that expressed a desire for ORV use areas within the BMGR and an equally large number of persons expressing a desire for prohibiting off-road travel. Thus, there is no clear consensus of opinion or predominant public attitude/value with regard to even limited off-road use of the BMGR. Continuation of the policy to prohibit off-road travel would continue to limit the areas available for such use in southwestern Arizona. For those recreation users that favor a recreational setting free of off-road travel, there would be a continued beneficial effect; for those seeking additional areas for off-road travel, there would be a continued negative effect.

- **Continuing to prohibit on- and off-road racing.** During the draft environmental assessment phase for developing the Goldwater Amendment, on- and off-road racing was proposed as a recreational use of the BMGR. However, this alternative was not selected in the final Goldwater Amendment and on- and off-road racing has never been authorized on the BMGR. No public comment in favor of implementing on- or off-road racing on the range was received during the scoping and public workshops for this EIS. Other opportunities for such uses are located in closer proximity to population centers (e.g., Yuma Speedway near Yuma, Pima Motorsports Park near Tucson, Parker 400 Course near Parker, and Phoenix International Raceway near Phoenix to name a few). Thus, continuation of this management objective is expected to have no impact on recreation.
- **Restricting motorized public travel in all washes, except where the wash is a designated part of the road system open to the public and is dry.** The Goldwater Amendment established the BMGR as a limited ORV use area, with all vehicles restricted to designated or established roads classified as existing primary, secondary, tertiary, patrol, or unimproved roads. To the extent that designated or established roads entered and traversed washes, travel in washes was authorized under this management plan. Although unrestricted driving in washes large enough to accommodate a vehicle is traditional among some BMGR users, this activity has not been previously authorized under BLM, Air Force, or Marine Corps regulations and BLM law-enforcement officers have enforced restrictions on this activity. The draft Barry M. Goldwater East HMP included a provision to permit driving in dry wash beds, but this document was never finalized or implemented. The proposed action in this EIS is consistent with the Goldwater Amendment and would restrict motorized public travel in all washes, except

for where the wash is a designated part of the road system open to the public and when the wash is dry.

Driving in washes offers a unique recreational experience with opportunities to view wildlife and xeroriparian vegetation that does not occur within the upland valley and bajada areas dissected by these washes. Driving in washes is a practice that is used by some hunters, and other visitors, to gain access to locations where game species are more likely to occur. Washes are also popular for vehicle-based camping sites. The proposed action would continue the prohibition on this type of vehicle-based recreational activity within the BMGR.

- **Require a special use permit for a single party with 20 or more vehicles in Unit 2 and 10 or more vehicles in all other units.** The direct impact of this management objective would be on groups with larger numbers of vehicles that recreate on the BMGR. Those most likely to be affected would be clubs and groups that organize outdoor recreational events (e.g., four-wheel drive clubs, scouting groups). The recreational opportunity would not be precluded; however, the requirement for a special use permit would be more stringent than the current 50-vehicle requirement. An indirect impact would be that other recreational users would be less likely to encounter larger-sized groups, which would be of benefit for those users seeking a sense of seclusion. Nonetheless, recreational party sizes with more than 10 vehicles are apparently relatively rare. During calendar year 2001, the average number of vehicles per party was 1.4 and only one single party was recorded as having ten vehicles (Barry 2002a). Although similar statistics are not available for BMGR—West, there are incidental reports that use by groups with greater numbers of vehicles are slightly more prevalent, particularly along El Camino del Diablo. The two longest segments of this road are located in Management Unit 2, where the threshold for a special use permit would be 20 vehicles; the threshold on the segments of El Camino del Diablo within Management Unit 1 would 10. For these reasons, the impact of this management objective on recreation is expected to be minimal.
- **Continue to require compliance with general vehicle operating rules.** This objective would not change recreation opportunity, but would continue to require responsible use of vehicles by recreational users. There would be no expected impact on recreation from continuing this requirement.
- **Retain a permit system and expand efforts to educate users about natural and cultural resource sensitivities.** The permit system may discourage some from using the BMGR for recreation because of the preplanning that is required and because there is a requirement to sign a hold harmless agreement. Expanding efforts to educate users about resource sensitivities may have a beneficial impact in that recreational users would have a

greater understanding and appreciation for the natural and cultural resources present on the BMGR.

- **Issue special recreation use permits, as appropriate.** This provision, in and of itself, would not have effects on recreation. However, it ensures that the means for issuing a special use permit would be provided for those management objectives for which a special use permit would be required (camping stays longer than 14-consecutive days, single parties with more than 10 or 20 vehicles, use of automatic weapons, recreational shooting between sunset and sunrise).
- **Implement increased public education and recreation use information programs, particularly to inform the public about road restrictions and resource sensitivities.** This management objective could enhance the recreational experience by providing better interpretive information about the road management policy and the reasons some roads are being closed. Greater public understanding results in improved voluntary compliance, and appreciation of how the road closures are a contributing part of the BMGR natural and cultural resources management program.
- **Retain a minimum number of full-time law enforcement positions dedicated to the BMGR.** Although this management objective is new, it does not reflect a change from the existing condition. There currently are a total of seven full-time law enforcement/security officers dedicated to the BMGR; however, there have been times in recent years where there was just one or two such positions. If budget constraints or other circumstances result in a decrease in operating funds, Strategy D would ensure that the law enforcement priority is for at least six and the Strategy C priority is for at least four officers. Recreational users would continue to be subject to relatively prevalent law enforcement presence and required adherence to the visitor use rules and regulations, including those new rules and regulations that may result from the implementation of the proposed INRMP.
- **Develop and implement limits-of-acceptable change monitoring to guide recreation use management and protect natural and cultural resources.** As stated in Section 5.12.1.1, adaptive management responses could limit or restrict recreational opportunities or uses to address emerging resource conservation and protection problems and prevent them from compounding. Furthermore, in the event that a monitoring program reveals that deleterious effects on natural or cultural resources are resulting from the combined effects of recreation and military uses, limitations could be placed on recreation use; although the Sikes Act and MLWA of 1999 provide for recreational use, that use must be environmentally sustainable and consistent with the military purposes of the range. On the other hand, by monitoring the effectiveness of management actions, ineffective restrictions on recreation may be lifted.

- **Assess requirements for signs or other measures to indicate road restrictions; implement management actions based on findings.** Signs and other modifications that may be used to indicate road restrictions are sometimes viewed as intrusive in a backcountry recreational setting that is relatively wild and secluded in character. Nonetheless, they would likely be necessary to implement management provisions, particularly with regard to the roads that would be closed under the proposed action. (The Marine Corps and Air Force intent is to control vehicle traffic within the range by posting roads that are open. The status of all roads that are not posted as open would be closed. This would help to avoid problems of persons driving on closed roads because the sign had been removed or was not visible.) This objective allows for a more detailed analysis of what means would be most appropriate for indicating road restrictions than is possible in this programmatic-level document. Effects on recreational character would be balanced with the effectiveness of meeting recreation use management objectives.
- **Assess the need for and effects of additional gates and fencing to control entry and use; erect as needed.** The potential effects on recreation from this objective would be similar to those stated for the above measure for signs. However, unlike signs or other measures to indicate road restrictions, gates and fencing to control entry and use would more likely be located at BMGR perimeter locations rather than interior range locations and, therefore, have less of a potential effect on the character of the recreational setting. Another potential effect would be that unauthorized entry for recreation would be less likely to occur with the implementation of such a management provision, which is a benefit from a recreation use management perspective. As discussed in Section 4.12.1, law enforcement reports indicate that an estimated five to ten percent of recreation use on the BMGR is non-permitted and, thus, not reflected in available recreation use statistics (BLM 2000a and 2001a; Barry 2000). As unauthorized use decreased, managers would have a more complete account of all recreation use on the BMGR, which would be beneficial in terms of effective recreation management.
- **Develop and maintain recreation use records and statistics.** This provision would be of benefit for recreation use management. There is currently a lack of recreation use data that can be used to track recreational trends—such as use patterns and activities (areas of the range that are frequented, sizes of parties, most frequent recreation activity), user populations, and visitor perceptions. Collection of data regarding hunter effort and harvest success could provide currently lacking data on harvest levels of game species on the BMGR. Such a record keeping system would provide valuable information to track recreation use trends and proactively manage recreation use to minimize conflicts between recreation use opportunity and resource protection and conservation.
- **Prohibit use of metal detectors.** This new management objective would not provide an opportunity for those recreational users that use metal detectors in recreational treasure hunting. This is not considered to be a frequent activity on the BMGR, but there is a

concern in that there could be unnecessary hazards because metal detectors could register locations of buried ordnance; thus, exposing the user digging for the object that registered on the metal detector to potential harm. While the lack of the opportunity would be a negative recreational effect, the safety benefits are crucial.

- **Prohibit entry to mines.** Although this activity is not currently strictly prohibited, range users are advised to avoid mine shafts due to their instability, other inherent hazards, and the incompatibilities of recreation use and protection and conservation of bat species. Despite this, some recreational use of mines does occur on the BMGR. Those recreational users that visit the BMGR for the purposes of exploring abandoned mine shafts on the BMGR, would no longer be afforded such an opportunity.

#### **5.12.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

The only real difference between Strategy C and Strategy D for this resource element is the requirement for a special use permit for a single party with 20 or more vehicles under Strategy C and 10 or more vehicles with Strategy D. If Strategy D were applied in Unit 2 rather than Strategy C, there could be more of an effect than the proposed action related to this restriction because El Camino del Diablo is known to be used by four-wheel drive groups that would be likely to have more than 10 vehicles. However, it is difficult to reliably assess this impact given the lack of detailed recreation use data for BMGR—West. If Strategy C were applied in Unit 1 and Units 3 through 7, rather than the proposed action (Strategy D), there would be even less impact on larger groups having more vehicles using the publicly accessible portion(s) of these units. As available data indicates no group sizes with 10 or more vehicles in BMGR—East, there would likely be only a slight difference in effect from requiring a permit for 20 or more vehicles versus 10 or more vehicles.

Important distinctions with Strategy B for recreation use and supervision in terms of potential consequences on outdoor recreation are as follows:

- **Evaluate the need for and effects of allowing public ORV travel in designated areas.** As discussed for the proposed action and detailed in Section 4.12.1, there is increasing interest in recreation related to ORV travel and decreasing opportunities for such use within the BMGR region. This alternative strategy may eventually provide for designated areas where this activity could occur and benefit the contingent of recreational users that desire such use, while negatively affecting the contingent of recreational users that are opposed to such types of recreational uses of the BMGR. The evaluation would allow for further assessment of off-road travel effects on groups, the environment, and recreational use trends on the BMGR and adjacent areas.

- **Require a special use permit for a single party with 30 or more vehicles.** The effects of this alternative management objective are expected to be somewhat less than what would occur under the proposed action. Recreational use groups having 30 or more vehicles are observed to be rare on the BMGR.
- **Implement measures to make permits easier to obtain.** This objective, which is not included in the proposed action, is regarded as potentially having a beneficial effect on recreation users and possibly resulting in an increase in recreation use of the BMGR. However, given that all users would still be required to sign a hold harmless agreement, the means of making permits easier to obtain would be fairly limited. The estimated five to ten percent of recreational users that do not obtain a permit may be more inclined to obtain a permit if the process is made easier, which would be a benefit in terms of recreation use management. Recreational use levels on the BMGR would probably change only slightly.
- **Retain existing public education and use information programs.** In comparison to the proposed action, this objective would not include the benefit of providing additional information about road restrictions and resource sensitivities. Also, unlike the proposed action, this strategy also does not provide for an evaluation of using signs or other means to indicate road closures. Thus, there would likely be less comprehension of road closures and use policies (e.g., a road is closed unless posted as open) and less voluntary compliance. Existing public education and use information programs do, however, include information about BMGR ecology and natural and cultural resources protection programs, including the importance of using vehicles only on existing roads.
- **Allow motorized public travel in designated washes (when dry).** Unlike the proposed action, this management objective would allow for the use of designated washes for recreational motorized use. The impact on recreation would be opposite of that which would occur under the proposed action: the scenery, recreational driving experience, vehicle-based camping, and hunter access unique to this form of motorized public access would be sanctioned in designated areas, which would be of benefit to recreational users that value this activity.
- **Retain a minimum of two full-time law enforcement officers.** This management objective would provide for a fewer minimum number of law enforcement officers than the proposed action. Past law enforcement experience has shown that, while having two full-time law enforcement officers improves user compliance with visitor rules and regulations, a greater law enforcement presence is likely needed to provide sufficient supervision.
- **Retain existing levels of resource protection law enforcement unless a compliance issue arises.** It is difficult to assess what the difference in effects on recreation would be

from this objective in comparison to the proposed action to develop and implement limits-of-acceptable change monitoring to guide recreation use management and protect natural and cultural resources. Under either management approach, recreational use and/or opportunity could be affected if detrimental effects to resources are occurring. The main difference is that the proposed action provides a more proactive approach whereby issues might be addressed prior to the point where a compliance issue arises. Thus, this Strategy B objective, which is not based on adaptive management, may provide less opportunity to take management actions that might avoid unnecessary conflict between recreation use and resource protection and conservation.

- **Retain existing gates and fences unless additional gates and fencing are needed for safety and compliance reasons.** Compared to the proposed action, this management objective would not result in potential changes to recreational character. It would also continue to potentially result in the estimated five to ten percent of non-permitted recreation use that is not reflected in recreation use statistics, which is viewed as negative in terms of recreation use management.
- **Evaluate the feasibility of allowing public entry to mines where such use is compatible with safety and resource protection requirements; if feasible, implement a program for such use under special use permit provisions.** Unlike the proposed action, which would prohibit entry to mines, this strategy would possibly allow public entry to mines under limited circumstances. Assuming that there is a mine site on the BMGR that would be safe for recreational use and that such use would not compromise resource protection requirements, this alternative action would provide an uncommon recreational opportunity for exploring historic mining sites. Thus, in comparison to the proposed action, this management objective could potentially create rather than preclude this recreational opportunity and use.

Other objectives that are not included in this alternative management strategy, but which are included in the proposed action are to develop and maintain recreation use records and statistics and prohibit the use of metal detectors. The impacts from these objectives, as assessed for the proposed action, would not occur with implementation of Strategy B.

### 5.12.5.3 No-Action Alternative (Strategy A)

The potential consequences of the no-action alternative for recreation services and use supervision on outdoor recreation would differ from the proposed action as follows:

- **Potentially allow motorized public travel in dry streambeds and wash bottoms in accordance with the Draft Barry M. Goldwater East HMP.** Unrestricted recreational driving in washes is currently prohibited under the Goldwater Amendment. This activity

could be sanctioned in BMGR—East if the draft Barry M. Goldwater East HMP were finalized, as required by the no action alternative, and a proposal in that draft HMP for public driving in washes were approved.

- **Require a special use permit for a single party with 50 or more vehicles.** This management objective, in contrast to the proposed requirement of a special use permit for single party size of 10 or more vehicles (or 20 or more vehicles in Unit 2), would have fewer potential impacts on recreation use. Party sizes with more than 50 vehicles have been rare on the BMGR, limited to such large-scale events as the construction of wildlife water developments using volunteers (which are otherwise addressed/managed via required NEPA analysis).
- **Retain a permit system.** As opposed to the proposed action, no additional measures would necessarily be taken to inform the public about natural and cultural resources present on the BMGR. Public appreciation, interest, and understanding of these resources and DoD efforts to manage them would be less pronounced.
- **Two related objectives are discussed together here: (1) provide the public with up-to-date visitor use maps and rules and regulations and (2) establish an environmental education program.** In contrast to the proposed action, no extra measures would necessarily be taken to inform the public about road closures and resource sensitivity. As a result, there could be less voluntary compliance with the road closure and less understanding of how the road closures contribute to natural and cultural resources management at the BMGR. The potential for the recreational experience to be further enhanced through interpretive programs as discussed for the proposed action, would not necessarily occur (although the information that is currently provided to recreational users includes some information about BMGR resources and ecology).
- **Two related objectives are discussed together here: (1) develop an action plan for interagency law enforcement and (2) enforce all public access permit requirements and regulations.** While these objectives reflect current law enforcement practices, they stand in contrast to the proposed action in that no minimum number of full-time law enforcement positions dedicated to the BMGR would be required. If funding constraints occur, there would be no guarantee law enforcement positions would not be eliminated. The less law enforcement presence, the more likely that infractions could occur, increasing potential for risk to public safety, resource damage, and increased conflict between recreational users and BMGR mission requirements.
- **Develop a BMGR sign plan, implement a signing program based on identified sign needs.** In contrast to the proposed action, sign needs associated with road closures would not necessarily be identified. Recreation users may have a more difficult time understanding what roads remain open to public access.

- **Implement appropriate public safety protection measures.** With this management objective rather than the proposed action, there would be less emphasis on gates and fencing to control entry and use and, therefore, less probability that gates and fencing would be erected. Unauthorized entry would likely continue to occur and such recreation use would continue to not be accurately reflected in recreation use statistics.

Other objectives that are not included in this alternative management strategy, but which are included in the proposed action are to develop and implement limits-of-acceptable change monitoring to guide recreation use management and protect natural and cultural resources, develop and maintain recreation use records and statistics, and prohibit the use of metal detectors. The impacts from these objectives, as assessed for the proposed action, would not occur with implementation of the no-action alternative.

### **5.12.6 Rockhounding**

#### **5.12.6.1 Proposed Action (Strategy C in Units 2 and 3, and Strategy D in All Other Units)**

The proposed action for rockhounding would prohibit rockhounding from all units of the range except for Units 2 and 3. Within Units 2 and 3, rockhounding would be prohibited within the Mohawk Mountains and Sand Dunes (expired ACEC and proposed special natural/interest area), and other areas that are sensitive to human-induced disturbances (e.g., cultural resource sites and areas frequented by sensitive species). The effect would be greatest in terms of recreation opportunity. Currently, rockhounding (surface removal only) is allowed in all portions of the range that are open to general public access, with the standard limitation for BLM-managed lands of 24 pounds plus one piece. With the proposed action, the opportunity for rockhounding would be eliminated within about one half of that portion of the BMGR that is generally open to public access.

The effect on recreation use, however, would probably be relatively minor. As indicated by available recreation use data for the BMGR, those recreational users that are engaging in rockhounding are also engaging in other recreation activities such as camping, hiking, and hunting. It is believed that few recreation users visit the BMGR solely for the rockhounding opportunity, but rather it primarily occurs as a secondary or incidental activity associated with other recreation use. Those minerals and gemstones avidly sought by rockhounds, such as precious and semi-precious gemstones, crystals, ores, and collector specimens are not known to be plentiful on the BMGR. Nonetheless, recreation use would likely decrease in those areas of the BMGR that may be of interest for rockhounders (e.g., areas with unique geology and associated rock specimens such as geodes or volcanic rock or abandoned mine sites). The level of decreased use in these areas is difficult to assess given the lack of specific recreation use data;

however, given that these sites would retain other interests for recreational users (e.g., scenic, geologic, and/or historic interest), such decrease would probably be moderate to low.

Another potential effect is that recreation use associated with rockhounding could be diverted to those portions of Units 2 and 3 where the activity is not prohibited. Whereas currently rockhounding is believed to occur in a relatively dispersed fashion, rockhounding could become more concentrated in character in those areas most favorable for rockhounding (perhaps localized rocky outcrops or abandoned mine sites in the Copper and Gila mountains and Wellton Hills). Similarly, the activity could be diverted to off-range locations where rockhounding is not prohibited.

#### **5.12.6.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

In Units 2 and 3, the alternative actions for this resource element are Strategy B and Strategy D. The differences between Strategy B and Strategy C are fairly minor. Both allow for limited rockhounding to occur, but the activity could be prohibited from special natural/interest areas and other designated areas for resource protection with Strategy C, whereas with Strategy B such restrictions would be applied only if a compliance issue arises. Although rockhounding might be prohibited in fewer areas with Strategy B than with Strategy C, both similarly have the potential to prohibit rockhounding from select locations on the BMGR. Thus, the effects on recreation from implementing Strategy B in Units 2 and 3 rather than the proposed action (Strategy C) would not be expected to differ appreciably from the proposed action. Of note, whereas rockhounding would be prohibited in the Mohawk Mountains and Sand Dunes (proposed special natural/interest area) in Unit 2 under the proposed action, it would not necessarily be prohibited in this area under Strategy B. Overall, Strategy B would have similar consequences on outdoor recreation as the proposed action: potential for the elimination of rockhounding as a recreation opportunity in certain areas and corresponding minor localized reductions in use, but no overall effects on recreation use patterns.

The effect of implementing Strategy D in Units 2 and 3 would differ from the proposed action (Strategy C for these units) in that rockhounding would be prohibited in these areas, eliminating a recreational opportunity that currently exists and which would continue to exist under the proposed action. As discussed in Subsection 5.12.6.1, although rockhounding is known to occur on the BMGR, it is not clear how the opportunity correlates with use. Visitation to locations within the units that were previously used principally for rockhounding (perhaps abandoned mine sites such as those in the Copper and Gila mountains and Wellton Hills) might decrease. Overall visitation to these units could also decrease if those who recreate within these units do so because of the rockhounding opportunity, but this is not believed to be the case.

In the remaining units, the alternative strategies for rockhounding are Strategy C and Strategy B. As stated, these two strategies differ only in that rockhounding could be prohibited in designated areas under Strategy C, and only prohibited under Strategy B if a compliance issue arises. The effect of implementing either of these strategies rather than the proposed action (Strategy D) in Units 1, 4, 5, 6, and 7 would be similar. By continuing to allow rather than prohibit this activity, those who currently rockhound in these publicly accessible areas of these units (part of Unit 1, most of Unit 6, and small isolated areas of Units 4 and 7), either as a primary or incidental recreational activity, would not be as greatly affected as they would under the proposed action. The opportunity for rockhounding and corresponding recreation use would only be eliminated in localized areas where the activity might be prohibited. In the majority of these relatively popular recreation areas for the BMGR (Area B and the Tinajas Altas Mountains area), rockhounding would be allowed to continue. Thus, under either alternative Strategy B or C in these units, recreation use and trends associated with current rockhounding would probably not be affected.

### **5.12.6.3 No-Action Alternative (Strategy A)**

The no-action alternative would not reduce the area of rockhounding recreational opportunity on the BMGR as the proposed action would. There would be no potential for change in recreation use patterns that are associated with current use of the BMGR for recreational rockhounding. Unlike all other strategies in this resource category, the quantitative limitation on surface rock removal would remain “24 pounds plus one piece” rather than the slightly more restrictive “no more than 25 pounds.”

## **5.12.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

### **5.12.7.1 Proposed Action (Strategy D in Unit 1 and Strategy C in All Other Units)**

The proposed action for this resource element (Strategy D in Unit 1 and Strategy C in all other units) would have minor impacts on recreation in that it would (1) change where wood could and could not be collected for campfires and (2) prohibit native wood campfires in Unit 1. While some may view the presence of dead and downed wood branches and snags as adding to a natural recreational setting, the use of dead and downed wood for campfires is also a popular activity associated with recreational use of the range. Currently, collection of dead and downed wood is prohibited within the expired ACECs and within 150 feet of El Camino del Diablo. Under the proposed action, it would be prohibited within Management Unit 1, but allowed in all other areas of the BMGR. Wood collection could eventually be prohibited in other areas of the BMGR besides Unit 1 because (1) in the ACECs, special management provisions could be adopted to preclude collection of dead and downed wood and (2) in high-use areas, native wood supplies would be monitored and wood collection would be restricted if resource conditions dictate. In any case, those areas where the collection of dead and downed wood would be

prohibited would retain a more unaltered, natural, and wild recreational setting. In those areas where wood collection would be allowed, the recreational setting could be altered in character where the harvesting of dead and downed wood is apparent.

All alternatives would continue to allow for campfire wood (except for native wood fires would be prohibited within Unit 1). Campfires are an important recreation use, providing fuel for cooking, light, and heat. Although native wood fires would be prohibited within Unit 1, fires created with wood brought into the range from off-range sources or charcoal would be allowed. However, the recreational experience associated with wood gathering would be precluded in these areas, in the same way that it is currently precluded within the ACECs and within 150 feet of El Camino del Diablo.

#### **5.12.7.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

Strategy B differs from the proposed action for this resource element in that it would allow wood cutting and gathering and firewood use as long as wood is used at a sustainable rate and no compliance issue arises. The greatest difference in comparison to the proposed action is that wood cutting would be allowed rather than prohibited. Otherwise there is not a great difference between Strategy B and Strategy C in terms of potential consequences on recreation. For those recreational users that value having access to native wood for campfires, this strategy would provide the greatest opportunity for such use. For those that favor a recreational setting that retains a natural character, this alternative is least favorable. This change in recreational setting would have the greatest potential for change in publicly accessible portions of the BMGR where wood collection is currently prohibited, part of the expired Mohawk Mountains and Sand Dunes ACECs, Tinajas Altas Mountains ACEC, and within 150 feet of El Camino del Diablo.

Strategy D is an alternative action for this resource element for all units except for Unit 1. This strategy would have more effects on recreation than the proposed action in these units (Strategy C), particularly within the units that are open to public use. The strategy would prohibit native wood campfires and preclude the collection and use of dead and downed wood for campfires, whereas within these units, the only current restrictions on the collection of dead and downed wood is within 150 feet of El Camino del Diablo and within the expired Mohawk Mountains and Sand Dunes ACEC. The type of effect that would occur is subjective. For those recreational users who value the opportunity to collect and use native wood for campfires, this strategy would be viewed as negative. For those recreational users that value a setting that retains the natural condition of wood branches, snags, and debris, this strategy would be viewed as positive.

Strategy C is an alternative action for this resource element for Unit 1. Within the expired Tinajas Altas Mountains ACEC portion of Unit 1, which is open to the public and where wood collection is currently prohibited, this alternative could represent a change in the recreational

character unless a special management provision is adopted to preclude wood collection within the expired ACEC. The restriction of wood collection within the expired ACEC is considered somewhat likely under the Strategy C management objective to restrict wood collection if resource conditions dictate because the Tinajas Altas/Davis Plain area has been subject to over harvesting of ironwood in the past.

### **5.12.7.3 No-Action Alternative (Strategy A)**

Compared to the proposed action, the consequences of the no-action alternative for this resource category would differ in that the collection of dead and downed wood would continue to be prohibited within the expired ACECs and within 150 feet of El Camino del Diablo Backcountry Byway and permitted within all other areas of the BMGR. Also, under the no-action alternative there would be no areas where native campfires would be prohibited, unlike the proposed action, which would prohibit native wood campfires in Unit 1. Unlike the proposed action, there would not be the potential for the recreational setting to change within the expired ACECs and El Camino del Diablo as a result of possibly allowing wood collection to occur where it had previously been prohibited.

## **5.12.8 Hunting**

### **5.12.8.1 Proposed Action (Strategy B)**

The proposed action for hunting (Strategy B) would continue existing game management programs. It would also assess the need for a special hunting permit program that requires payment of nominal fees to be used for the protection, conservation, and management of wildlife, including habitat improvement and related activities on the BMGR and implement/manage actions as indicated by the assessment results. One issue to be addressed in the assessment would be whether such a program would be feasible in terms of generating enough funds with a nominal fee to support the program based on hunter participation rates (1,692 total hunter use days for AGFD Game Management Units 40A and 40B in 2000, see Table 4-28). If such a program were implemented, it could adversely impact hunters by requiring the payment of a nominal fee. As a result, hunter use may decrease within the BMGR and increase in areas near the BMGR where similar hunting opportunity is present, but where no fee would be assessed. This effect may be particularly evident in years where chances of hunter success on the BMGR are regarded as marginal. Some opportunities for hunting, however, are somewhat unique to the BMGR (i.e., annual bighorn sheep hunt) and hunters may be required to pay the fee in order to participate in the hunt. Over time, the protection, conservation, and management of wildlife would be expected to enhance existing game management programs (which focus on maintaining sustainable populations of game species) and, thereby, benefit hunters and potentially increase hunter participation rates. For example, the program could be

combined with the current permitting program and provide more accurate and useful data to BMGR resource managers on rates of harvest of game species than is currently available. In the long term, a better understanding of relationships between harvest levels and maintaining sustainable populations of game species could be achieved.

Another potential adverse effect could result from the proposed evaluation of the effects of non-game species collection on wildlife, habitat, and other resources and, if indicated, limit or restrict collection activities within the authority of state law. Those who participate in non-game species collection as a means of recreation could be negatively impacted if limitation or restrictions were eventually imposed as a result of this management objective.

#### **5.12.8.2 Alternative Actions (Strategy C and Strategy D)**

There is no difference between the proposed action and alternative Strategy C. Alternative Management Strategy D would have the same effects as the proposed action, with the exception that instead of the proposed evaluation of the effects of non-game species collection, the Arizona Game and Fish Commission would be petitioned to close the BMGR to non-game species collection.

#### **5.12.8.3 No-Action Alternative (Strategy A)**

The no-action alternative for hunting would not have the potential effects on recreation that the proposed action could with possibly implementing a special hunting program that requires the payment of nominal fees for hunting on the BMGR. The no-action alternative would be potentially lacking in long-term sustainable populations of game species, to the extent that such a program could result in long-term benefits beyond what could be accomplished under existing BMGR game management programs.

### **5.12.9 Recreational Shooting**

#### **5.12.9.1 Proposed Action (Strategy C)**

Implementation of the proposed action for recreational shooting (Strategy C range-wide) would potentially negatively affect those interested in using the BMGR for recreational shooting with automatic weapons because automatic weapons would be prohibited, except by special use permit. The Air Force has found that recreational shooting involving the use of automatic weapons is incompatible with the aviation training mission in BMGR—East. The Marine Corps had similar mission compatibility concerns regarding previous organized shooting rallies within BMGR—West involving the use of automatic weapons, but is willing to consider sanctioning

this activity under special use permit. The Marine Corps would require the results of a careful safety and environmental impact assessment, however, on a proposal for automatic weapons shoots within BMGR—West before deciding on a special use permit application for this activity. Although the Marine Corps would be the lead agency in the development of the necessary safety and environmental assessment studies, proponents for the recreational use of automatic weapons may be required to provide the funding for the studies. If issuance of a special use permit for the use of automatic weapons were the outcome of the application and assessment process, there would not be a negative effect other than the inconvenience and possibly expense of obtaining the permit.

For those recreational shooters that use non-automatic weapons, the only initial impact of the proposed action would be that recreational shooting between sunset and sunrise would no longer be allowed, except by special use permit. Otherwise, recreational shooting with non-automatic weapons would continue to be sanctioned under existing regulations as long as it is compatible with military use, public safety, and no significant resource issues are identified. In lieu of obtaining the special use permit required, those seeking recreational shooting opportunities for nighttime shooting and/or use of fully automatic weapons under the proposed action would have to seek such opportunities in off-range locations.

The importance and character of recreational shooting as an activity/issue would be assessed under the proposed action to determine the appropriateness of this activity on the BMGR and implement a decision based on the findings. The establishment of designated specific shooting area(s) would be considered. The studies that are called for are an indication that current use of the BMGR for recreational shooting is not well understood. The occurrence of recreational shooting and the values and attitudes that BMGR recreational users have towards recreational shooting are all data that are lacking for the purposes of this assessment. The assessment of the appropriateness of recreational shooting on the BMGR could result in any number of possible results. The consideration of establishing designated recreational shooting area(s), if implemented, would result in a favorable impact for recreational shooters, but negative impacts for those recreational users that favor a recreational setting where this type of recreational use is not present. Any further assessment of the potential effects of the proposed action on recreation is regarded as too uncertain given the limitations of currently available information about recreational shooting.

### **5.12.9.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would not be likely to have the same effects on recreational shooting as the proposed action. The management objective to allow recreational shooting to occur under existing regulations—as long as it is compatible with military use, public safety, and no significant resource issues are identified—is essentially a continuation of current policy. If shooting at night or automatic weapons were determined to be incompatible, these forms of recreational shooting

could also be precluded under this strategy. As noted in Section 5.12.9.1, the Air Force has already determined that recreational use of automatic weapons is incompatible with its military mission within BMGR—East and Marine Corps has suspended this activity from BMGR—West pending possible future consideration of its public safety and environmental effects. Unlike the proposed action, there would be no planned assessment of the importance and character of recreational shooting as an activity/issue on the BMGR.

With Strategy D, there would be more immediate impacts to recreational shooters, as all recreational shooting activities (except as they relate to hunting) would be prohibited. An assessment would be conducted to determine the appropriateness of allowing this activity in designated areas. As stated for the proposed action, the outcome of such an assessment cannot be predicted, but if designated shooting areas were established, this could have positive effects for recreational shooters, but potentially negative effects for those recreational users who would prefer not to see such intensive recreation uses occur on the BMGR.

### **5.12.9.3 No-Action Alternative (Strategy A)**

With the no-action alternative (Strategy A range-wide), the predicted impacts on recreational shooting as assessed for the proposed action would not occur. Recreational shooting would be allowed to continue to occur as long as it is compatible with military use, public safety, and does not significantly affect resource protection. There would be no assessment of the importance and character of recreational shooting as an activity/issue.

### **5.12.10 Utility/Transportation Corridors**

The proposed action and alternatives for utility/transportation corridors would have little effect on recreation. The planned Yuma ASH alignment is within the northwestern BMGR where public access is prohibited. The only area of the range adjacent to the State Route 85 corridor where there is public access is Unit 6 (Area B). There is nothing within the proposed and/or alternative management strategies for management of the State Route 85 corridor that would affect recreation (with the exception of the no-action alternative as it relates to the Crater Range SRMA as discussed in Section 5.12.2.3). The potential development of additional transportation/utilities corridors, which would be allowed under Alternative Management Strategy B and the no-action alternative, could negatively impact recreation if they are located in publicly accessible portions of the range as they could change the recreational character of the setting in the affected areas. Future approval of the additional transportation/utility corridors through the interior of the BMGR is unlikely, however, because of incompatibility problems that this activity would pose for the military purposes of the range.

### **5.12.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

#### **5.12.11.1 Proposed Action (Strategy C)**

The proposed management objectives for general vegetation, wildlife, and wildlife habitat management would continue to provide for management of these resources in a manner that maintains, and possibly improves the recreational setting. The characteristics of the natural environment, including ecosystem functions, would be favored by actions such as eliminating trespass grazing by livestock and habitat restoration efforts for areas that have been damaged by a discontinued military, agency, or intensive public use. The management objective to identify key areas and implement restrictions as needed to protect and conserve habitat, ecosystems, and biodiversity could result in prohibitions or restrictions on recreation use and/or opportunity within or near these key areas. Game species populations would be expected to remain stable throughout the range of the targeted species, provided that natural processes, such as precipitation rates, remains supportive of those populations.

Wildlife water developments are generally regarded as of benefit to target game species, but concerns about unintended effects, in terms of non-target species and ecosystem management have been raised. In terms of recreation, these wildlife waters may be appropriately viewed as favorable in terms of recreational hunting in that the game species that use open water on the range include bighorn sheep, deer, javelina, and upland game birds. Wildlife water developments also create greater potential opportunities to view and enjoy wildlife in the vicinity of the waters. However, they also represent a manmade modification in the environment that could detract from the wild setting that defines the recreational character of much of the BMGR and introduce a new location wherein camping within ¼ mile would be prohibited. The proposed action would allow for the construction of six high priority wildlife waters during the first five years of the INRMP and calls for literature reviews and additional studies to better understand the benefits and effects of wildlife water developments. Although the effects on recreation from the development of the six proposed wildlife waters is expected to be minimal and localized, these effects on recreation cannot be further assessed at this time because the location and other details of the developments are not currently known, but would generally be expected to be neutral or positive. However, in accordance with NEPA and other applicable statutes, such effects would be further analyzed in site-specific documentation for each water development proposal.

#### **5.12.11.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Strategy D for this resource element is the same as the proposed action, with the exception that no new wildlife waters would be developed during the first five-year term of the INRMP. There would be the same benefits as described for the proposed action, but not the potential for minimal and localized impacts from wildlife water developments, at least during this five-year period.

Alternative Strategy B would similarly provide the same effects on recreation in terms of vegetation, wildlife, and wildlife habitat as the proposed action. Because it does not include the management objective to identify key areas and restrict activities as necessary to protect and conserve them, there is not the potential effect on recreational use and opportunity, as described for the proposed action. There is little distinction that can be made between potential effects of the proposed action and Strategy B with regard to the effects of wildlife water developments. Although Strategy B authorizes up to 17 new wildlife waters and the consideration of additional wildlife water developments during the term of the INRMP, it is unlikely that more than about six of these 17 water developments would be constructed in the first five years of the INRMP (the same as the proposed action). Wildlife water development actions beyond the first five years of the plan under the proposed action would be dependent upon studies to be conducted.

### **5.12.11.3 No-Action Alternative (Strategy A)**

The no-action alternative for this resource element would have fewer benefits than the proposed action in terms of ecosystem management and habitat restoration. This management approach, however, is more heavily focused on game species management and, thus, may equally benefit hunters. There would be 17 new wildlife waters constructed as planned in the HMPs, although it is unlikely that more than about six of these would be developed in the first five years of the INRMP (the same as the proposed action). The effects of these waters on recreation would be minimal and in localized areas and beneficial for hunters throughout the range of the targeted game species.

### **5.12.12 Special Status Species**

Special status species management requirements can affect recreation use opportunities. Management Unit 3, for example, was closed to recreation entry beginning in March 2002 from 15 March to 15 July each year to minimize the potential for harassment effects on Sonoran pronghorn during the annual fawning period for this endangered species. Given the reduced 2002 Sonoran pronghorn population estimate (21 animals), it is possible that recreation use opportunities may be further impacted by such requirements or actions deemed appropriate by the USFWS and/or the Sonoran Pronghorn Recovery Team. The management objectives under consideration in the proposed action (Strategy C), alternative actions (Strategies B and D), and the no-action alternative (Strategy A), however, would not have direct impacts on BMGR recreation. Most impacts to recreation occur because of compliance requirement or management programs that are independent of the proposed INRMP (e.g., biological opinions, Flat-tailed Horned Lizard Range-wide Management Strategy, Sonoran Pronghorn Recovery Plan). The only potential impact that could be a result from implementation of the proposed INRMP would be indirect; that is, the adaptive management process could potentially result in modifications to the

management objectives and some of these changes could potentially affect recreation use opportunity. Differences between consequences of the proposed action, alternative actions, and no-action alternative, however, would be too speculative at this juncture.

### **5.12.13 Soil and Water Resources**

#### **5.12.13.1 Proposed Action (Strategy D)**

The proposed action for soil and water resources (Strategy D) would potentially affect recreation use in that it could result in the restriction or modification of recreation-related activities as necessary to meet the following objectives:

- continue to restrict the operation of motorized vehicles to established roads
- comply with statutory requirements for soil and water resources and to prevent erosion in areas of cultural resource sensitivity
- take measures to minimize soil/water contamination or erosion resulting from vehicle use or other activities
- temporarily restrict vehicular activities when soils are susceptible to a heightened risk of erosion, such as following heavy rain
- restore areas where vehicle use has caused excessive surface damage, temporarily closing roads if necessary

Impacts to recreation would vary depending on the management objective and related actions taken for its implementation. However, such impacts are expected to be relatively minor as long-term impacts would most likely be limited to localized areas. While restricting motorized access following a heavy rain would likely affect a wide area of the range, impacts from these restrictions on recreation would likely be short-term (not expected to last for more than several days to weeks). For example, a long-term closure of the eastern segment of El Camino del Diablo within the Cabeza Prieta NWR has recently been necessary because of dust build-up problems and the lack of a readily available solution to this problem. As the intended management measures would prevent erosion and other impacts that could detract from the predominant natural recreational setting of the BMGR, the proposed action for soil and water resources would provide indirect benefits for some types of recreation over the long term.

### **5.12.13.2 Alternative Actions (Strategy B and Strategy C)**

Strategy C for this resource element would not include the last two objectives listed above, both of which are temporary measures potentially limiting access on roads, so potential impacts to recreation from restriction or modification of activities would not occur as they would under the proposed action. Similarly, Strategy B would not include the objective to restrict or modify activities as necessary to comply with statutory requirements for soil and water resources and to prevent erosion in areas of cultural resource sensitivity. Not implementing these objectives from the respective implementation of Strategy B or Strategy C rather than the proposed action would likely result in minimal differences in consequences on recreation as described for the proposed action.

### **5.12.13.3 No-Action Alternative (Strategy A)**

One objective for soil and water resources in the no-action alternative that would potentially affect recreation is the continued restriction of the operation of motorized vehicles to established roads. This objective is more completely addressed in terms of recreation in the management objectives for recreation use and supervision (which address the restriction of off-road travel and compliance with general vehicle operating rules). While this provides some degree of restriction/modification of recreation use, it is not as extensive as that described for the proposed action.

## **5.12.14 Air Resources**

### **5.12.14.1 Proposed Action (Strategy A)**

No impacts to recreation are foreseen for the proposed action for air resources. Although the proposed action includes a provision for the control of excessive fugitive dust at recreation activity areas, this is a continuation of existing policy. Excessive fugitive dust from recreation activity has not historically been a management issue for the BMGR, but it could potentially become one in the future. Control measures, if needed, could potentially include limitations or restrictions on recreation use, but perhaps more likely would include management by DoD such as the application of dust palliatives to roadways or recreation activity areas.

### **5.12.14.2 Alternative Actions (Strategy B, Strategy C, and Strategy D)**

Alternative Management Strategy B for air resources could have a negative effect on recreational users if dust emissions from uncontrolled human activities reached levels where they were

detrimental to the visual setting or caused a public health and safety hazard (e.g., lack of visibility on dusty roadways).

There is no appreciable difference in predicted effects on recreation from the proposed action and Alternative Strategy C. Strategy D, however, could potentially provide more protection of air quality than the proposed action. This strategy would also avoid new activity in areas of deteriorated air quality, and therefore there would be less potential for compounding effects degrading air quality and impacting recreational users.

#### **5.12.14.3 No-Action Alternative (Strategy A)**

Because the proposed action is Strategy A for this resource management element, there is no difference in effects between the proposed action and no-action alternative.

### **5.12.15 Visual Resources**

#### **5.12.15.1 Proposed Action (Strategy B)**

The proposed action for visual resources (Strategy B) would continue to manage the scenic resources of the BMGR in a manner that is generally protective of the current recreational setting. This would be generally beneficial in retaining the predominantly natural setting that contributes to the recreational character of much of the BMGR.

#### **5.12.15.2 Alternative Actions (Strategy C and Strategy D)**

Strategy C for this resource element would add to the visual resource management program and potentially provide for management of visual resources that takes land use, viewers, and viewsheds into consideration. As recreation users are primary viewers of the BMGR, this strategy would provide additional benefits for recreation in preservation of the current recreational setting. Alternative Strategy D would further benefit recreation beyond that of the proposed action or Strategy C in that there would be additional management and restoration for unroaded areas. However, due to their lack of motorized access, these areas would be less frequently viewed by recreational users than other areas of the BMGR, but views of these areas may nonetheless be available from various viewpoints within areas accessible to the public for recreation.

### **5.12.15.3 No-Action Alternative (Strategy A)**

In terms of recreation, there is little if any difference in consequences of the no-action alternative for this resource element in comparison to the proposed action. The assessments of new actions, as required for the proposed action, would most likely be required with NEPA regardless of which alternative is implemented.

### **5.12.16 Wildfire Management**

#### **5.12.16.1 Proposed Action (Strategy B)**

The proposed action for wildfire management could benefit recreation indirectly by minimizing threats to recreation users from wildfire and by minimizing effects of fires on the recreation setting. The proposed management objective calls for a comprehensive plan that include fire prevention, suppression, recovery, mapping, monitoring, and possible mitigation protocols for both human and non-human caused fires in accordance with the threat to human life, property, and natural and cultural resources. No such plan currently exists. Conversely, the plan could also affect recreation if it results in the prescription of additional rules and regulations for the recreational use of fire (i.e., for campfires) so as to prevent or reduce the risk of recreation-related wildfires.

#### **5.12.16.2 Alternative Actions (Strategy C and Strategy D)**

The alternative actions are identical to the proposed action for this resource element and, therefore, would not result in potential consequences that differ from those described for the proposed action.

#### **5.12.16.3 No-action Alternative (Strategy A)**

The no-action alternative for wildfire management would not have the potential effects on recreation as described for the proposed action. Current policy, to suppress wildfires to achieve the lowest acreage loss and in the most cost-effective and efficient manner, is less comprehensive than the proposed action. If a large-scale wildfire were to occur under the no-action alternative, there would be more potential for risk of harm to recreational users and degradation of the recreation setting. No additional rules involving the use of fire for recreation use would be expected.

### **5.12.17 Perimeter Land Use, Encroachment, and Regional Planning**

#### **5.12.17.1 Proposed Action (Strategy D)**

Because lands adjacent to the BMGR also support various recreation uses, the proposed action for this resource element offers several advantages in terms of recreation management. As discussed in Section 4.12.1, there are increasing rates of participation in outdoor recreation activities and increasing population in the BMGR region. Coordinating with these adjacent land managers on recreation use and supervision issues; recreation use statistics; recreation attitudes, values, and trends; interrelationships; coordinated approaches for management; etc. would provide additional tools for BMGR and adjacent land managers to better respond to the recreational use needs while also protecting natural and cultural resources.

#### **5.12.17.2 Alternative Actions (Strategy B and Strategy C)**

Both of the alternative actions offer some degree of the benefits for recreation as discussed for the proposed action for this resource element, only to a lesser degree. Strategy B is the least comprehensive and thus offers the least benefits, whereas Strategy C offers some protection, but is more limited in scope.

#### **5.12.17.3 No-action Alternative (Strategy A)**

Because the proposed action offers no special management objectives for perimeter land use, encroachment, and regional planning, none of the benefits as noted for the proposed action would necessarily occur under the no-action alternative for this resource element.

### **5.12.18 Aggregate Effects on Outdoor Recreation**

#### **5.12.18.1 Proposed Action**

There are five categories of potential aggregate effects on outdoor recreation as a result of the combined effects of the objectives as assessed under the 17 individual resource management elements in the preceding sections. Four of these are specific to the BMGR as follows: recreational opportunity, recreation character, changes in recreation use, recreation management. The fifth category is effects on outdoor recreation outside the BMGR. The overall aggregate impacts cannot be further summarized, as there is a mixed effect, with no clear objective finding of beneficial or adverse impacts on outdoor recreation. Potential aggregate impacts for each category are as follows:

### BMGR Recreational Opportunities

The aggregate effects of the proposed action would have few effects on recreation opportunity on the BMGR. For the portions of the BMGR available for outdoor recreation use, recreational opportunities would continue to include dispersed hunting, backpacking, hiking, primitive camping, recreational driving, picnicking, recreational shooting, photography, nature study, visiting historical/cultural sites, rockhounding, and sightseeing. Those recreational opportunities that would continue to be precluded, first and foremost, would be those that are incompatible with the military mission or resource protection requirements established by law or implemented through the proposed INRMP (see Section 2.1), and thus are not further analyzed herein. However, as a result of implementing the proposed action, some opportunities for recreation that could conceivably fall within this legal framework would continue to be prohibited, including off-road travel, on- and off-road racing, and driving in washes. Other types of recreational opportunity would continue to be limited or restricted but in a different manner, including recreational driving, camping, and rockhounding. There are also some new prohibitions/restrictions that would affect opportunities for recreational shooting, treasure hunting, and entry to mines. In addition, some potential changes in recreational opportunity could occur following further assessment, including recreational shooting, camping, hunting, and non-game species collection.

The greatest aggregate impact to recreational opportunity would be in regard to recreational driving. Each of the forms of motorized recreational use that would continue to be precluded—ORV travel, on- and off-road racing, and driving in washes—are generally viewed as favorable in terms of meeting resource protection and conservation goals of a higher standard, but would do so at the expense of opportunity for these forms of recreation on the BMGR. Based on input received during public scoping and Core Planning Team input during the INRMP planning process, demand for opportunity for both ORV travel and driving in washes on the BMGR has been noted, while demand for on- and/or off-road racing has not. However, there has also been opposition for allowing for such opportunity, based on concerns for potential adverse impacts to natural and cultural resources.

In addition, although recreational driving would continue to be limited to travel on existing roads and trails in areas where public access is allowed, further limitations would occur as the result of the roads that would be closed or closed to public access under the proposed action. The proposed action would reduce the road network available for public use by about 36 percent, from 973 miles to 621 miles (a difference of 352 miles), with 91 percent of the reduction in available public use road mileage occurring in BMGR—West. The type of recreational opportunity that would be most affected would be recreational driving on redundant road networks. In addition, motorized recreational opportunity could be temporarily restricted when soils are at heightened risk for erosion. Plus, the proposed action would change the threshold for the requirement for a special use permit for single parties from 50 vehicles or more to 10 or more

vehicles (or 20 or more vehicles in Unit 2). Together with the continued prohibition of some types of recreational driving, proposed road closures, and temporary restrictions when soils are at heightened risk for erosion, and based on input received during public scoping and Core Planning Team input during the INRMP planning process, the aggregate effect on recreational opportunity would be greatest for recreational driving groups that have an interest in the continued opportunity for access to the maximum compatible recreational driving opportunities on BMGR (e.g., some four-wheel driving interest groups).

Other aggregate impacts would occur that would place limitation on recreational camping opportunities. The combined effect of the proposed closure of 352 miles of roads generally open to the public use and temporary closures for soil and water resource protection would, in aggregate, eliminate the associated recreational opportunity, including roadside vehicle-based camping, in these areas. In addition, there are other management actions that would further limit camping opportunity, in particular vehicle-based camping, in the provisions for restricting camping along certain road segments and requiring all campsites to be more than ¼-mile away from designated areas when needed for resource protection purposes. Similarly, if the six new wildlife waters proposed were constructed within publicly accessible portions of the range, they would introduce new locations wherein camping within ¼-mile would be prohibited in accordance with state law.

The opportunity for recreational wood gathering for campfires would continue to be restricted in certain areas; although the opportunity would be precluded based on management units, rather than by special land management designations as it currently is (within the expired ACECs and within 150 feet of the expired El Camino del Diablo Backcountry Byway). Although campfires would continue to be allowed, a new prohibition on the use of native wood for campfires would affect recreational opportunity within the publicly accessible portion of Unit 1 (encompassing most of the expired Tinajas Altas Mountains ACEC, which would be redesignated as a special natural/interest area). Related to this topic, the development of special management provisions as needed for resource protection within the proposed special natural/interest areas could translate into additional restrictions on recreational opportunities within these areas, although provisions are not known at this time.

New restrictions on rockhounding would not only limit the amount of rock material that could be removed by handpicking for non-commercial use, but would also prohibit the activity from occurring in all units of the range except for those portions of Units 2 and 3 that are not designated as special natural/interest areas and other areas that are sensitive to human-induced disturbances (e.g., cultural resource sites and areas frequented by sensitive species). With the proposed action, the opportunity for rockhounding would be eliminated within about one half of that portion of the BMGR that is generally open to public access.

The proposed action would also introduce some restrictions on recreational shooting, treasure hunting, and mine exploration. New restrictions on recreational shooting opportunity would

result from the requirement to obtain a special use permit for the firing of automatic weapons or the use of firearms between sunset and sunrise. Recreational opportunity associated with the use of metal detectors for treasure hunting would be precluded due to new management action that would prohibit the use of metal detectors on the BMGR. Lastly, whereas opportunity for entering mines is currently allowed but advised against, the proposed action would prohibit entry to mines. Based on available data about recreation use of the range, activities related to each of these three recreational opportunities are infrequent among past and current range users.

Finally, changes in recreational opportunity could result from the findings of several assessments that are called for under the proposed action including a special hunting program that may assess a nominal fee for hunting on the BMGR and a study of non-game species collection that may place restrictions or limitations on this activity on the BMGR within the authority of state law. If designated camping or recreational shooting areas are established, new types of recreational opportunity could potentially be created on the BMGR that vary from the current types of opportunity for these activities. Additionally, if the findings of the inventory and monitoring efforts reveal that deleterious effects are occurring as a result of recreation use, the Air Force and Marine Corps could adapt their management to address the issue or issues. Adaptive management responses could modify, limit, or restrict recreational opportunity to address identified resource conservation and protection problems.

### BMGR Recreational Setting

The aggregate effects of the proposed action would not be expected to result in dramatic changes to the recreational setting of the BMGR from the existing condition. The recreational setting of the BMGR would continue to be relatively wild in character with a sense of remoteness and seclusion dominant in many areas accessible to the public. Although the proposed action would result in mixed effects on the recreational setting, overall the balance of the aggregate impacts would be a recreational setting in which natural environmental conditions are more dominant, but where there may be increased evidence of other recreational users and land management/recreation use supervision.

Aggregate impacts from management objectives would enhance the natural setting and related recreational character may be additive and/or interactive, including: continuing to prohibit ORV travel and driving in washes; closing 658 miles of roads and the natural or assisted reclamation of these areas; limiting areas where wood cutting and gathering, firewood use, rockhounding, and transportation/utility corridor development could occur; continuing visual resources management practices; developing a comprehensive wildfire management plan; and coordinating with perimeter land owners and managers. Two consequences of the proposed action could potentially deter from the natural setting in localized areas: (1) the construction of six new wildlife waters, which would represent a manmade modification in the environment that could detract from the natural recreational setting if constructed in areas open to public access and (2)

not redesignating the now expired El Camino del Diablo Backcountry Byway as a special natural/interest area, because there could potentially be effects to the natural setting through the discontinuation of special management objectives (including no longer prohibiting collection of dead and downed wood within 150 feet of the corridor or allowing new surface disturbing activities within ¼-mile of this corridor).

Management objectives that would reduce the road network, and limit areas where camping, wood gathering, and rockhounding would be permitted could result in a slight aggregate increase in encounters between users, thereby lessening the sense of seclusion in the affected areas. On the other hand, management objectives could reduce the encounters between users if visitation decreases as a result of new restrictions or limitations on recreational opportunity (see third point, below) or from requiring a special use permit for groups with 10 or more vehicles (or 20 or more vehicles in Unit 2).

Although the law enforcement presence and required adherence to the visitor use rules and regulations would not be expected to change, there would be new rules and regulations that may result from the implementation of the proposed INRMP. The educational materials regarding natural and cultural resources management and the proposed road management policy would be communicated to the public through the recreational permit system and educational/interpretive materials. There would be more gates, fencing, and signing to control entry and use. Adding to the rules and regulations that recreation users would have to comply with and the more evident presence of land management and recreation use supervision could change the character of the recreational experience for some.

Lastly, some changes in the recreational setting could eventually occur as the result of assessments regarding establishing designated camping areas, specific shooting area(s), and signs and other measures for indicating road closures. Both the designated camping and shooting areas, if established, would result in a more pronounced change in recreational setting in the vicinity of these designated areas than would result from the other management objectives. Although the camping areas, as currently envisioned, would be undeveloped, the evidence of other users would be more prominent and interaction with other users would be more likely within and near these camping areas, which would result in a less primitive and secluded recreational experience. Likewise, recreational shooting areas represent a relatively intensive use that would have similar impacts on the natural recreational setting in localized areas. Assessing requirements for signs or other measures to indicate road restrictions and implementing management actions based on findings could potentially change the recreational setting in localized areas. Signs and other modifications that may be used to indicate road restrictions are sometimes viewed as intrusive in a backcountry recreational setting that is relatively wild and secluded in character. Nonetheless, they would likely be necessary to implement management provisions, particularly with regard to ensuring that the roads that would be closed under the proposed action would no longer be driven. Although the current intent is to post roads that are open and all roads not posted as such would be closed, the proposed assessment allows for a

more detailed analysis of what techniques would be most appropriate for indicating road restrictions. Effects on recreational setting would be balanced with the effectiveness of meeting recreation use management objectives, particularly in the long term as the closed roads revegetate and blend into the natural setting.

### BMGR Recreation Use

As a result of management actions proposed in this EIS, there could be some increases or decreases in recreation use of the BMGR. In aggregate, there is a greater potential for decreased use than increased use as a result of the management objectives identified for the proposed action. However, over time, BMGR recreation use rates are expected to increase independent of the proposed INRMP as a result of regional population growth and trends toward increased participation in outdoor recreation activities. The greatest potential for decreased recreational use of the BMGR would potentially result from the proposed reduced road network. As a result of reduced recreational driving opportunities, some recreational users that currently visit the BMGR for the recreational driving opportunities available with the current road network or for direct vehicle access to selected personally favored sites that would no longer be accessible may choose to no longer visit the range. Likewise, opportunities for rockhounding, camping, exploring mines, or treasure hunting would be restricted or eliminated, and a special use permit would be required for certain types of recreational shooting and for groups with larger numbers of vehicles. As a result, some range visitation may decrease among those who visit the range for these recreational opportunities, which are currently allowed with fewer restrictions and limitations than they would be if the proposed action were implemented for this EIS.

With regard to decreases in visitation that may result from reduced recreational driving opportunity, vehicle-based camping, and other uses associated with motorized access, the greatest aggregate effect would likely occur within BMGR—West, where almost 91 percent (or 320 miles) of the decrease in the available public use road mileage would occur. While only 32 miles of publicly accessible road would be closed in BMGR—East, rockhounding would be prohibited in Unit 6 (but allowed in Units 2 and 3 in BMGR—West) and entry to mines would be prohibited range-wide. However, based on available recreation use data, a weaker correlation is expected between recreation use rates and opportunity for rockhounding, entry to mines, and use of metal detectors than between recreation use rates and motorized access opportunities. Little, if any, effect to overall recreation use would be expected as a result of the requirements for special use permits for shooting at night and with automatic weapons and for single parties with 10 or more vehicles (and 20 or more vehicles in Unit 2) because these uses comprise a relatively small amount of overall recreation use of the BMGR.

The redesignation of the expired ACECs as special natural/interest areas, however, could bring renewed attention and interest in these areas and result in increased visitation to these areas where they are open to public access, particularly if the DoD engages public awareness and

outreach programs regarding these areas. There is also the potential that, over time, the more natural recreation setting expected from the implementation of the proposed action may result in increased visitation among those recreational users that value such opportunities.

Again, some effects could occur as a result of assessments that are proposed in this EIS. These include the potential for nominal hunting fees, limitations or restrictions on non-game species collection (within the authority of state law), and further regulation of recreational shooting. Whereas, recreational use could decrease as a result of the special hunting program requiring payment of nominal fees and limitations or restrictions on non-game species collection, the establishment of recreational shooting area(s) could actually increase recreation use of the BMGR because there is a regional demand for this type of use.

### BMGR Recreation Management

As previously explained, the proposed action would result in a fundamental change in the approach to recreational management in the adoption of a limits of acceptable change approach. This fundamental change would be intertwined with other proposed changes to specific management tools. For example, there would be an improved record keeping system to track recreation use trends and proactively manage recreation use to minimize conflicts between recreation use opportunity and resource protection and conservation. The permit system would continue to be a key recreation management tool, and would be added to in order to inform the public about road restrictions and resource sensitivities. Special use permits would be required for more activities. The erection of gates and fencing to control entry would decrease unauthorized use of the range and provide a more complete account of all recreation use on the BMGR. Likewise, coordinating with adjacent land managers would provide additional tools for BMGR and adjacent land managers to better respond to the recreational use needs while also protecting natural and cultural resources.

A minimum number of full-time law enforcement positions dedicated to the BMGR would be retained, which would continue to be an advantage for managing recreation use. There would likely be increased visitor rules and regulations to implement as a result of proposed management objectives including rules for the disposal of human sewage and solid waste, road closures, expressed prohibition of driving in washes, prohibiting entry to mines and the use of metal detectors, prohibiting rockhounding in some areas, special use permit requirements, etc. There would also be a change in focus from increased regulation within former ACECs and along El Camino del Diablo Backcountry Byway to the unit-specific enforcement of restrictions and prohibitions (e.g., rockhounding, wood gathering, etc.). However, additional management provisions could be adopted and rules and regulations could be expanded within the proposed and any future special natural/ interest areas.

There could be additional impacts on recreation management as the result of the workload and findings of the assessments called for with regard to the special hunting program, non-game species collection, designated camping and shooting areas; monitoring native wood supplies in high-use areas; and requirements for signs and other measures to indicate road restrictions. For the most part, these resulting effects on recreation management would most likely be additional rules and regulations and means for enforcing them. However, if the hunting program were implemented, it could provide more accurate and useful data to guide recreation management of game species.

### Recreation Outside of the BMGR

As a result of some of the proposed management actions, some recreational users may visit non-BMGR locations for outdoor recreation opportunities that would no longer be available or more strictly controlled on the BGMR, such as motorized public access, rockhounding, entering mines, etc. The greatest potential for impact would be on BLM-managed lands that are managed for limited ORV use (meaning that vehicles must remain on established roads), that would offer additional backcountry recreational driving opportunities than the BMGR would with the proposed road closures. Recreation use of the Imperial Sand Dunes Recreation Area, which offers diverse recreational driving and ORV use opportunities, may also increase as a result of the proposed motorized access objectives.

Another potential effect on recreation outside of the BMGR would potentially result from the establishment of the Cabeza Prieta NWR bypass roads. The bypass roads would serve as an alternate to the roads within the refuge/wilderness that are administrative use roads currently used by the Border Patrol during ground surveillance. As this portion of the refuge is also Wilderness, the discontinuation of routine use of these roads by Border Patrol would be favorable to recreational users of the refuge wilderness setting. Coordination with adjacent land managers for the benefit of natural resources could also potentially influence outdoor recreation outside the BMGR.

The results of proposed assessments could displace use from the BMGR to adjacent lands. These include the special hunting program, if it were to result in the assessment of a nominal fee for hunting on the BMGR, and the recreational shooting assessment, if it were to result in the restriction/prohibition of recreational shooting on the BMGR.

### **5.12.18.2 Alternative Actions**

#### Management Strategy B

In comparison to the proposed action, Management Strategy B would have similar aggregate impacts on outdoor recreation. The greatest difference would be that no road closures would occur and thus associated aggregate recreational impacts, as assessed for the proposed action, would not occur. In addition, the careful consideration of some potentially compatible recreational activities that would be precluded under the proposed action would be considered. These are ORV travel in designated areas and entry to mines. A brief summary of differences between this strategy and the proposed action by each category of aggregate impact follows:

#### *BMGR Recreational Opportunities*

In comparison to the no-action alternative, there would be no change in recreation opportunities related to existing motorized public access, associated camping, and other recreational activities. However, in comparison to the proposed action, there would be more than 352 miles of additional road accessible to the public and perhaps even more miles as motorized public travel would be allowed in designated washes and additional roads may be established for recreational purposes. There could be less of an impact on larger groups as a special use permit would not be required for a single party unless the party had 30 or more vehicles. There would also not be the restrictions and limitations on recreational shooting, treasure hunting, camping, and entry to mines, or potential effects following further assessment on recreational shooting and camping. However, the potential effects would be the same as the proposed action for hunting and non-game species collection. There would be greater opportunity for wood cutting, gathering, and use than under both the proposed action and the current condition.

#### *BMGR Recreational Setting*

As compared to the proposed action, there would be few aggregate effects on the recreational setting from Management Strategy B. Aggregate impacts on the existing recreational setting as a result of the continuation of current policy would continue with few distinctions. Vehicle-based camping would be allowed within 100 feet of established roads rather than 50 feet, which could further disperse and seclude campers from other users. Although first constrained by the military mission, new transportation/utility corridors may be established, which could have site-specific impacts on recreational setting. Rather than six new wildlife waters, up to 17 new waters would be constructed, which could affect the recreational setting if located in recreation use areas.

### *BMGR Recreation Use*

In contrast to the proposed action, there would not be any expected changes in recreation use patterns compared to existing conditions from implementing Management Strategy B. If an ORV use area were established, however, there might be increased recreation use due to the relatively high demand and short supply of such opportunities in the BMGR region. The same effects on recreation use that could occur with the proposed action as a result of assessments—including nominal hunting fees and limitations or restrictions on non-game species collection (within the authority of state law)—could also occur under this strategy.

### *BMGR Recreation Management*

As compared to the proposed action, there would be fewer consequences on recreation management under Strategy B. For the most part, recreation management would occur based on current programs without a change to a limits of acceptable change approach. As no special management provisions would be continued for the expired ACECs, SRMAs, and Backcountry Byway and no other special natural/interest areas would be established, all recreation management would be based on either a range-wide or a unit-by-unit basis. The same potential effects as assessed for the proposed action with regard to a special-fee hunting program and non-game species collection could occur, within the authority of state law. As the objectives for coordination with adjacent land owners and managers are more limited in scope than those of the proposed action, there would be some, but a lesser degree of potential influence on off-range recreation use expected, but potentially more than occurs under the existing condition.

### *Recreation Outside of the BMGR*

None of the management actions that were identified as potentially causing increased use in other recreational lands in the vicinity of the BMGR would occur with Management Strategy B. Conversely, if an ORV use area were established, there might be less ORV use and entry to mines in lands in the vicinity in favor of exercising these opportunities on the BMGR. The same effects as described for the Cabeza Prieta NWR bypass road, however, would occur with this strategy. Also, as with the proposed action, actions taken based on assessment of the special hunting program may result in hunting outside the range to avoid the nominal fee, if a fee were established. Similarly, if non-game species collection on the BMGR were limited or prohibited, this activity could occur more frequently on BMGR perimeter lands.

### Management Strategy C

There are few differences in the potential aggregate effects on outdoor recreation from this alternative as compared to the proposed action. This strategy was selected as the proposed action, at least in part, for all of the resource categories affecting outdoor recreation. A brief summary of differences between this strategy and the proposed action by each category of aggregate impact follows:

#### *BMGR Recreational Opportunities*

In comparison to the proposed action, there would be similar recreational opportunities under Strategy C. There would, however, be fewer restrictions on rockhounding and wood gathering and there would be no restriction on the use of native wood for campfires in any portion of the range.

#### *BMGR Recreational Setting*

There is almost no difference in predicted aggregate effects of Management Strategy C as compared to the proposed action on the recreational setting. There might be less dust with Strategy C because palliatives could be applied on heavily traveled roads and, as the VRM system would be used for visual resources management, there might be greater protection of scenery as compared to the proposed action.

#### *BMGR Recreation Use*

There would be no difference between the aggregate impacts on BMGR recreation use between the proposed action and this strategy.

#### *BMGR Recreation Management*

There would be no measurable difference between the aggregate impacts on BMGR recreation management between the proposed action and this strategy.

#### *Recreation Outside of the BMGR*

The management actions that were identified as potentially causing increased use in other recreational lands in the vicinity of the BMGR with the proposed action would also likely occur

with Management Strategy C. The same effects as described for the Cabeza Prieta bypass road for the proposed action would also occur with this strategy.

### Management Strategy D

In comparison the proposed action, the focus on maximum resource conservation and protection under this strategy would result in additional aggregate impacts on recreation. There are greater distinctions between the proposed action and Management Strategy D, in aggregate, for each of the five aggregate effect categories as summarized below:

#### *BMGR Recreational Opportunities*

Strategy D would result in more restrictions on motorized access and associated recreational opportunities. Strategy D would have 419 fewer miles of road accessible to the public than what currently exists. In comparison to the proposed action, there would be 67 fewer miles of road accessible to the public with Strategy D (about a 7 percent difference), plus an additional 15 miles would be restricted to government use only with Strategy D. There would also be no opportunity for rockhounding or for wood cutting, collection, and native wood campfires range-wide. At least until an assessment of recreational shooting could be completed, opportunity for this activity would be precluded. Following the assessment, any opportunity for recreational shooting opportunity would be limited to designated areas. In addition, a special use permit would be required for visitor stays in excess of seven consecutive days rather than 14 days and for single parties with 10 or more vehicles range-wide (including Unit 2).

#### *BMGR Recreational Setting*

The aggregate effects of Management Strategy D on the recreational setting would be similar to those of the proposed action. There are a few differences, which in aggregate, would result in a more natural setting than the proposed action. There would be 67 more miles of roads closed and restored (either naturally or by augmented means) under this strategy, which would increase the potential for encounter with other users to a slight degree as compared to the proposed action. At least during the first five years of the proposed INRMP, no new wildlife waters would be constructed. The natural setting would also potentially be more dominant as the result of more aggressive air quality and visual resources management as compared to the proposed action.

### *BMGR Recreation Use*

As compared to the proposed action, there could potentially be greater decreases in recreational use of the BMGR due to the more wide-ranging limitations on recreational opportunities. The redesignation of the expired SRMAs and Backcountry Byway in addition to the ACECs would potentially result in greater temporary impacts on recreation use rates to the publicly accessible portions of these areas.

### *BMGR Recreation Management*

Strategy D would be expected to have most of the same impacts as the proposed action with regard to recreation management. Comparatively, there would be a greater number of prohibitions and restrictions to enforce, including a prohibition on wood cutting, gathering, and native wood campfires. Although there would be a shift in management focus from special management areas to the proposed INRMP management units, the expired SRMAs and Backcountry Byway would also be designated as special natural/interest areas and additional special management provisions could be created for these areas, in addition to the former ACECs.

### *Recreation Outside of the BMGR*

There would be a greater potential for BMGR recreational users to visit non-BMGR locations for outdoor recreation opportunities that would no longer be available or more strictly controlled on the BGMR under Strategy D, as compared to the proposed action. There would be no benefit to recreational users of the Cabeza Prieta NWR wilderness setting because the refuge bypass road would not be developed.

### **5.12.18.3 No-Action Alternative**

The consequences on outdoor recreation from selection and implementation of the no-action alternative rather than the proposed action is that BMGR recreational opportunities, setting, use and management would continue under applicable provisions the Goldwater Amendment, HMPs, and various compliance decisions. The no-action alternative would not necessarily result in the same aggregate impact as occurs under the existing condition, because applicable management objectives from these plans that were ineffectively implemented or never implemented in the past, could yet be implemented and have an effect on recreation. Key differences between the aggregate effects of Strategy A in comparison to the proposed action are as follows:

### BMGR Recreational Opportunities

In comparison to the proposed action, there would be fewer restrictions on motorized access and associated recreational opportunities. Although off road vehicle use would continue to be prohibited, there would be 973 miles of roads that would remain open to public use at least until a transportation plan could be completed and implemented, whereupon at least some road closures similar to those of the proposed action would be expected. There would be no change in current opportunities for camping (although the transportation plan could eventually affect vehicle-based camping opportunity similar to the effects of the proposed action, but perhaps of a differing magnitude); rockhounding; or wood cutting, gathering, and native wood campfires. At least until an assessment of recreational shooting could be completed, opportunity for this activity would not be allowed. There would be no assessments and potential effects on recreational opportunity relative to the special hunting program, non-game species collection, recreational shooting, or designated camping areas that could occur under the proposed action.

### BMGR Recreational Setting

As compared to the proposed action, there would be little change to the recreational setting from the existing condition predicted with the selection and implementation of Strategy A. However, the transportation plan could eventually have similar aggregate impacts on the recreational setting as the proposed action with regard to motorized public access and unroaded area management.

### BMGR Recreation Use

As compared to the proposed action, there would be less of a probability that recreation use rates would change as a result of implementing this strategy. If the transportation plan were finalized, however, there could be similar aggregate impacts on recreational use relative to recreational driving and other associated uses as roads not meeting military, agency, or public use needs would be closed.

### BMGR Recreation Management

In comparison to the proposed action, recreation management would continue under existing programs, with no limits-of-acceptable-change framework. Tools for management, including recreation permit programs, visitor education and interpretation, and recreation use statistics would remain similar to existing programs, although they may change slightly from time to time as is currently the case. There would be no additional or revised rules or prohibitions to implement. The expired ACECs, SRMAs, and Backcountry Byway would all be retained along

with the special management provisions for these areas. Thus, some types of recreation management would continue to be somewhat defined by these areas rather than by the proposed INRMP management units. There would also be no minimum number of law enforcement officers, which could limit the effectiveness of enforcing the existing rules whereas the proposed action would be expected to improve law enforcement.

### Recreation Outside of the BMGR

Under Strategy A, no change in recreation use in the vicinity of the BMGR would be expected, at least in the short term. However, similar to the proposed action, the completion and implementation of the transportation plan has the potential to divert recreational driving use from the BMGR to off-range locations.

## **5.13 PUBLIC HEALTH AND SAFETY**

### **5.13.1 Resource Inventory and Monitoring**

There would be no effect on public health and safety from the proposed action, alternative actions, or no-action alternatives for this resource management element.

### **5.13.2 Special Natural/Interest Areas**

The management objectives for special natural/interest areas would have no effect on public health and safety regardless of whether the proposed action, an alternative action, or the no-action alternative were selected and implemented for this resource category.

### **5.13.3 Motorized Access and Unroaded Area Management**

#### **5.13.3.1 Proposed Action (Strategy C)**

The proposed action, Strategy C, would result in closure of redundant roads range-wide. A fewer number of roads could translate into a higher concentration of traffic on the remaining roads and a higher potential for vehicular accidents on the roads that would remain open. Increases in the number of vehicles traveling on the same road would increase the potential for fugitive dust as most roads on the range are unpaved. Because excessive dust can obscure visibility, this could increase the potential for vehicle accidents. On the other hand, a greater concentration of motorists could increase the likelihood that a lost or stranded motorist would receive assistance, which would benefit public safety.

One reason that some roads are proposed for closure is because they have become unsafe for continued motorized use (e.g., the final segment of the road leading to Betty Lee Mine, which has become narrow and unstable along the ridges of the Copper Mountains). The roads that are proposed for closure do not serve any current military or agency purpose, and therefore are not maintained roads; consequently, road hazards (e.g., ruts, unstable portions of roads along mountain ridges, etc.) may be more prevalent along these roads. Similarly, there could be a slight increased potential for motorists to encounter scattered ordnance from driving on unmaintained, wildcat roads. While this is always a risk on the BMGR, this risk is reduced along BMGR roads that are more frequently traveled because ordnance hazards are more likely to have been observed, reported, and appropriately mitigated by trained EOD personnel. Because the public is not allowed to access portions of the BMGR that are most likely to be impacted by ordnance, the likelihood of encountering ordnance on unmaintained roads is minimal.

The proposal to develop two bypass roads in the northwest corner of the Cabeza Prieta NWR for the purpose of eliminating the current use of administrative roads in the refuge by the Border Patrol is not expected to affect public health or safety.

#### **5.13.3.2 Alternative Actions (Strategy B and Strategy D)**

With Management Strategy B, no roads would be closed, additional roads (including but not limited to the Cabeza Prieta NWR bypass road) would potentially be developed for public access, and/or future motorized public access would potentially be allowed in currently restricted areas if there is a change in military security restrictions. As opposed to the proposed action, the occurrence of the same or a greater number of publicly accessible BMGR roads would disperse recreational motorists, which would result in comparatively lower levels of risk of vehicular collision due to the lower levels of concentrated vehicle traffic on roadways and related generation of fugitive dust. However, there would also be potential increased risks in that motorists that are stranded or lost in remote locations would have less chance of being assisted by other passers-by. Wildcat roads and roads that may be unsafe for continued motorized use would not be closed under this strategy. In addition, if the public is allowed to access currently restricted areas in the future, this could potentially place the public at a higher risk of encountering road hazards and scattered ordnance.

Road closures under the application of Management Strategy D would have the same potential effects as the proposed action. The magnitude of difference between the alternatives, as compared to the proposed action, cannot be distinguished clearly enough to differentiate the public health and safety effects of these management strategies.

### **5.13.3.3 No-Action Alternative (Strategy A)**

Much like the application of Strategies C and D to various BMGR management units, road closures under the no-action alternative (as could possibly be planned for in a range-wide transportation plan) could potentially lead to a greater concentration of motorists on open roads, with an increased risk for collisions due to increased traffic and fugitive dust. However, this could also increase the likelihood of stranded motorists being rescued and reduce the increased risks of road and ordnance hazards along unmaintained roads. Given that the specific results of the transportation plan and how road closures may differ from those proposed, the magnitude of this effect is unpredictable at this time.

### **5.13.4 Camping and Visitor Stay Limits**

All of the management strategy alternatives for this resource category would continue to allow for dispersed self-contained (i.e. non-vehicle-based, such as backpacking) camping in all areas open to the public. Because of this, it would continue to be more difficult to locate campers in an emergency than it would be if camping were confined to designated camping areas. In addition, campers would be more likely to encounter military ordnance than they would while staying at designated camping areas. For both of these reasons, public health and safety could continue to be slightly compromised by allowing dispersed camping.

Strategy C (the proposed action) and Strategy D (an alternative) offer potential advantages in that designated camping areas may be established and areas available for camping would be somewhat reduced (by restrictions along roadway segments for resource protection or within ¼-mile of sensitive resources).

By defining and prescribing rules for the disposal of human sewage and solid waste under Strategies B, C, and D, the risk of encountering refuse left behind by previous campers would be minimized. This would be an advantage in terms of public health and safety in that improperly disposed waste (particularly sewage) can increase exposure to sewage-related pathogens and associated risks.

### **5.13.5 Recreation Services and Use Supervision**

#### **5.13.5.1 Proposed Action (Strategy C in Unit 2 and Strategy D in All Other Units)**

Implementation of the proposed action (Strategy C within Unit 2 and Strategy D within all other management units) could benefit public health and safety through the following objectives:

- **Continue to prohibit ORV travel and on- and off-road racing.** ORV travel is inherently dangerous due to the increased risk of becoming stuck or stranded, or encountering ordnance. In addition, on- and off-road racing is inherently dangerous due to the increased risk for high-speed collisions to occur.
- **Restrict motorized public travel in all washes (except where the wash is a designated part of the road system open to the public and is dry).** This management objective is beneficial to public safety because it minimizes the risk of getting stuck and/or stranded in a wet wash as well as minimizes the risk from driving in washes when flash flooding or swift moving water could lift and carry a vehicle.
- **Require a special use permit for a single party with 20 or more vehicles in Unit 2 and 10 or more vehicles in all other units.** This requirement would potentially decrease the amount of dust, sewage, and trash associated with larger groups and the associated public health and safety hazards.
- **Continue to require compliance with general vehicle operating rules.** The provisions set forth in these rules would continue to help to decrease the risk associated with operating a vehicle on BMGR lands (see Section 4.12.1.3 for more information regarding the specific operating rules).
- **Two related objectives are discussed together here: (1) retain a permit system and expand efforts to educate users about natural and cultural resource sensitivities and (2) issue special recreation use permits, as appropriate.** One benefit to public health and safety with this management objective would lie in the continued ability to alert visitors of potential problems with the call-in process prior to visiting the range. On BMGR—East, there is also a procedure to call off the range when leaving (see Section 4.12.1.3), which may help to determine if there might be lost or stranded recreationists. The call-in process informs the appropriate authorities of the intended location and duration of stay for permitted visitors. Another is that the permit and accompanying hold harmless agreement informs recreational users about the potential environmental and military hazards present on the BMGR, including unexploded ordnance, and how to avoid hazardous areas and/or situations.
- **Implement increased public education and recreation use information programs, particularly to inform the public about road restrictions and resource sensitivities.** Public safety would be improved by this objective as visitors would benefit from better navigation of BMGR roads through the distribution of improved maps through the permitting system.
- **Retain a minimum number of full-time law enforcement positions dedicated to the BMGR.** If changes to the law enforcement budget for the BMGR were enacted in the

future and cuts to personnel were required, Strategy C would retain a minimum of four full-time law enforcement positions on the BMGR and Strategy D would retain a minimum of six full-time law enforcement positions. Maintaining a minimum number of law enforcement positions would benefit public health and safety in that the presence of BMGR law enforcement personnel would likely help to minimize violations of rules and regulations, which often are for the purposes of minimizing or eliminating potential risks to recreational users.

- **Assess requirements for signs or other measures to indicate road restrictions; implement management actions based on findings.** Signs or other measures to indicate road restrictions would be a benefit to public safety, particularly with regard to navigation and avoiding roads that were closed due to concerns for public safety.
- **Assess the need for and effects of additional gates and fencing to control entry into and use of the range.** This management objective would decrease the risk of the public entering the BMGR unknowingly due to the lack of gates/fencing along the BMGR perimeter. Where the range is open to public use, the risk would be limited to these persons being uninformed about potential hazards; where the range is closed to general public use, dangers could include unknowingly entering a hazardous military use area.
- **Prohibit use of metal detectors.** The use of metal detectors would be prohibited, where it currently is not (but is thought to occur infrequently). This would help to minimize the safety hazard due to the accidental excavation of military ordnance.
- **Prohibit entry to mines.** This management objective would benefit public health and safety through the prohibited entry into mines. Currently, this inherently risky activity is not strictly prohibited; range users are advised to avoid mine shafts due to their instability and other inherent hazards, but some recreational use of mines continues to occur.

#### 5.13.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)

In contrast to the proposed action, under Management Strategy B there would not be as many objectives to benefit public health and safety as follows:

- **Evaluate the need for and effects of allowing public ORV travel in designated areas.** Rather than prohibiting off-road travel like the existing condition and proposed action, the need for and effects of allowing public off-road travel in designated areas would be evaluated. If such use were allowed to occur, there could be increased risk to public health and safety due to fugitive dust, vehicle emissions and malfunction, and vehicle crashes.

- **Allow motorized public travel in designated washes (when dry).** Although the risk of being caught and swept away in swift moving water would be minimized by restricting this activity to when the washes are dry, there could still be a risk in the event that a flash flood occurs in upland areas and reaches the wash bed prior to adequate warning that flooding could occur. Even with some warning, if one has traveled deep in the wash, it could be difficult to reach safe ground in time. This is an important distinction in potential consequences of this strategy in contrast to the proposed action, as the proposed action would further minimize this risk by not allowing motorized travel in washes.
- **Require for a special use permit for a single party with 30 or more vehicles.** Similar to the proposed action, there may be benefits to public health and safety from this management objective, as compared to a party of 50 or more vehicles under the existing conditions, due to the decreased potential for concentration of waste and fugitive dust. However, there would be a greater potential for the concentration of waste and fugitive dust (and associated decrease in the public health and safety benefit) with Strategy B compared to the proposed action.
- **Implement measures to make permits easier to obtain.** Ease of obtaining a range permit could increase compliance for the requirement to have a permit. The permit is an important tool used to inform the public about the health and safety risks on the BMGR.
- **Two related objectives are discussed together here: (1) retain existing public education and use information programs and (2) retain existing interpretation and signs unless there is a public safety issue.** As current education programs contain adequate information about potential hazards present on the BMGR, this management objective would generally have the same potential effects on public health and safety as the proposed action. However, the proposed action is slightly more beneficial as it includes additional measures to inform the public about road closures, which could assist in navigation and avoidance of unsafe areas.
- **Retain a minimum of two full-time law enforcement officers.** As compared to the proposed action, Strategy B would retain a fewer minimum number full-time law enforcement positions. Thus, if there were budget cuts that reduced the funding available for these positions, there would be commensurately less law enforcement personnel present to assist visitors and assure compliance with visitor rules and regulations.
- **Retain existing gates and fences unless additional gates and fencing are needed for safety and compliance reasons.** From a public safety point of view, this objective does not differ much from the proposed action. However, if gates/fences are not erected in areas where entry is unauthorized, ingress/egress to an unsafe area could be overlooked. These unauthorized users would not have the benefits of being adequately informed of all

potential hazards and aids to navigation as would those authorized users that have obtained a permit and associated information.

- **Evaluate the feasibility of allowing public entry to mines where such use is compatible with safety and resource protection requirements; if feasible, implement a program for such use under special use permit provisions.** If entry to mines were allowed as a result of this management objective, there would still be some inherent risk to users unique to mines even if a safety assessment determined that the risk level would allow access to interested recreational users.

Other objectives that are not included in this alternative management strategy, but which are included in the proposed action are to develop and maintain recreation use records and statistics and prohibit the use of metal detectors. The impacts from these objectives, as assessed for the proposed action, would not occur with implementation of Strategy B.

Because there is little difference between Strategies C and D, consequences would not differ between the proposed action for public health and safety and these strategies as alternatives, regardless of the unit to which they are applied.

### 5.13.5.3 No-Action Alternative (Strategy A)

Changes from the existing conditions would not occur under the application of Management Strategy A, but would continue to benefit public health and safety with implementation of existing recreation services and use supervision objectives. The distinctions in potential consequence of the no-action alternative as compared to the proposed action are as follows:

- **Allow motorized public travel in dry streambeds and wash bottoms in accordance with the Draft Barry M. Goldwater East HMP.** The HMP designates specific washes that may be used for travel. While travel is not authorized in all dry streambeds and washes, there would be increased risk of harm during a flash flood, as discussed for Strategy B, for travel within the authorized washes.
- **Require a special use permit for a single party with 50 or more vehicles.** The differences between the no-action alternative and the proposed action for public health and safety would be similar to those described for Strategy B.
- **Four related objectives are discussed together here: (1) retain a permit system, (2) provide the public with up-to-date visitor use maps and rules and regulations, (3) establish an environmental education program, and (4) Develop a BMGR sign plan, implement a signing program based on identified sign needs.** Although the proposed action may provide additional benefits in that it focuses on informing the public

about road closures, the effects of these management objectives to public health and safety would otherwise be similar to those of the proposed action.

- **Two related objectives are discussed together here: (1) develop an action plan for interagency law enforcement and (2) enforce all public access permit requirements and regulations.** Most of the benefits to public health and safety from these management objectives versus the proposed action objectives would be similar. However, no minimum number of full-time law enforcement positions dedicated to the BMGR would be required with the no-action alternative. If funding cuts occur, there would be no guarantee law enforcement positions would not be eliminated. The less law enforcement presence, the more likely that infractions could occur, which would increase potential for risk to public safety.
- **Implement appropriate public safety protection measures.** With this management objective rather than the proposed action, there would be less emphasis on gates and fencing to control entry and use and, therefore, continued risks to those who enter the range unauthorized—both from military hazards and other environmental/road hazards.

The only other notable management objective that is not included in this no-action alternative, but which is included in the proposed action is to prohibit the use of metal detectors. The potential benefit to public health and safety from ordnance mistaken as treasure, as assessed for the proposed action, would not occur with implementation of the no-action alternative.

#### **5.13.6 Rockhounding**

There would be no effect on public health and safety from the proposed action, alternative actions, or no-action alternatives for rockhounding.

#### **5.13.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

Allowing campfires to continue on the BMGR, as is presented in all of the management strategy objectives, could potentially increase the risk of wildfires on the BMGR. The risk of wildfire caused by campfire is regarded as low, however, since no such occurrence has been documented. By prohibiting native wood fires under Strategy D (as proposed in Unit 1), the risk for related injuries would be less than that of the other alternatives. However, no such incidents have been reported on the BMGR in the past and would not be expected to have an impact on overall public health and safety. Woodcutting could also be a dangerous activity; all strategies except for Strategy B (an alternative action) would prohibit this activity.

### **5.13.8 Hunting**

Regardless of the alternative implemented for hunting, there would be no expected impacts on public health and safety. Continuing the existing game management programs and compliance with state hunting law (provided for in all alternatives) would maintain the current level of public health and safety.

### **5.13.9 Recreational Shooting**

#### **5.13.9.1 Proposed Action (Strategy C)**

The proposed action for recreational shooting, Strategy C, would have beneficial effects on public health and safety by reducing or eliminating some of the risks that exist under the current recreational shooting policy. First, a special use permit would be required for the use of fully automatic weapons, whereas currently no such requirement exists. Fully automatic weapons are more hazardous than other firearms because they have a high rate of fire and are often operated in a sweeping motion. While with all guns, the user must be sure that shots fired will not injure anyone or anything beyond the intended target or face possible charges for wanton disregard for the safety of others or property, it is more difficult to continue to ascertain where one's shot will strike when firing an automatic weapon. While public recreational shooting with automatic weapons has occurred on BMGR—West in the past, the Marine Corps is not currently allowing this use until a better understanding of the effects can be determined. The proposed action would also require a special use permit for shooting between sunset and sunrise. The benefits of this management objective are similar in that the ability to accurately ascertain that no person or property would be unintentionally harmed when shooting is dramatically hindered at night.

Dispersed recreational shooting with other type of firearms would be allowed to continue and firearm operators would continue to be held responsible for ensuring that recreational shooting occurs in a safe manner. AGFD regulations for the use of firearms when hunting would continue to apply to recreational shooting. (These include prohibiting the taking of wildlife from motorized vehicles; certain limitations on use of firearms at night; prohibiting the discharge of any firearm from, across, or into a road or railway; prohibiting the use of certain devices and ammunition; and discharging a firearm within ¼-mile of an occupied residence.) These continued requirements would reduce the risks associated with recreational shooting, but not eliminate them. The occurrence of recreational shooting and the associated recreational opportunity/public safety tradeoffs on the BMGR are not currently well understood. The proposed action includes a study to gather additional information about recreational shooting and its appropriateness. This study would further address public safety concerns related to the dispersed recreational shooting that would be allowed to continue under the proposed action; based on the study findings, decisions would be made on the appropriateness of recreational shooting on the BMGR and what additional restrictions, if any, would be necessary.

Lastly, there is a management objective to consider establishing specific designated shooting area(s). Such considerations would include the evaluation of public safety hazards, including both the aerial and surface extent of hazards. Designated shooting area(s) would offer advantages for public safety over dispersed recreational shooting. Rather than solely relying on the firearm operator to make an assessment of safe shooting conditions, hazards would have been assessed and incorporated into the designated use of the areas. It is not currently known, however, if dispersed recreational shooting outside of designated area(s) would continue to be allowed if designated shooting area(s) are established. Concentrated shooting areas would also raise concerns for the potential for lead contamination to occur at levels that could exceed regulatory guidelines. However, potential impacts to public health would be limited as there are few pathways for lead contaminated soils to affect humans that have only transient contact with them, plus concerns for potential lead contamination would be addressed in the consideration of establishing these designated area(s).

#### **5.13.9.2 Alternative Actions (Strategy B and Strategy D)**

To the extent that recreational shooting is a hazard to public health and safety on the BMGR, Strategy B would not have the advantages for public health and safety that the proposed action would. Changes to reduce or eliminate current risk levels associated with recreational shooting would only be implemented if a determination of incompatibility were made. Shooting at night and/or with automatic weapons would not necessarily require a special use permit. Unlike the proposed action, there would be no assessment of the appropriateness of recreational shooting or consideration of designated shooting areas.

Strategy D would offer the greatest advantages in terms of public safety in that recreational shooting (not to include hunting) would be prohibited. The appropriateness of allowing the activity to occur in designated areas would be evaluated. If these areas were established, they would have the same public safety advantages as noted for the proposed action.

#### **5.13.9.3 No-Action Alternative (Strategy A)**

The no-action alternative for recreational shooting would be similar to Strategy B and would have greater public safety risks than the proposed action.

### **5.13.10 Utility/Transportation Corridors**

#### **5.13.10.1 Proposed Action (Strategy C)**

In general, there would be an increased potential for traffic collisions on utility/transportation corridors under the proposed action because another transportation corridor would be introduced (the Yuma ASH would be allowed because its application was filed prior to 6 November 2001). However, it can be assumed that the Yuma ASH would be designed for the forecasted volume of traffic and that applicable safety measures would be applied during the project. In addition, it is anticipated that a fence would be constructed along this corridor, which would not only ensure the safety of Marine Corps personnel, but also the safety of the public.

Because low-flying aircraft could potentially collide with overhead utility lines, it would be beneficial to retain utilities to the State Route 85 corridor as currently restricted under the terms of the Goldwater Amendment.

#### **5.13.10.2 Alternative Actions (Strategy B and Strategy D)**

The potential development of additional transportation corridors under Strategy B would have the same potential impacts on public health and safety and increased risk of vehicular collisions associated with new transportation corridors in excess of that which would occur with the proposed action. However, as with the proposed action, any new transportation corridor would consider the forecasted volume of traffic during highway design and would include appropriate safety measures.

In general, restricting all future utility and transportation corridor development to existing corridors under Strategy D would be of more benefit to public health and safety than the proposed action because no new potential for traffic safety hazards would be created. In addition, Strategy D (as with the proposed action) would restrict construction of overhead transmission lines to paralleling the existing Gila Bend to Ajo transmission line. This would preclude additional obstacles that could pose a hazard to aircraft operations, and minimize the potential for an aircraft crash that could threaten public safety.

#### **5.13.10.3 No-Action Alternative (Strategy A)**

The no-action alternative, like the proposed action, would continually benefit public health and safety through the restriction of overhead transmission lines to paralleling the Gila Bend to Ajo transmission line. There would also be the continual risk of negatively impacting public health and safety with construction of a new transportation corridor in excess of that which would occur

with the proposed action (wherein the Yuma ASH would be the only additional utility/transportation corridor constructed).

### **5.13.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

Each of the alternatives, including the no-action alternative, would continue to plan for the future implementation of wildlife water developments or would allow for the maintenance and repair of existing water developments. Because artificial wildlife water catchments have the potential to attract bees, this could have a negative impact on public health and safety if someone were to encounter and be stung by bees that were attracted to the water. The potential also exists for a slip-and-fall hazard associated with the water catchments. However, there has been no such recorded incident occurring as a result of these hazards on the BMGR in the past; therefore, the threat of such impacts is regarded as low.

On the other hand, in many areas of the range, the wildlife water developments are the only source of water for many miles. These waters have been reportedly used by UDAs crossing the range and could potentially have saved human lives.

### **5.13.12 Special Status Species**

Impacts on public health and safety would not be expected with implementation of any of the management strategies for this resource management element.

### **5.13.13 Soil and Water Resources**

#### **5.13.13.1 Proposed Action (Strategy D)**

Implementation of Strategy D for soil and water resources would involve taking measures to minimize soil/water contamination resulting from vehicle use. Because the potential for increased exposure to hazardous materials and/or waste would exist from such contamination, Strategy D would benefit public health and safety. However, even the potential for such a risk is generally low.

Conducting a range-wide soil survey under Strategy D could benefit public safety because it would produce additional knowledge of the soil in areas where there is a natural propensity for fugitive dust, which typically reduces the visibility on BMGR roads and could endanger motorists' safety. Adaptive management measures could be implemented in existing use areas or new management measures in new use areas to minimize this risk.

Strategy D would also temporarily restrict vehicular activities when soils are susceptible to a heightened risk of erosion, such as following a heavy rain. This provision would benefit motorists' safety not only due to the threat of becoming stuck in fresh mud, but also from the threat of swift moving water or flash floods which could create precarious conditions for vehicles on poorly maintained roads.

#### **5.13.13.2 Alternative Actions (Strategy B and Strategy C)**

As in the proposed action, implementation of Strategy C for soil and water resources would take measures to minimize soil/water contamination resulting from vehicle use. Like the proposed action, this would benefit public health and safety, but the potential for such risk is generally low.

Strategy B for soil and water resources would not provide for such an action, and would therefore not benefit public health and safety as implementation of Strategy C and D would.

#### **5.13.13.3 No-Action Alternative (Strategy A)**

Current soil and water resource management provisions would be implemented under Strategy A and would therefore not result in any additional benefit to public health and safety.

#### **5.13.14 Air Resources**

##### **5.13.14.1 Proposed Action (Strategy A)**

With regard to air resources, the proposed action is the same as the no-action alternative, Strategy A. There would be a continued benefit to public health and safety through the control of excessive fugitive dust in certain areas and the development of Best Management Practices as these actions would help reduce fugitive dust on certain roads, reducing the hazard of vehicular collisions due to low visibility.

##### **5.13.14.2 Alternative Actions (Strategy B, Strategy C, and Strategy D)**

Implementation of Management Strategy B for air resources does not provide for any special management objectives. Because of this, no added benefit to public health and safety would occur. The lack of a dust control program could potentially negatively affect motorist safety.

Strategies C and D for air resources, which would include the use of dust palliatives on heavily traveled roads, would have a potential added benefit on public health and safety as described for the proposed action. Fugitive dust would be more strictly controlled than with the proposed action, which could decrease the likelihood of a vehicular collision on certain roads due to reduced visibility in addition to that which is provided in the proposed action.

#### **5.13.14.3 No-Action Alternative (Strategy A)**

Because the no-action alternative for air resources is identical to the proposed action, the impacts on public health and safety are the same.

#### **5.13.15 Visual Resources**

There would be no anticipated effects on public health and safety with implementation of the proposed action, alternative actions, or no-action alternative for this resource management element.

#### **5.13.16 Wildfire Management**

##### **5.13.16.1 Proposed Action (Strategy B)**

The proposed range-wide fire management plan under Strategy B would benefit public health and safety by providing additional knowledge of the potential threats associated with wildfires along the BMGR perimeter. If the proposed range-wide fire management plan produced additional information about individual residences located along the BMGR perimeter, it would better assist BMGR managers in the event of a life-threatening situation.

##### **5.13.16.2 Alternative Actions (Strategy C and Strategy D)**

Management Strategies C and D (the alternative actions) for wildfire management are identical to the proposed action and would have the same effects on public health and safety.

##### **5.13.16.3 No-Action Alternative (Strategy A)**

Under the no-action alternative for wildfire management, wildfire suppression and management would continue to be managed under the existing objective. Additional management

prescriptions would not likely occur and thus, the additional public health and safety impacts that could occur with the proposed action would not be expected.

### **5.13.17 Perimeter Land Use, Encroachment, and Regional Planning**

#### **5.13.17.1 Proposed Action (Strategy D)**

The proposed action for this resource management element, Strategy D, would benefit public health and safety because it would provide for the maximum level of coordination and communication between periphery land users and managers. On occasions where there is a direct conflict with military activities on the range and off-range land uses affecting public health and safety, the DoD is obligated to actively pursue resolution of such conflict. Initiating coordination before there is a public health and safety conflict would create the greatest benefit.

#### **5.13.17.2 Alternative Actions (Strategy B and Strategy D)**

Under the alternative actions for this resource element, the range-wide application of Management Strategy B or Management Strategy C, there would still be an increase in perimeter land use studies and coordination compared to the no-action alternative and this would also have beneficial public health and safety effects, similar to those of the proposed action. However, these effects would be to a lesser degree due to the fewer number of studies and evaluations presented under those strategies.

#### **5.13.17.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, perimeter land use, encroachment, and regional planning activities and studies would be the same as those currently in effect or planned. Thus, associated impacts would not be expected to differ from the existing conditions and comparatively less beneficial than the proposed action.

### **5.13.18 Aggregate Effects on Public Health and Safety**

#### **5.13.18.1 Proposed Action**

There are two categories of additive/interactive effects of the proposed action of the 17 resource management elements that could affect public health and safety: (1) those activities that could potentially impact the number of public accidents and/or injuries that occur on the range and (2)

increased coordination and shared data between BMGR land managers and adjacent land managers that could better identify public health and safety risks.

The proposed management objectives for motorized access and unroaded area management; camping and visitor stay limits; recreation services and use supervision; recreational shooting; wood cutting, gathering, firewood use, and collection of native plants; soil and water resources; and air resources could potentially cause a decrease in the potential for public safety-related incidents on the range. Aggregate impacts resulting in these benefits are related to the following issues:

- reduced potential to encounter military ordnance
- improved motorist navigation through better education policy
- fewer mine safety hazards
- fewer metal detector hazards (such as digging up buried ordnance)
- better law enforcement
- reduced potential for becoming stranded in remote areas of the BMGR
- reduced potential for miscellaneous health and/or safety risks associated with wood collection, sewage disposal, etc.
- fewer aircraft accidents due to restriction of additional overhead transmission lines

In addition, the proposed increase in studies, surveys, and agency coordination with soil and water resources; wildfire management; recreational shooting; and perimeter land use, encroachment, and regional planning could all increase the amount of data and/or information that would benefit land management on the range. These benefits would include:

- wildfire management knowledge
- increased soil and water data/knowledge
- increased coordination between BMGR land managers and adjacent land managers

Conversely, some of the objectives proposed for motorized access and unroaded area management; utilities; and general vegetation, wildlife, wildlife habitat, and wildlife waters could have adverse impacts on BMGR public health and safety. Issues related to these objectives are as follows:

- vehicular accidents due to fugitive dust
- vehicular accidents associated with a new transportation corridor
- hazards associated with bees and slip-and-fall risks at wildlife waters

In summary, as described in Section 4.13.1, the majority of public health and safety issues on the BMGR are related to natural hazards, associated with extreme temperatures, venomous wildlife, general camping activities (hiking, climbing, etc.). This EIS has been prepared to be consistent with the primary military safety requirements, by avoiding unrestricted public access into the

range (see Figure 2-4). The rules of conduct that are presented under the proposed action—such as restricting access to mines, implementing sewage disposal rules, prohibiting wood cutting, prohibiting metal detectors, etc.—would reduce some of the risks associated with visitor activities and would also reduce the risks associated with unique safety hazards on the BMGR, such as unexploded ordnance.

A number of public health and safety concerns might be identified with public access on BMGR roads, but the extent to which these would occur cannot be easily determined. While road reductions under the proposed action could potentially result in increased concentration of fugitive dust and, in turn, increase vehicular accidents, there is no evidence that would suggest that this would definitely occur. While eliminating traffic in more dispersed areas of the range could potentially reduce the risk of motorists becoming stranded with vehicle problems, until more is known about the issue, a determination cannot be made as to the magnitude of the overall impact of such restrictions.

Overall, the proposed action would enhance the public health and safety of the range, as it would result in more actions to protect public health and safety as compared to Alternative Management Strategies A and B.

### **5.13.18.2 Alternative Actions**

#### Management Strategy B

The range-wide application of Management Strategy B would include management objectives that primarily focus on regulatory compliance rather than the introduction of additional management objectives for public health and safety. Objectives for motorized access and unroaded area management; camping and visitor stay limits; recreational services and use supervision; recreational shooting; utilities; and general vegetation, wildlife, wildlife habitat; and wildlife waters could all potentially have a negative impact on BMGR public health and safety.

Management Strategy B would not result in an appreciable change from the existing condition in terms of public health and safety standards, with the exception of allowing public ORV travel, which could increase the risk of vehicular collisions and other accidents in addition to evaluating for additional transportation and utility corridors. This strategy would not provide for additional safety provisions that are presented in the proposed action. Although the extent is unknown at this time, Strategy B could possibly result in somewhat increased risks for those who participate in ORV travel (should this activity be approved in the future) as well as increased risks associated with an additional utility or transportation corridor.

### Management Strategy C

There would be limited differences in aggregate impacts between the proposed action and the range-wide application of Strategy C for public health and safety. Like the proposed action, the rules of conduct for Strategy C—such as restricting access to mines, implementing sewage disposal rules, prohibiting wood cutting, prohibiting metal detectors, etc.—would reduce some of the risks associated with visitor activities and would also reduce the risks associated with unique safety hazards on the BMGR, such as unexploded ordnance. Overall, as with the proposed action, this strategy would enhance the public health and safety of the range.

### Management Strategy D

The range-wide application of Management Strategy D would have similar effects as the proposed action, but to a greater extent. This strategy would provide for even more enhanced protection of public health and safety over the proposed action, such as additional road closures (which could be both positive and negative for public safety), a prohibition of recreational shooting, and the restriction of all future utility and/or transportation corridors. Overall, the objectives presented in the 17 resource management elements for Management Strategy D would provide for an even greater amount of public safety provisions as compared to the proposed action.

#### **5.13.18.3 No-Action Alternative**

The aggregate impacts for this management strategy would differ from the proposed action in that there would not be any change in existing public health and safety practices. As stated for the proposed action, however, this EIS has been prepared to be consistent with all military safety requirements in order to avoid public health and safety issues. Although additional provisions to reinforce this standard are not provided for, the objectives, in aggregate, would accomplish the basic requirements.

## **5.14 LAW ENFORCEMENT**

### **5.14.1 Resource Inventory and Monitoring**

The MLWA of 1999 assigned the DoD the responsibility of being the primary land steward of the BMGR. As such, the DoD cannot dictate the actions or responsibilities of other agencies conducting work on the BMGR, but it can have an influence on them. Strategy D, the proposed action for this resource element, provides for the highest degree of resource inventory and monitoring on the range, which could ultimately affect DoD law enforcement actions, and could

also influence other agencies' law enforcement actions on the BMGR. For example, if inventory or monitoring activities, as they are proposed most aggressively under Strategy D, were to determine that Border Patrol activities (see Section 4.14) and/or UDA activity associated with the international border was having a deleterious effect on BMGR natural or cultural resources, as land stewards the DoD would likely coordinate closely with the Border Patrol, and other law enforcement as appropriate, to alleviate such effects.

The remaining alternatives would have the same potential effects on both DoD and non-DoD agencies' law enforcement activities as the proposed action, but to a lesser degree, as the proposed action provides for the greatest degree of inventory and monitoring that could result in detection of a natural or cultural resource issue.

## **5.14.2 Special Natural/Interest Areas**

### **5.14.2.1 Proposed Action (Strategy C)**

The Flat-tailed Horned Lizard HMA and the expired ACEC designations would gain a redesignation of special natural/interest areas under Strategy C, the proposed action. Special land designations such as this could potentially limit certain types of law enforcement activities within these areas. This land designation would generally hold the DoD to maintain a higher level of management attention as opposed to other areas of the range, and the U.S. Border Patrol and other law enforcement agencies operating on the BMGR would be expected to conduct their activities in the same spirit. As an example, if an electronic instrumentation site were needed for surveillance of illegal drug trafficking activity, candidate sites not impacting special natural/interest area may be favored over those that would impact these areas.

### **5.14.2.2 Alternative Actions (Strategy B and Strategy D)**

Management Strategy D would have the same effects on DoD and non-DoD law enforcement activities as the proposed action, although to a larger extent because the Backcountry Byway and SRMAs would also be designated as special natural/interest areas.

Law enforcement activities on the BMGR could still be influenced under Strategy B with the special natural/interest area redesignation for the Flat-tailed Horned Lizard HMA. However, by not providing for any other special natural/interest area designations on the range, this management strategy would have less of an influence on how law enforcement activities would be conducted as compared to the other alternatives.

### **5.14.2.3 No-Action Alternative (Strategy A)**

Maintaining the HMA, ACEC, SRMA, and Backcountry Byway designations and special management provisions would continue to affect the manner in which law enforcement activities are conducted in those designated areas. Because the SRMAs and Backcountry Byway are also included, there would potentially be greater effects on law enforcement from the no-action alternative than the proposed action. However, existing management provisions for these areas do not have much impact on law enforcement.

## **5.14.3 Motorized Access and Unroaded Area Management**

### **5.14.3.1 Proposed Action (Strategy C)**

During preparation of this EIS, the various agencies who conduct their mission on BMGR lands, including the Border Patrol and the BEC law enforcement working group, were consulted with regard to the minimum number of roads required to complete their mission. As a result, although Strategy C would propose to close redundant roads, the agencies and law enforcement would not be expected to incur negative impacts. There could, however, be an increased burden for BMGR law enforcement personnel to monitor compliance with and appropriately enforce the proposed road closures.

The proposed action would implement site-specific planning for the development of two roads to bypass existing roads within the northwest corner of the Cabeza Prieta NWR. The Border Patrol would benefit from this management objective because the bypass roads would eliminate the need to use administrative roads in the refuge during periodic surveillance and reduce conflict between the Border Patrol mission requirement and the Cabeza Prieta NWR Wilderness management mandate.

### **5.14.3.2 Alternative Actions (Strategy B and Strategy D)**

The principal differences between the alternative management strategies and the proposed action is that the more road closures there are, the greater the increased burden on DoD law enforcement personnel to ensure that users are complying with the proposed road closures, at least in the short term. Where applied within publicly accessible management units, Strategy D would potentially impose a greater burden than the proposed action. With Strategy B, there could also be increased impacts on law enforcement in the long term because of the potential that additional roads might be opened up to or created for public use, thus increasing the patrol area for DoD law enforcement personnel.

Similar to the proposed action, in the long term, as roads closed under Alternative Strategy D would revegetate and lose their appearance as a road, the burden on law enforcement would be lessened as there would be fewer miles of road to patrol.

One other important distinction is that implementing Strategy D would not allow for development of the Cabeza Prieta bypass roads and have the potential law enforcement benefit as described for the proposed action, whereas Management Strategy B would have the same relative effect as the proposed action.

### **5.14.3.3 No-Action Alternative (Strategy A)**

If a transportation plan under Strategy A is developed in the future, consultation with these agencies would again be conducted, minimizing any potential negative effects to law enforcement activities that might be experienced by the various agencies. Road closures are regarded as likely because roads not meeting military, agency, or public use needs would be closed, but the impact on DoD law enforcement from implementing those closures relative to the proposed action is unforeseeable.

## **5.14.4 Camping and Visitor Stay Limits**

### **5.14.4.1 Proposed Action (Strategy C)**

The proposed action, Strategy C, would increase the amount of camping and visitor stay regulations on the BMGR as opposed to the current condition. For example, vehicle-based camping along certain road segments would be restricted, all campsites would be required to be located more than ¼ mile away from designated sensitive natural and cultural resources, and rules for the disposal of human sewage and solid waste would be defined. Although these restrictions would likely be defined over time, the end result is that law enforcement personnel would be assigned additional enforcement responsibilities. The magnitude of this effect cannot be determined with certainty based on available data, but it is likely to be regarded as minimal, if any.

### **5.14.4.2 Alternative Actions (Strategy B and Strategy D)**

Although Strategy D provides slightly stricter regulations on camping (a limitation of vehicle-based camping stays to 7 consecutive days within a 28-day period except by a special use permit, as opposed to 14 consecutive days with all other alternatives), it would not likely result in measurable impacts on law enforcement as compared to the proposed action.

Although the potential for an effect on enforcement agencies' duties still exists with Management Strategy B, it would be slightly less strict than the proposed action. As with the proposed action, however, the magnitude of the effects of these alternatives cannot be determined with certainty based on available data, but it is regarded to be minimal, if any.

#### **5.14.4.3 No-Action Alternative (Strategy A)**

Because the camping locations and terms of stay would remain unchanged with the no-action alternative, no changes in camping regulations would occur. Rules for the disposal of sewage and solid waste would not be created. Therefore, unlike the proposed action, no effect on law enforcement would occur.

### **5.14.5 Recreation Services and Use Supervision**

#### **5.14.5.1 Proposed Action (Strategy C for Unit 2 and Strategy D for All Other Units)**

The level of law enforcement responsibilities under the proposed action for recreation services and use supervision (Strategy C for Unit 2 and Strategy D for all other units) would be greater for the DoD law enforcement officers who would enforce the restrictions. The new restrictions would include reduced party sizes (except by special use permit) and prohibitions on metal detectors and mine exploration.

Both Strategies C and D would develop and implement limits-of-acceptable change monitoring to guide recreation use management and protect natural and cultural resources. Under this implementation, monitoring areas for wildcat dumping or resource degradation on the BMGR could be added to the duties of enforcement personnel so that appropriate management actions could be determined and taken.

#### **5.14.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

Compared to the proposed action, most Strategy B provisions of the recreation services and use supervisions resource management element would reduce law enforcement responsibilities on the BMGR because Strategy B has fewer visitor restrictions. Compared to the current responsibilities, this alternative implements slightly stricter regulations on the size of a single party needing a special use permit; however, few parties of 30 or more vehicles use the BMGR so the effort needed to implement this restriction would be minimal.

While there currently are two DoD law enforcement and five security guard positions staffed for the BMGR, Strategy B only calls for a minimum of two full-time DoD law enforcement positions dedicated to the BMGR. If only two law enforcement officer positions are assured with the implementation of Strategy B and the security guards were no longer available to patrol the BMGR, this would place a much heavier burden on the law enforcement officers, particularly if the proposed restrictions for other resource management elements were implemented.

Because there is little difference between Strategies C and D, consequences would not differ between the proposed action for this resource category and these strategies as alternatives, regardless of what unit to which they are applied. However, if budget constraints or other circumstances required a reduction in the current number of law enforcement/security positions, Strategy C would require a minimum of only four positions whereas Strategy D would require a minimum of six positions. The security guards provide a patrol presence that may deter persons on the range from breaking laws, which reduces the workload of the law enforcement officers. Any reduction in the security staff would place a heavier burden on the two existing law enforcement officers. However, ensuring four or six officers who are authorized to enforce the laws would mean that the existing law enforcement officers would no longer need to come to the assistance of the security guards to enforce the laws.

As under the proposed action, Strategies C and D, regardless of the unit to which they are applied, could result in additional monitoring for limits of acceptable change.

#### **5.14.5.3 No-Action Alternative (Strategy A)**

No new visitor restrictions would occur with the application of Management Strategy A. Compared to the proposed action, this would result in fewer responsibilities for the law enforcement officers. No minimum number of law enforcement positions is proposed with Strategy A; therefore, reductions in staff could place a greater burden on the remaining staff, particularly if the proposed restrictions for other resource management elements were implemented.

#### **5.14.6 Rockhounding**

All of the management strategies for rockhounding on the BMGR would require the same level of enforcement, regardless of the degree of allowable collection.

### **5.14.7 Wood Cutting, Gathering, and Firewood Use and Collection of Native Plants**

Restrictions on wood cutting, gathering, and firewood use on the BMGR already exist. The difference in each of the alternatives for this resource category would not be expected to alter the type of or degree of law enforcement that would be needed in the future. The areas in which future restrictions/regulations on wood cutting, gathering, and firewood use would change to some degree, but this would still not be expected to cause a change in the enforcement responsibilities.

### **5.14.8 Hunting**

#### **5.14.8.1 Proposed Action (Strategy B)**

In addition to continuing the existing game management programs, this strategy provides for an assessment of the need for a special hunting permit program as well as an evaluation of the effects on non-game species collection on various BMGR resources. If a special hunting permit program with nominal fees were implemented, the fees would be collected in advance so this would not be expected to cause a change in DoD law enforcement responsibilities. However, a nominal fee program could potentially discourage hunters from coming to the BMGR, thereby reducing the workload for law enforcement officers.

#### **5.14.8.2 Alternative Actions (Strategy C and Strategy D)**

Management Strategy C is identical to the proposed action and would have the same effects.

As opposed to the proposed action, a petition to close the BMGR to non-game species collection would be submitted to the Arizona Game and Fish Commission under Management Strategy D. If implemented, this additional restriction could increase law enforcement responsibilities for DoD, AGFD, or both agencies.

#### **5.14.8.3 No-Action Alternative (Strategy A)**

The no-action alternative would not change the current DoD law enforcement activities or responsibilities. If nominal fees were required to hunt on the BMGR as a result of the proposed action, the no-action alternative (which would not include a fee program) could potentially result in more BMGR hunters than with the proposed action and thus more visitors for the law enforcement officers to monitor. This difference would likely be negligible.

### **5.14.9 Recreational Shooting**

#### **5.14.9.1 Proposed Action (Strategy C)**

Some additional responsibilities associated with the regulation of recreational shooting would occur under the proposed action as opposed to the no-action alternative. This could slightly affect the amount of or type of law enforcement activities for which various DoD enforcement personnel would be responsible.

#### **5.14.9.2 Alternative Actions (Strategy B and Strategy D)**

Under Management Strategy D, recreational shooting would be prohibited, unless subsequent assessments of the activity determine otherwise. As compared to the proposed action, enforcing this regulation would change the manner in which this activity is handled by enforcement personnel.

Strategy B would not include restrictions on recreational shooting unless it were found to be incompatible with military use, public safety, or protection of significant resources. Compared to the proposed action, this would require less law enforcement action.

#### **5.14.9.3 No-Action Alternative (Strategy A)**

As long as future recreational shooting activities on the BMGR are compatible with military use and there is no public safety issue, recreational shooting would be allowed under existing regulations. This would require less law enforcement activity than the proposed action.

### **5.14.10 Utility/Transportation Corridors**

None of the alternatives presented for management of utility/transportation corridors would be expected to change the type or amount of law enforcement activities on the BMGR.

### **5.14.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

Each of the alternatives, including the no-action alternative, would continue to provide for the development of procedures to control all trespass livestock and feral burros. With the additional measure proposed for the implementation of this management objective (including fencing and coordination with adjacent land owners), this could eventually result in additional enforcement actions if adjacent ranchers were to refuse to comply with grazing prohibitions. Although

trespass grazing has long been an issue on BMGR lands, future enforcement activities may occur through implementation of the management strategies proposed in this EIS.

Developing additional wildlife waters (under Strategies A, B, and C) could potentially add to the DoD law enforcement responsibilities because state law (ARS 17-308, Unlawful Camping) has determined that "...it is unlawful for a person to camp within one-fourth mile of a natural water hole containing water or a man-made watering facility containing water in such a place that wildlife or domestic stock will be denied access to the only reasonably available water."

#### **5.14.12 Special Status Species**

Changes to the type or amount of law enforcement activities would not be expected with implementation of any of the management strategies for this resource management element.

#### **5.14.13 Soil and Water Resources**

Each of the alternatives for this resource category would potentially affect enforcement on the BMGR to some degree. As compared to the current condition, the incremental increase in restrictions, modifications, and measures with Strategies B, C, and D, could add to the DoD law enforcement responsibilities.

Restrictions to vehicular activity when soils are susceptible to a heightened soil erosion risk (as presented in Strategy D, the proposed action), such as following a heavy rain may affect Border Patrol activities to some degree if patrol duties are temporarily restricted in certain areas following a heavy rain.

#### **5.14.14 Air Resources**

The management strategies for air resources would not affect law enforcement activities.

#### **5.14.15 Visual Resources**

Placement of law enforcement equipment (such as cameras, fences, etc.) would continue to be encouraged to be located on previously disturbed land and positioned to avoid impacts to scenic vistas. This would apply with all alternative management strategies for visual resources.

### **5.14.16 Wildfire Management**

#### **5.14.16.1 Proposed Action (Strategy B)**

Implementation of the proposed action for wildfire management, Management Strategy B, could potentially have an effect on the manner in which law enforcement is conducted if a new DoD program was created for additional fire prevention, suppression, mapping, monitoring, and possible mitigation protocols. If a wildfire management plan for the range were implemented, it would be expected to create new rules for activities on the BMGR, which could in turn affect the protocol for various aspects of law enforcement actions (i.e. how a fire is reported, how citations would be issued, etc.).

#### **5.14.16.2 Alternative Actions (Strategy C and Strategy D)**

Management Strategies C and D for wildfire management (the alternative actions) are identical to the proposed action and would have the same effects on law enforcement activities.

#### **5.14.16.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, wildfire management suppression would continue to be managed under the existing objective. Although the applicable MLWA provisions would remain in place, no management plan would be created to address its implementation. Further, additional management prescriptions would not likely occur and thus, no law enforcement effects would be expected.

### **5.14.17 Perimeter Land Use, Encroachment, and Regional Planning**

#### **5.14.17.1 Proposed Action (Strategy D)**

Application of Management Strategy D range-wide for this resource management element could result in beneficial law enforcement effects through the proposed coordination with other law enforcement agency personnel, such as local sheriffs, local police departments, and the Tohono O'odham Nation. Because law enforcement issues are not always limited within geographical boundaries, increased coordination and communication could assist BMGR law enforcement personnel with their mission.

### **5.14.17.2 Alternative Actions (Strategy B and Strategy C)**

Under the alternative actions for this resource category, the range-wide application of Management Strategy B or Management Strategy C, there would still be an increase in perimeter land use studies and coordination compared to the current condition, and this would also have beneficial law enforcement effects, similar to those of the proposed action. However, these beneficial effects would be more limited due to the number of studies and evaluations proposed under those strategies.

### **5.14.17.3 No-Action Alternative (Strategy A)**

Under the no-action alternative for this resource element, no special regional planning or coordination is proposed. While this would not differ from existing conditions, the benefits associate with the proposed action would not be realized.

## **5.14.18 Aggregate Effects on Law Enforcement**

### **5.14.18.1 Proposed Action**

Selection and implementation of the proposed action would be unlikely to have significant impacts on DoD law enforcement actions and/or responsibilities on the BMGR. Two types of aggregate impacts would be expected: (1) impacts to where daily law enforcement activities are allowed on the range, and (2) changes in resource management policy that would have an impact on law enforcement responsibilities.

Management objectives that would influence where DoD law enforcement activities are allowed to occur on the range include changes to road access, survey results from the proposed increase in resource inventory and monitoring, and new special natural/interest area designations. If certain law enforcement activities are identified as causing damage to natural and/or cultural resources within a certain area, those activities could potentially be relocated, which could create a burden on law enforcement actions. The proposed Cabeza Prieta NWR bypass roads, however, would provide the U.S. Border Patrol with the ability to patrol this portion of the range without breaching the Wilderness restrictions that prohibit the use of motorized vehicles.

The proposed changes in resource management policy for camping; recreational services and use supervision, recreational shooting, wood collection, and soil resources would be expected to create additional law enforcement responsibilities on the range. Additional law enforcement responsibilities would be included for the following issues:

- requiring all campsites to be more than ¼-mile away from sensitive natural and cultural resources
- enforcing new sewage disposal rules and regulations
- restricting public travel in washes
- requiring special use permits for large parties
- prohibiting the use of metal detectors
- prohibiting public entry into mines
- restricting recreational shooting
- eliminating trespass grazing by livestock
- restricting wood cutting, gathering and campfires
- restricting vehicular and construction activities when soils are susceptible to erosion
- establishing fire management protocols

These effects are expected to add to the current DoD law enforcement responsibilities, but in the long term, would be expected to benefit BMGR natural and cultural resources. Although additional burden would be placed on DoD law enforcement, the proposed action would retain a minimum of four full-time law enforcement positions on the range, which would help alleviate the increased workload. Overall, these resource management policies are slightly more protective of natural and cultural resources than the current conditions. These effects, individually and in aggregate, would be minor.

#### **5.14.18.2 Alternative Actions**

##### Management Strategy B

Under the range-wide application of Management Strategy B, there would be slightly more DoD law enforcement responsibilities than the current condition, but fewer responsibilities than under the proposed action. Although most ongoing natural and cultural resource management (and law enforcement) practices would be continued, resource protection and conservation measures would be more generally limited to those necessary to achieve basic regulatory compliance. An increase in regulatory responsibility would not be as great as the proposed action; however, at the same time, there would be a minimum of only two full-time law enforcement positions for the range.

While DoD law enforcement access would not be curtailed because the road network would be essentially the same as current conditions, this alternative would have the most miles of road to patrol and the potential creation of additional roads could increase the area. However, like with the proposed action, the U.S. Border Patrol would benefit from the ability to patrol using the proposed Cabeza Prieta NWR bypass roads rather than driving within the Cabeza Prieta Wilderness. With no provision for adaptive management in response to monitoring results, it would be less likely that law enforcement activities would change in response to resource survey

and inventory results. Resource management objectives for camping and visitor stay limits as well as recreational services and use supervision would create additional responsibilities for law enforcement, but the degree of restrictions would be similar to existing conditions rather than the increases associated with the proposed action.

### Management Strategy C

There would be little difference in the DoD law enforcement effects described for the proposed action and those that would result with the range-wide application of Management Strategy C. Compared to the proposed action, there would be fewer visitor restrictions, but the differences would be negligible.

### Management Strategy D

The range-wide application of Management Strategy D would result in a higher degree of resource protection, with more rules and restrictions, as compared to the proposed action. For example, resource inventory and monitoring would occur at a more intense level; more areas would be designated as special natural/interest areas; more roads would be closed and the bypass roads for Border Patrol use would not be created; and wood collection and campfires as well as recreational shooting would be prohibited. While there would be added responsibilities for the law enforcement officers, there would be at least six full-time law enforcement positions to do the work.

In aggregate, while this strategy would result in the most resource protection and would provide for additional law enforcement positions, it would have the greatest burden on DoD and Border Patrol law enforcement activities and responsibilities of all the alternatives.

#### **5.14.18.3 No-Action Alternative**

Impacts to law enforcement under the range-wide application of Management Strategy A for each of the resource management elements would differ from the proposed action in that there would be fewer studies, evaluations, and rules/regulations, particularly for special natural/interest areas; motorized access; camping and visitor stay limits; recreation services and use supervision; wood cutting, gathering, and firewood use; hunting; recreational shooting; and wildfire management. At the same time, there would be no minimum number of law enforcement positions required, regardless of future BMGR law enforcement funding.

## **5.15 PERIMETER AND TRANSBOUNDARY LAND USE**

As discussed in Section 4.15, lands located adjacent to and within the study area (five miles of the BMGR) are under various ownership and management, including that of the state and county, BLM, NPS, Native American tribes, USFWS, and Mexico. While DoD encourages coordination/communication between DoD installations and peripheral land users and/or managers, the DoD does not have the authority to control future land use projects or land use zoning. Where there is a direct conflict with military activities on the range and off-range land uses affecting public health and safety, however, the DoD is obligated to actively pursue resolution of such conflict. This section describes the effects on perimeter and transboundary land use when the various management strategies are applied to the 17 resource management elements.

### **5.15.1 Resource Inventory and Monitoring**

Regardless of which resource monitoring strategy is implemented, there would be a positive perimeter and transboundary land management effect due to ecological inventory and monitoring. The extent of inventory and monitoring increases progressively from Strategy A to D with the no-action alternative (Strategy A) offering the least intensive program and the proposed action (Strategy D) offering the most intensive program. BMGR lands are contiguous with BLM, USFWS, Native American, and Mexican lands, and thus share the same ecological characteristics, including wildlife populations, vegetative communities, physiographics, watersheds, and airsheds, just to name a few. Increased ecological monitoring, as presented in all management strategy alternatives would result in an increase in the amount of data/information that could provide both BMGR and off-range land managers with a more complete understanding of ecological characteristics of the area. In turn, this could positively influence land management, and its related use, in lands located along the BMGR perimeter.

### **5.15.2 Special Natural/Interest Areas**

The former ACECs, SRMAs, and Backcountry Byway under consideration in the alternative strategies have no identifiable influence on adjacent lands. As a result of the 1997 Flat-tailed Horned Lizard Range-wide Management Strategy and conservation agreement, however, the HMA extends westward of the BMGR boundary to encompass contiguous flat-tailed horned lizard habitat on federal lands. Although the HMA designation within the BMGR would be changed to “special natural/interest area” for consistency with DoD guidance, the area would retain existing management provisions. Each alternative management strategy includes a provision to redesignate the flat-tailed horned lizard HMA as a special natural/interest area and retain existing management provisions. Thus, regardless of management strategy, this would have a beneficial effect on adjacent lands in that it would continue to provide an ecological

reserve aiding the maintenance of the flat tailed-horned lizard population, thereby reducing the significance of off-range effects of land uses such as agriculture and high-density residential (mobile home) communities. Lands located south of Yuma and near the western and northwestern BMGR boundary are within flat-tailed horned lizard range, but are afforded no special protection. The only off-range area that is protected is that portion of the HMA located adjacent to the southwest corner of the BMGR, which is federal Bureau of Reclamation-managed land (see Figures 4-17 and 4-21). The redesignation of that portion of the HMA within the BMGR to a special/natural interest area would have no effect on the off-range portion of the HMA.

### **5.15.3 Motorized Access and Unroaded Area Management**

#### **5.15.3.1 Proposed Action (Strategy C)**

The proposed application of Management Strategy C range-wide would result in closure of redundant roads, which may encourage some users to visit other lands for some types of motorized recreation. As a result, recreational users seeking motorized recreation that would be eliminated on the BMGR could potentially travel to other areas located adjacent to or near the BMGR periphery for a similar experience that would be made unavailable on the BMGR. For example, motorists who frequent areas in Unit 2 could potentially abandon activities on the BMGR and recreate on BLM lands north of Interstate 8 instead. Motorized access on these lands is managed by the BLM much the same way as BMGR lands are currently managed—vehicles may only be used on existing roads and trails, but there is no road management plan in place for closing or restricting access.

Selecting the proposed action would provide the option to pursue the development of two roads to bypass existing roads within the northwest corner of the Cabeza Prieta NWR in the form of site-specific planning. These roads would eliminate the current use of administrative roads in the refuge (also designated Wilderness) by Border Patrol during periodic surveillance. If the roads were constructed, this would directly benefit Cabeza Prieta NWR and Wilderness in managing the refuge for protection and conservation, with limited use of administrative roads.

#### **5.15.3.2 Alternative Actions (Strategy B and Strategy D)**

If Management Strategy B were applied range-wide, it would allow for the development of new roads for public access and/or future motorized public access to currently restricted areas if there is a change in military security restrictions. Although it is not anticipated that there would be a need for the development of any large number of additional roads, if there is a positive correlation between the number of publicly accessible roads and the amount of public visitation, such an alternative could result in a shift in recreation use away from adjacent lands to the

BMGR (the opposite impact as predicted with the proposed action). As with the proposed action, site-specific planning would be implemented for the approximately 7-mile Cabeza Prieta NWR bypass roads, so the potential benefit for the refuge as discussed for the proposed action could also be realized under this strategy.

Road closures under the application of Management Strategy D could, like the proposed action, result in a decrease in the number of recreationists seeking the type of motorized access currently available on the BMGR and a related increase of such use on BMGR perimeter lands. Again, assuming that the extent of the road network influences the number of visitors to the range, one could conclude that Management Strategy D would increase recreational pressures on the off-range lands, but to a greater degree than with the proposed action. Under this alternative management strategy, 67 more miles of roads generally open to public access would be closed than would be closed under the proposed action, for a total of 554 miles of roads generally open to public access. The magnitude of the difference, as compared to the proposed action, cannot be distinguished clearly enough to differentiate the perimeter and transboundary land use effects of the management strategies. Implementing Strategy D (rather than Strategy C as proposed) however, would also not allow for the development of the Cabeza Prieta NWR bypass roads in Unit 2 and would preclude the potential benefits for the refuge that could occur with the proposed action.

### **5.15.3.3 No-Action Alternative (Strategy A)**

Much like the application of the proposed action (Strategy C), road closures under the no-action alternative (as could be planned for in a range-wide transportation plan) could potentially lead to a shift in some motorized access-based recreation away from the BMGR to adjacent lands such as BLM lands. Because it is difficult to determine how many persons would choose to recreate elsewhere, the magnitude of the effect is unpredictable at this time.

## **5.15.4 Camping and Visitor Stay Limits**

### **5.15.4.1 Proposed Action (Strategy C)**

The proposed action, the range-wide application of Strategy C, has the potential to change the visitor experience on the BMGR with the restriction of vehicle-based camping along some roads for resource protection purposes and the proposal to assess the appropriateness of establishing designated camping areas. If camping areas are designated, visitors that do not enjoy such a camping experience due to the localization of fire rings, debris, and people, may shift their camping activity away from the BMGR to adjacent lands. Alternatively, if a visitor prefers to camp where a fire ring might already have been established and ground has been cleared for tents, there is also a potential that designated camping areas could increase camping activity on

the BMGR, rather than the adjacent lands. Although the magnitude of this effect cannot be determined with certainty based on available data, particularly as there is no certainty as to whether designated camping areas would be established, it is likely to be minimal, if any.

The proposed rules for disposal of solid waste and sewage for the BMGR (in conjunction with increased law enforcement) could result in an increase in improper disposal of such wastes off-range. Because there is not currently a notable problem with improper disposal of wastes on the BMGR, however, the potential is regarded as minimal.

#### **5.15.4.2 Alternative Actions (Strategy B and Strategy D)**

An alternative action implementing Strategy D would restrict vehicle-based camping stays to 7 consecutive days, as opposed to 14 consecutive days with the other three alternatives. To the extent that campers would select a different camping location where they could stay longer, this alternative could result in a reduction in the number of people who camp on the BMGR. This could, in turn, result in an increase in camping activity on adjacent lands where this activity is allowed. This alternative would not differ from the proposed action in terms of prescribing rules for waste disposal.

As with the proposed action, an alternative action implementing Strategy B would not result in a change in camping stay limits and would result in rules for waste disposal. Although vehicle-based camping would be allowed within 100 feet of designated roads, rather than 50 feet with the proposed action, this would not result in a change in the number of campers choosing to camp on the BMGR rather than nearby recreation areas; therefore, no change in perimeter and transboundary land use would occur.

#### **5.15.4.3 No-Action Alternative (Strategy A)**

Because the camping locations and terms of stay would remain unchanged with the no-action alternative, no changes in camping patterns would occur. There would also not be the potential for rules for the disposal of waste to influence improper disposal of wastes off-range. Therefore, no effect on perimeter or transboundary land use would occur.

### **5.15.5 Recreation Services and Use Supervision**

#### **5.15.5.1 Proposed Action (Strategy C in Unit 2, Strategy D in All Other Units)**

Implementation of the proposed action (Strategy C within Unit 2 and Strategy D within all other management units) could result in fewer persons visiting the range and a greater number of recreationists visiting adjacent lands where the following uses can occur:

- *ORV Travel:* ORV travel would continue to be prohibited, plus the proposed requirement to retain a minimum number of law enforcement officers on the BMGR would increase enforcement. Such use could be shifted to other off-range areas where such use is permitted or to where it is unauthorized, but less strictly enforced.
- *Large Groups:* A special use permit would be required for a single party on the BMGR with 20 or more vehicles in Unit 2 (Strategy C) and 10 or more vehicles in other units (Strategy D), whereas currently the requirement is for 50 or more vehicles.
- *Using Metal Detectors:* The use of metal detectors would be prohibited, where it currently is not (but it is not thought to occur frequently).
- *Entry to Mines:* Whereas currently the BMGR visitor rules and regulations advise avoidance of mines, under the proposed action entry to mines would be prohibited.

Strategies C and D would assess the need for and effects of additional gates and fencing to control entry and use, and erect these gates as needed. If additional perimeter gates were constructed, access for trespass cattle belonging to adjacent land owners would be restricted. This would also restrict access to some recreationists who may have gained unauthorized access to the range from various locations on the range periphery.

The magnitude of these effects cannot be accurately assessed given the lack of the current knowledge base regarding BMGR recreation use, values, and attitudes and how they might be influenced by such changes in recreation use and supervision.

#### **5.15.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

In contrast to the proposed action, under Management Strategy B there would be continued and potentially increased recreational opportunity on the BMGR that could correlate to a decreased use of BMGR perimeter lands in favor of use of the BMGR as follows:

- *ORV Travel:* Rather than prohibiting ORV travel like the existing condition and proposed action, the need for and effects of allowing public ORV travel in designated areas would be evaluated.
- *Simpler Permitting Process:* Under Strategy B, measures to make recreational permits easier to obtain would be implemented.
- *Large Groups:* A special use permit would be required for a single party of 30 or more vehicles, as compared to a party of 50 or more vehicles under the existing conditions, and 20 or 10 or more vehicles under the proposed action.
- *Entry to Mines:* Whereas with the proposed action entry to mines would be flatly prohibited, mine entry with Strategy B would potentially be allowed as a study would be conducted to evaluate the feasibility of allowing this activity.

As with the proposed action, determining what effect, if any, to perimeter lands from the above recreation services and use supervision management objectives would be difficult given the lack of the current knowledge base regarding BMGR recreation use, values, and attitudes.

Because there is little difference between Strategies C and D, consequences would not differ between the proposed action for this resource category and these strategies as alternatives, regardless of the unit to which they are applied.

### **5.15.5.3 No-Action Alternative (Strategy A)**

Changes from the existing conditions would not occur under the application of Management Strategy A and would therefore not have an effect on perimeter land use. As compared to the proposed action, there would not be the potential for increased recreational use of BMGR perimeter lands based on the proposed changes in recreation services and use supervision.

## **5.15.6 Rockhounding**

### **5.15.6.1 Proposed Action (Strategy C in Units 2 and 3, Strategy D in All Other Units)**

The application of Strategy C to Units 2 and 3 and the application of Strategy D to all other units would result in greater restrictions to surface rockhounding for recreational purposes, with Strategy D prohibiting rockhounding altogether. These added restrictions could potentially prompt rockhounders specifically in search of this type of activity to utilize nearby non-BMGR lands for these activities instead (but not adjacent areas where rockhounding is prohibited, such as within Cabeza Prieta NWR or Organ Pipe Cactus NM). While the number of persons who

would choose to access nearby lands for rockhounding cannot be quantified, the level of effect this alternative would have on perimeter lands would be expected to be small, if any, as rockhounding is not believed to be a common activity on the BMGR and it would continue to be allowed in most of the areas of the BMGR that are open to the public.

#### **5.15.6.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

The application of Strategy B would restrict or prohibit rockhounding activity (beyond a 25-pound limit) only if a regulatory compliance issue arises. With this alternative, it should not be expected that persons would choose alternate areas for their rockhounding activities; therefore, application of Strategy B is not expected to have an effect on perimeter and transboundary land use.

Any alternative mix of Strategy C and Strategy D, regardless of management unit, could potentially have the same effects as the proposed action (a greater number of individuals seeking alternate recreation locations for rockhounding).

#### **5.15.6.3 No-Action Alternative (Strategy A)**

With the no-action alternative, no change in the amount of rockhounding done on perimeter lands would be expected as the surface rock removal limit would remain at current levels and no restrictions on rockhounding would be implemented.

### **5.15.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

#### **5.15.7.1 Proposed Action (Strategy D in Unit 1, Strategy C in all Other Management Units)**

Implementation of Strategy C in Units 2 through 7 would allow dead and downed wood for campfire use, and implementation of Strategy D in Unit 1 would prohibit wood cutting, and wood gathering as well as prohibit native wood campfires. For those visiting in that portion of Unit 1 that is open to public access, the possibility exists for campers to obtain firewood from off-range sources before establishing a campsite on the range. While any increase in store-bought wood would have no predicted impact on perimeter land uses, collection from off-range native wood supplies could have a potential negative effect on perimeter lands. This effect is only applicable to a small portion of Unit 1 where wood collection would be prohibited and which is also open to general public access.. Also, within the publicly accessible portion of Unit 1, the likelihood that campers would cross the U.S./Mexico border to gather firewood is very small for

two reasons: (1) it is illegal for campers to cross the border at non-designated traffic checkpoints, and (2) there is very little wood present on northern Mexican lands due to the over-harvesting of trees.

#### **5.15.7.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

As long as it occurs at a sustainable rate and no regulatory compliance issue arises, wood cutting, gathering, and firewood use would be permitted under Management Strategy B. As such, campers should not have a need to access perimeter lands for firewood collection prior to camping on the BMGR and subsequent effects on perimeter land use would not be expected.

Implementing Strategy D in Units 2 through 7 would also result in the potential for campers to access perimeter lands for firewood collection prior to visiting the BMGR, as described under the proposed action for Unit 1. Because collection of wood on Cabeza Prieta NWR is prohibited, implementing Strategy D in Units 2 and 3 would not be expected to affect the refuge. However, applying Strategy C to Unit 1 would allow the use of dead and downed wood for campfires and the effects of accessing adjacent lands for firewood, as predicted as a possible effect under the proposed action, would not be as likely.

#### **5.15.7.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, BMGR campfire provisions would remain unchanged. Because this strategy would still allow campfires using dead and downed wood in most areas, the potential effects of collecting wood from perimeter lands would not be expected.

### **5.15.8 Hunting**

#### **5.15.8.1 Proposed Action (Strategy B)**

With the proposed action of implementing Management Strategy B range-wide, the need for a special hunting permit program for the BMGR that requires payment of nominal fees to be used for the protection, conservation, and management of wildlife (including habitat improvement and related activities) would be assessed. If such a program were implemented as a result of this assessment, some hunters may choose to hunt in other areas within the BMGR perimeter buffer area where hunting is allowed without this fee. The magnitude of the effect on perimeter lands may be more accurately determined as a result of the assessment of the need for the program. However, if a fee program were implemented, the effects on perimeter land uses would be expected to be relatively minimal and to dissipate over time because the habitat improvement

projects would help maintain sustainable populations of game species, which could attract hunters to the BMGR.

#### **5.15.8.2 Alternative Actions (Strategy C and Strategy D)**

Strategy C would be identical to the proposed action and would have the same effects as the proposed action.

Strategy D would also continue existing game management programs and include an assessment of the need for a permit program with nominal fees; the effects of this would be the same as with the proposed action. In addition, with Strategy D, a petition to close the BMGR to non-game species collection would be submitted to the Arizona Game and Fish Commission. As with the potential impacts of other resource elements, if this petition is approved it could be expected that non-game species collectors would visit other areas located outside BMGR boundaries where this kind of activity is allowed. Again, without data to quantify the amount of non-game species collection that occurs on the BMGR, it is difficult to determine the degree of effect on perimeter lands as compared to the proposed action.

#### **5.15.8.3 No-Action Alternative (Strategy A)**

The no-action alternative, Strategy A, would continue existing game management programs. Therefore, this alternative would not have the potential effect on perimeter lands as described for the proposed action.

### **5.15.9 Recreational Shooting**

#### **5.15.9.1 Proposed Action (Strategy C)**

Prohibiting the recreational use of fully automatic weapons on the BMGR under Strategy C (except with possession of a special use permit) would likely deter some recreational shooters from visiting the range if they are specifically seeking a suitable area for this type of activity. As an alternative, recreational shooters using automatic weapons may choose to engage in this activity on adjacent lands, although these areas would not be well suited for such use. The area most likely affected would be BLM-managed lands located north of the BMGR boundary. Recreational shooting with automatic weapons in this area could have a negative impact on nearby communities from increased safety risks, noise, and debris from expended bullets and targets.

Dispersed recreational shooting with non-automatic weapons would continue to be allowed at least until an assessment of the importance and appropriateness of this activity on the BMGR is conducted. Therefore, in the short term, no change in such use of BMGR perimeter lands would be expected. If designated shooting areas were established as a result of the assessment findings, dispersed recreational shooting use may occur less frequently on BMGR perimeter lands in favor of using the designated areas on the BMGR. If recreational shooting is prohibited or restricted as a result of the assessment findings, then there could be increased demand on perimeter lands for this recreational opportunity.

#### **5.15.9.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would allow for recreational shooting on the range as long as it is compatible with military use, public safety, and no significant resource issues are identified. This strategy is very similar to the existing condition and is not predicted to have the impacts to perimeter and transboundary land use that may occur with implementation of the proposed action.

Strategy D, on the other hand, would prohibit all recreational shooting activities on the range in the short term, but an assessment determining the appropriateness of allowing the activity in designated areas would be conducted. Like the proposed action, implementing Strategy D would decrease the number of recreational shooters who utilize the range for their activities and potentially result in the use of adjacent lands for recreational shooting. Unlike the proposed action, however, recreational shooting with both non-automatic and fully automatic weapons would be affected. Thus, as compared to the proposed action, this alternative could potentially have greater impacts (i.e., safety, noise, and debris) on lands adjacent to the BMGR (particularly the residential areas near BLM-managed lands north of the BMGR) at least in the short term. If designated shooting areas were eventually established on the BMGR, however, this impact would be expected to dissipate.

#### **5.15.9.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, recreational shooting would be managed under the existing regulations and changes in existing perimeter and transboundary land use impacts related to this activity that may occur under the proposed action would not be expected.

### **5.15.10 Utility/Transportation Corridors**

#### **5.15.10.1 Proposed Action (Strategy C)**

Restricting all future utility/transportation development to existing corridors (except for the Yuma ASH, for which an application was filed prior to 6 November 2001) could affect future perimeter and transboundary land use patterns. Future land use developers would not be allowed to apply for and construct any new utility/transportation corridors through the BMGR, if one were needed. Other corridor routes would need to be located outside of the range, which could influence land use within the perimeter lands. Overhead and underground utility development within the State Route 85 corridor would continue subject to current limitations on where such utilities could be located. The proposed Gila Bend to Ajo 230 kV Transmission Line Project and associated perimeter land use (i.e., reopening of the Ajo Mine) would not be affected because it has been planned in accordance with these restrictions.

#### **5.15.10.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would evaluate the Yuma ASH and other potential future projects for new utility/transportation corridors on a case-by-case basis. BMGR military mission requirements would likely preclude approval of most new corridor proposals. Any approved new utility/transportation corridors would likely have some influence on perimeter land uses, but the assessment that can be made on Strategy B effects is extremely limited because perimeter and transboundary land use effects cannot be reliably predicted without a definitive determination on the potential for new corridors. However, whereas this alternative would not prohibit new corridor development outside the Yuma ASH as the proposed action would, new utility/transportation corridors proposed in association with future land use projects may still be denied through the case-by-case decision process, and result in similar effects on perimeter land use projects as the proposed action.

Strategy D would restrict all future utility/transportation development to existing corridors. Because the proposed Yuma ASH is to be constructed within a new transportation corridor on the western edge of the range, its development within the BMGR would be prohibited. Because the Yuma ASH is needed to promote international commercial trade, delaying the project in order to change the alignment could also affect perimeter and transboundary land use. Changes in highway alignments and construction dates could affect associated growth patterns in the area; in the short term, developers would continue to focus on existing transportation routes until the Yuma ASH is built. As with the proposed action, implementing Strategy D would not affect the proposed Gila Bend to Ajo 230 kV Transmission Line Project and associated perimeter land use.

### **5.15.10.3 No-Action Alternative (Strategy A)**

The no-action alternative would not represent a change from the existing conditions; therefore, the Yuma ASH would be constructed as planned and other potential future overhead and underground utility projects along State Route 85 would continue to be restricted as to where they could occur within the corridor. Effects to perimeter lands from the construction of Yuma ASH and utility/corridor development along the State Route 85 corridor would not differ from that predicted for the proposed action. New corridor proposals could be considered and reviewed through appropriate field examinations and/or environmental assessments, but the military mission requirements within the BMGR would likely preclude approval of most corridor proposals.

### **5.15.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

Each of the alternatives, including the no-action alternative, would continue to provide for the development of procedures to control all trespass livestock and feral burros. With the additional measures that may be proposed for the implementation of this management objective (including fencing and coordination with adjacent land owners), this could eventually result in a higher number of trespass livestock being forced to remain on their originating lands. If nearby grazing lands are currently benefiting from unauthorized livestock grazing on the BMGR, they could be negatively affected. The extent to which this would place limitations on the number of cattle that could be supported by each respective off-range ranch or grazing lease is unknown.

Application of the proposed action (Management Strategy C) and alternative Management Strategies B and D, as opposed to the no-action alternative, would benefit perimeter lands if the increase in monitoring activities resulted in additional regional knowledge regarding the spread of invasive, non-native vegetation species. When shared with perimeter land managers, this knowledge could assist them with making better-informed choices regarding the management of invasive species.

### **5.15.12 Special Status Species**

#### **5.15.12.1 Proposed Action (Strategy C)**

The proposed action, which is to apply Management Strategy C range-wide, could potentially benefit perimeter and transboundary land use. This alternative would implement habitat improvements in support of endangered species recovery plans and provide resources for predator control to protect special status species. Such programs could affect perimeter land managers who, although they manage areas where such measures are more closely scrutinized due to their Wilderness status (e.g., the majority of Cabeza Prieta NWR and Organ Pipe Cactus

NM), might consider implementing similar programs if the resultant data showed these BMGR programs were successful. It is important to note, however, that although the potential effects are analyzed in this EIS at a programmatic level, implementation of such measures based on compliance requirements (e.g., food plots and coyote predator control to benefit Sonoran pronghorn) may occur independent of the proposed INRMP, as supported by site-specific NEPA analysis.

Additional survey and inventory of special status species on the BMGR could benefit other adjacent land managers in increased understanding of the ecosystem-wide abundance of these species.

#### **5.15.12.2 Alternative Actions (Strategy B and Strategy D)**

Because Management Strategy D is identical to Strategy C, the effects would be the same effects as described for the proposed action.

Range-wide application of Management Strategy B would have similar perimeter and transboundary land use effects as those of the proposed action, but to a lesser degree, as the proposal to provide resources for necessary predator control and surveys of the abundance of special status species are absent.

#### **5.15.12.3 No-Action Alternative (Strategy A)**

The no-action alternative would result in fewer programs for special status species beyond compliance requirements. However, the continued evaluation and implementation of special status species programs and continued support of Sonoran pronghorn monitoring and recovery efforts could potentially result in some exchange with adjacent land managers also concerned about ecological issues.

### **5.15.13 Soil and Water Resources**

Efforts to assess BMGR soil conditions, as presented in all of the management strategy alternatives for soil and water resources, would have a positive effect on adjacent land use because it would ultimately protect any future degradation of stream courses and water reservoirs that are connected to BMGR surface water routes. Furthermore, studies conducted to gather additional knowledge regarding soil resources and groundwater levels would provide a more complete understanding of the soils and groundwater of the region. This would benefit nearby land managers in future land use decisions, as they would have a broader knowledge base of the regional soil and groundwater characteristics. These benefits would increase from Strategy A to

Strategy D, commensurate with the increased measures to prevent degradation of these resources and level of soil and groundwater studies.

#### **5.15.14 Air Resources**

##### **5.15.14.1 Proposed Action (Strategy A)**

With regard to air resources, the proposed action is the same as the no-action alternative, Strategy A. Therefore, no measurable change from existing perimeter and transboundary land use effects would occur. BMGR activities affecting air quality primarily focus on fugitive dust (PM<sub>10</sub>) from vehicles driving on the unpaved roads and from military aircraft emissions. None of the emission levels approach regulatory thresholds of non-compliance with the State Implementation Plan.

##### **5.15.14.2 Alternative Actions (Strategy B, Strategy C, and Strategy D)**

Management Strategy B does not prescribe any special management objectives, but because the air quality in the BMGR region is good, no off-range effects would be anticipated.

Management Strategies C and D would implement the use of dust palliatives to control excessive fugitive dust on heavily traveled roads and construction sites. Furthermore, Management Strategy D would provide monitoring air quality trends to avoid new emission sources in areas of deteriorated air quality. These management strategies would have a beneficial effect on perimeter lands because management activities on the BMGR contribute to the overall air quality conditions of the airsheds in which both the BMGR and perimeter lands are included. However, the difference from the proposed action would likely be minor as palliatives to control fugitive dust would generally result in very localized effects associated with driving on the roads, but could have greater benefits on windy days when the dust may travel further.

##### **5.15.14.3 No-Action Alternative (Strategy A)**

Because the no-action alternative is the proposed action for air resources, the effects are the same as the proposed action.

#### **5.15.15 Visual Resources**

Regardless of which management strategy is implemented for BMGR visual resources, several management objectives are prescribed for the protection of BMGR visual integrity. Any of these

management strategies would provide for the protection of reciprocal views onto the range from off-range lands, therefore having a positive effect on perimeter lands.

### **5.15.16 Wildfire Management**

#### **5.15.16.1 Proposed Action (Strategy B)**

The proposed action, Management Strategy B, would result in the development of a fire management plan that would address fire prevention, suppression, recovery, mapping, monitoring, and possible mitigation protocols. Implementation of the plan could reduce the threat of a wildfire spreading both on the range and to off-range land, thus benefiting perimeter land uses. Coordinated planning as to protocol for local area responders and compensation in the event of such an occurrence would benefit adjacent communities and the protection of property and resources in adjacent lands. Such planning would be in support of the MLWA of 1999, which provides that the Secretaries of the Navy and Air Force “shall take necessary actions to prevent, suppress, and manage brush and range fires occurring within the boundaries of the BMGR, as well as brush and range fires occurring outside the boundaries of the BMGR resulting from military activities; and may obligate funds appropriated or otherwise available to enter into memoranda of understanding, and cooperative agreements that shall reimburse the Secretary of the Interior for costs incurred under this clause” [Section 3031(b)(3)(E)(vi)].

#### **5.15.16.2 Alternative Actions (Strategy C and Strategy D)**

Management Strategies C and D (the alternative actions) are identical to the proposed action and would have the same perimeter and transboundary land use effects.

#### **5.15.16.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, wildfire management would continue to focus on suppressing fires to achieve the lowest acreage loss and in the most cost-effective and efficient manner. Although the applicable MLWA provisions would remain in place, no management plan would be developed to address its implementation. Nonetheless, additional management prescriptions would presumably be implemented and thus, no perimeter and transboundary effects would be expected.

### **5.15.17 Perimeter Land Use, Encroachment, and Regional Planning**

#### **5.15.17.1 Proposed Action (Strategy D)**

Application of Management Strategy D range-wide could potentially result in beneficial perimeter land use effects through the proposed coordination with other federal agencies on national or regional conservation matters in addition to the proposed coordination with adjoining land managers and property owners regarding local conservation matters. Information sharing would increase. An increase in coordination between DoD and adjoining land managers would encourage similar natural resources conservation activities and reduce the potential for conflicts for both on- and off-range lands.

#### **5.15.17.2 Alternative Actions (Strategy B and Strategy C)**

Under the alternative actions, the range-wide application of Management Strategy B or Management Strategy C, there would still be an increase in perimeter land use studies and coordination compared to the no-action alternative, and this would also have beneficial perimeter and transboundary land use effects, similar to those of the proposed action. However, these effects would be of a lesser degree due to the fewer number of studies and evaluations proposed under those strategies.

#### **5.15.17.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, perimeter land use, encroachment, and regional planning activities and studies would be the same as those currently in effect or planned. Thus, associated effects would not be expected to differ from the existing conditions.

### **5.15.18 Aggregate Effects on Perimeter and Transboundary Land Use**

#### **5.15.18.1 Proposed Action**

There are two categories of additive/interactive effects of the proposed action for the 17 resource management elements that could affect perimeter and transboundary land use: (1) those activities that are likely to occur on adjacent lands because of the proposed action and (2) land management decisions based on shared data between BMGR land managers and adjacent land managers.

The proposed management objectives for motorized access and unroaded area management; camping and visitor stay limits; recreation services and use supervision; recreational shooting;

hunting; wood cutting, gathering, firewood use, and collection of native plants; and rockhounding could potentially cause a shift in recreation use away from the BMGR to adjacent lands because of the additional management objectives and associated regulations. While individually the proposed changes in management policy may discourage some visitors, the combination of policy changes might further encourage recreationists to visit an off-range location within the region rather than the BMGR. For example, hunters might be discouraged from hunting on the BMGR if many miles of road are closed because of the need to transport their kill by foot rather than by vehicle, depending on the location where the animal is shot. Other hunters may not be discouraged from hunting on the BMGR solely because of the reduced road network, but the need to obtain a range permit and the potential addition of a nominal fee to hunt on the BMGR combined with a reduced road network might cause the hunter to select an alternate location to hunt in the region.

In addition, the proposed management objectives for resource inventory and monitoring; special status species; soil and water resources; wildfire management; and perimeter land use, encroachment, and regional planning could all affect the manner in which perimeter and transboundary land use coordination is conducted between the BMGR and adjacent lands. The increased natural and cultural resource knowledge and data gathered through the activities proposed in these management objectives (for example, the combination of findings from increased monitoring, additional data from surveying for special status species, soil surveys, and increased coordination with off-range managers) would benefit both BMGR managers and the various land managers in the region.

### **5.15.18.2 Alternative Actions**

#### **Management Strategy B**

As opposed to the proposed action, the aggregate effects of implementing Management Strategy B range-wide for the 17 resource management elements could attract recreational use to the BMGR and away from adjacent lands. Provisions to allow vehicle-based camping within 100 feet of existing public-use roads, motorized travel in designated washes, rockhounding, and potentially allowing public entry to mines could have the potential to entice visitors wanting these recreational opportunities. The number of visitors of perimeter land areas that might be drawn to recreate instead on the BMGR to take advantage of such opportunities cannot be determined, but would likely be a relatively small number of persons.

Several of the management provisions for Strategy B regarding general vegetation, wildlife, wildlife habitat, and wildlife waters; special status species; soil and water resources; wildfire management; and perimeter land use, encroachment and regional planning could all improve coordinated land management between the various land managers of the region, although to a lesser degree than the proposed action.

### Management Strategy C

There are very few differences in aggregate effects between the proposed action and the range-wide application of Strategy C. Therefore, the range-wide application of Strategy C would not likely result in a different aggregate effect on perimeter and transboundary land use than the proposed action.

### Management Strategy D

The aggregate effects associated with Management Strategy D would also be similar to those of the proposed action, but there would be more restrictions on recreational use. In this case, more people could possibly choose to recreate in off-range locations. There would be approximately 67 fewer miles of road open to public use than with the proposed action, a special use permit would be required when there are more than 10 vehicles in a single party, the visitor stay limit would be 7 consecutive days (rather than 14 days) within a 28-day period, non-game species collection would be prohibited (if the Arizona Game and Fish Commission approves the petition), and recreational shooting would be prohibited in the short term and either prohibited or limited to designated areas in the long term. These more restrictive policies could discourage visitation to the BMGR and increase visitation in other areas within the BMGR region. The degree of change cannot be quantified; however it is expected to be greater than that of the proposed action.

In regard to the management provisions that would increase knowledge about the resources and encourage better coordination with other regional managers, Strategy D is the same as the proposed action, so the aggregate benefits would be the same.

#### **5.15.18.3 No-Action Alternative**

The aggregate impacts for Management Strategy A would differ from the proposed action in that there would not be any change in existing perimeter and transboundary land use policies. There would be no change in the road network in the short-term or in the management policies for camping, recreation services and use supervision, recreational shooting, hunting, wood cutting and gathering, or rockhounding. Thus, no change in visitation patterns to the BMGR or other locations within the BMGR region would be attributed to the range-wide application of this strategy. Established coordination efforts between BMGR and regional managers would be expected to continue, but no increase efforts in coordination or in expanding the understanding about range resources would be proposed.

## **5.16 CULTURAL RESOURCES**

### **5.16.1 Resource Inventory and Monitoring**

#### **5.16.1.1 Proposed Action (Strategy D)**

Management Strategy D, the proposed action for the resource inventory and monitoring element of the plan, includes implementation of a cultural resource monitoring program as identified in the ICRMP. Survey efforts have focused on areas where current military training and support activities have the greatest potential to affect cultural resources; not surprisingly, over half of the resources identified have been impacted to some extent. Ongoing consultation with SHPO and others will address strategies for avoiding or minimizing additional impacts. While cultural sites in the impact areas are already being monitored through annual inspections, continued and expanded monitoring would have the major benefit of generating information about sources and extents of impacts that would further allow the Air Force and Marine Corps to manage cultural resources to the extent consistent with the military purposes for which the BMGR lands were withdrawn and reserved. Adaptive management responses could modify, limit, or restrict activities to address any identified resource conservation and protection problems. The inventory and monitoring activities for other types of resources involve field activities that have some potential for adversely affecting some types of cultural resources, such as fragile archaeological sites. However, the potential disturbance from these field activities is quite limited. Overall, the effects of the proposed action on cultural resources would be quite beneficial.

#### **5.16.1.2 Alternative Actions (Strategy B and Strategy C)**

Cultural resource monitoring, as proposed in the ICRMP, is included in Alternative Management Strategies B and C, and projected impacts of these strategies with regard to cultural resources are essentially the same as for the proposed action.

Strategy B would not include adaptive management responses, which could make it more difficult to protect cultural resources when they become known. Because fewer inventory and monitoring efforts would occur with Strategy B, there would be less disturbance to archaeological sites from field activities, but also less knowledge and data to direct cultural resources management decisions.

### **5.16.1.3 No-Action Alternative (Strategy A)**

Cultural resource monitoring as proposed in the ICRMP is included in Management Strategy A, the no-action alternative. Projected impacts of this no-action alternative with regard to cultural resources are essentially the same as those described for Strategy B.

## **5.16.2 Special Natural/Interest Areas**

### **5.16.2.1 Proposed Action (Strategy C)**

Management Strategy C, the proposed action, would redesignate the expired ACECs as special natural/interest areas. The most sensitive cultural resources within the expired ACECs are within the former Tinajas Altas Mountain ACEC, which the BLM designated in part to protect cultural resources and better control damage caused by visitors. Continuing that management philosophy would benefit the significant cultural resources at Tinajas Altas. The redesignation of this area as a special natural/interest area also may provide an opportunity for the Marine Corps to engage in public awareness and outreach programs to educate the public regarding cultural resources on military lands and DoD efforts to conserve those resources. However, any program that would lead to increased visitation without measures to control damage by self-guided visitors could lead to adverse effects. The proposed action specifically allows for special management provisions as needed to protect cultural resources, as well as to establish additional special natural/interest areas to better manage special cultural resources. This would promote preservation of cultural resources within those areas but protection would be provided regardless of the designation as a special natural/interest area.

Not redesignating the SRMAs is unlikely to have any measurable effect on cultural resources because most are in military uses areas restricted from public access for safety reasons. Not redesignating the now expired El Camino del Diablo Backcountry Byway also is unlikely to result in any effects on cultural resources. This segment of the Camino del Diablo is a historic corridor but the road has lost historic integrity and much of the designated Backcountry Byway is not included in the National Register listing of the road. If not redesignated, the road would be managed as all other roads on the BMGR, but would continue to be recognized for its historical significance and the interpretive signs erected along the corridor would remain. Recreation use of the road would also probably be unchanged, as the route would remain one of the primary recreation use roads on the BMGR, providing access to much of the publicly accessible portions of BMGR—West and to the Cabeza Prieta NWR-portion of El Camino del Diablo, which is listed in the National Register of Historic Places.

### **5.16.2.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Management Strategy B differs from the proposed action in that, in addition to the expired SRMAs and expired Backcountry Byway, the expired ACECs would be managed without special provisions. Although cultural resources in these areas would still be provided the full protection required by historic preservation regulations, the effect of this strategy is likely to be somewhat detrimental because it would result in less emphasis on management of special cultural resources such as those at Tinajas Altas.

The effects of not redesignating the expired SRMAs and expired Backcountry Byway as special natural/interest areas would be minimal and the same as described for the proposed action. Alternative Management Strategy B also does not provide for designation of new special natural/interest areas to better manage special resources, which could be less beneficial than the proposed action for protecting some cultural resources.

Alternative Management Strategy D differs from the proposed action in that, in addition to the expired ACECs, the expired SRMAs and Backcountry Byway would also be redesignated as special natural/interest areas. The designation of SRMAs and the Backcountry Byway does not appear to have had any measurable effect on cultural resources and therefore this strategy is comparable to the proposed action with respect to cultural resources. Assuming the redesignation would include adoption of the management provisions identified in the Goldwater Amendment, Strategy D would permit development of recreational facilities in the part of the Crater Range SRMA east of State Route 85. The recreational facilities envisioned in the Goldwater Amendment RMP include a point-of-interest interpretive kiosk (regarding the geology of the area and Sonoran Desert plants, animals, and ecosystems) and picnic area. The scale of those facilities would be relatively limited, but cultural resource surveys and effect assessments would need to be conducted in accordance with the ICRMP as such facilities are planned, built, and operated. Such consideration should ensure that any identified adverse effects are avoided, minimized, or partially mitigated, but impacts to diffuse recreational activities are difficult to characterize and predict, and would expand cultural resource monitoring efforts.

### **5.16.2.3 No-Action Alternative (Strategy A)**

Management Strategy A, the no-action alternative, would retain all of the expired ACECs, SRMAs, Backcountry Byway, and HMA, as special natural/interest areas and retain special management provisions. Management Strategy A would permit development of recreational facilities in the part of the Crater Range SRMA east of State Route 85, and in this regard have impacts similar to Alternative Management Strategy D. Redesignation of El Camino del Diablo Backcountry Byway may continue to enhance public recognition of the historical importance of the travel corridor but is unlikely to have much effect on the actual use of the road. Therefore, the redesignation is unlikely to have any measurable impact on cultural resources.

### 5.16.3 Motorized Access and Unroaded Area Management

#### 5.16.3.1 Proposed Action (Strategy C)

The proposed action for motorized access and unroaded area management is Management Strategy C. This action would close redundant roads in localized areas (see Figures 3-1 and 3-2). Overall, the road network available for public use would decrease by about 36 percent, from 973 miles to 621 miles. Most of this reduction would be in BMGR—West where 320 miles of public use roads would be eliminated. Thirty-two miles of road currently available for public use would be closed in BMGR—East.

Some of the existing roads pass through archaeological sites and continued use may cause some degradation. More extensive impacts are likely to result from vehicle based camping along roads on the BMGR (see Section 5.16.4). The causes of inadvertent damage and intentional vandalism of archaeological sites are complex, but ease of vehicular access is a major factor (Ahlstrom and others 1992; Nickens and other 1981). The secondary impacts of roads are difficult to quantify, but a reduction in the road network is likely to have beneficial effects by decreasing the rate of damage to archaeological sites that occurs as an indirect impact of motorized vehicle access.

A unit-by-unit assessment of potential effects follows:

- **Management Unit 1:** About 117 miles of roads would be closed in Management Unit 1, and 223 miles would remain open to use, but only 78 miles would be outside restricted military use areas and open to the public (see Table 3-7). The roads within military use areas that would be closed are redundant roads that are concentrated in the northwest corner of the BMGR. Most of the publicly accessible roads that would be closed are redundant routes surrounding the Tinajas Altas Mountains (see Figure 3-2). This is likely to reduce inadvertent damage and intentional vandalism to archaeological sites in this sensitive area.
- **Management Unit 2:** Within Management Unit 2, about 237 miles of roads would be closed leaving 294 miles available for both public and government use. An additional 16 miles of road would be restricted to government use only (see Table 3-7). Most roads to be closed are redundant roads or spur roads leading to the base of the Gila or Copper mountains (see Figure 3-2). The road to the Betty Lee Mine would be closed at a point where the road condition has deteriorated and become unsafe for vehicle use; but the site could still be accessed on foot. This is likely to have the beneficial effect of discouraging unauthorized collection of large artifacts from the site. More generally, these road closures are likely to reduce inadvertent damage and intentional vandalism to archaeological sites as described for Management Unit 1.

About 7 miles of new road could be built to bypass the Cabeza Prieta NWR. In accordance with the ICRMP, cultural resource surveys would be conducted and any significant archeological or historical sites found would be addressed prior to building these roads. Because the roads would not be open to recreational use, they are unlikely to create any substantial indirect effects on cultural resources.

- **Management Unit 3:** About 21 miles of roads would be closed in Management Unit 3 primarily in the vicinity of the Mohawk Mountains and Sand Dunes (see Table 3-9 and Figure 3-2). Because there are relatively few roads within this management unit, these closures are likely to have a relatively minor but beneficial effect in reducing damage to archaeological sites.
- **Management Unit 4:** About 49 miles of road would be closed in Management Unit 4 (see Table 3-10 and Figure 3-1). Because there is only one 6-mile road segment within this management unit that is open to the public, these closures are likely to have a relative minor but beneficial effect in reducing damage to archaeological sites.
- **Management Unit 5:** About 164 miles of roads would be closed in Management Unit 5 (see Table 3-11). Because no roads within this management unit are open to the public, these closures are likely to have a relative minor but beneficial effect in reducing damage to archaeological sites.
- **Management Unit 6:** About 32 miles of roads, mostly open to public use, would be closed in Management Unit 6 (see Table 3-12). These road closures are likely to have a beneficial effect by reducing inadvertent damage and intentional vandalism to archaeological sites.
- **Management Unit 7:** About 38 miles of roads would be closed in Management Unit 7. Because only about 6 miles of road are currently is open to the public in this unit (see Table 3-13), these closures are likely to have a relative minor but beneficial effect in reducing damage to archaeological sites

### 5.16.3.2 Alternative Actions (Strategy B and Strategy D)

Alternative Management Strategy B applied range-wide would retain the entire existing road network, in contrast to the proposed action which would reduce the network by 30 percent. By retaining the existing road network, Strategy B has no potential to reduce impacts to cultural resource damages resulting from motorized access on roads within the BMGR. Alternative Management Strategy B also would allow construction of additional roads for public access needs. Proposals for construction of such roads and their effects, including impacts on cultural

resources, would be reviewed in accordance with the ICRMP, on a case-by-case and site-specific basis. Similarly, Strategy B could also include additional future motorized public access to currently restricted locations if changes in military activities eliminate safety or security restrictions in those locations.

Management Strategy D would close 107 more miles of road than the proposed action, of which 67 miles are public use roads. Strategy D also would not include development of the Cabeza Prieta NWR bypass roads. This strategy is likely to be proportionately more beneficial for protecting cultural resources.

### **5.16.3.3 No-Action Alternative (Strategy A)**

The no-action alternative stipulates that a transportation plan would be developed, and until it is completed the existing road network of an estimated 2,222 miles, of which 973 miles are open to the public, would remain open. The results of the transportation plan cannot be predicted at this time; but roads not meeting land management, public, or military needs could be closed. Generally, retaining the current strategy is likely to forego potential declines in indirect adverse impacts to cultural resources that might be attained by the proposed action or alternative management strategies. The extent of damage to archeological and historical sites along road corridors on the BMGR has not been well documented so it is not possible to quantify these benefits. However, many archaeological sites on the BMGR are quite fragile and limiting visitation and other uses, as has been done in many areas of BMGR since the range was established in World War II, has been a major factor in preserving the integrity of the many archaeological resources on the range. An important factor in gauging the effects of the secondary impacts of roads is that they tend not to be specifically recognized and mitigated.

### **5.16.4 Camping and Visitor Stay Limits**

#### **5.16.4.1 Proposed Action (Strategy C)**

The impacts on cultural resources of Management Strategy C, the proposed action for camping and visitor stay limits, is difficult to assess because the extent of such camping activities is not well documented. Occasional, limited camping typically does not result in the level of ground disturbance that could affect archaeological and historical sites, but extended stays, camping by large parties, or repeated use of popular camp sites typically results in relatively more disturbance. Many cultural resources are fragile, surface manifestations that could be seriously damaged or destroyed by driving over them even once or twice. The proposed action would essentially maintain the status quo, and continue to allow non-vehicle based camping in all areas open to the public, and vehicle-based camping within 50 feet of most existing roads. Vehicle-based camps would be limited to no more than 14 consecutive days in a 28-day period without a

special use permit. The proposed action does allow for restricting camping in areas if warranted for protection of cultural resources, but identifying such situations would require survey and monitoring.

The proposed action would require an assessment of the benefits and effects of establishing designated camping areas and implementing a plan based on the findings. Designated camping areas are likely to concentrate any negative effects on cultural resources, but such impacts are more likely to be assessed and mitigated than are the impacts of more dispersed camping. Cultural resource surveys and effect assessments would need to be conducted in accordance with the ICRMP. Such consideration should ensure that any identified adverse effects are avoided, minimized, or partially mitigated, but designated camping areas could expand cultural resource monitoring efforts.

#### **5.16.4.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Management Strategy B differs from the proposed action in that vehicle-based camping would be allowed within 100 feet of roads rather than restricted to 50 feet. This would expand the area subject to indirect effects of inadvertent damage on cultural resources. Also, this alternative does not include the potential for restrictions on camping along certain road segments for protection of cultural resources, nor does it include an assessment and decision regarding the establishment of designated camping areas. Overall, this alternative management strategy is likely to result in more adverse impacts than the proposed action.

The only difference between Alternative Management Strategy C and Strategy D is that Strategy D would reduce vehicle-based camping stays to 7 consecutive days within a 28-day period without a special use permit. Based on the limited recreational use data available, 97 percent of all recorded visitation on BMGR—East during calendar year 2000 was less than seven days, and mostly one to four days (Barry 2002a). Thus, the impact of alternative Strategy D on cultural resources is expected to be very similar to the proposed action.

#### **5.16.4.3 No-Action Alternative (Strategy A)**

Management Strategy A, the no-action alternative would result in adverse effects on cultural resources similar to those described for Strategy B, with the exception that vehicle-based camping would be required to be within 50-feet rather than 100-feet of all roads in areas open to the public.

### **5.16.5 Recreation Services and Use Supervision**

#### **5.16.5.1 Proposed Action (Strategy C in Unit 2 and Strategy D in All Other Units)**

The proposed action is Management Strategy C in Units 2 and Strategy D in all other units, and includes a variety of actions to better manage recreation on the BMGR. These strategies include implementing educational measures in conjunction with continuing the current permit system, restricting motorized vehicles to lawful operation on authorized roads, and assessing needs for more effective measures to control entry and road closures. The proposed action calls for a minimum of six full-time law enforcement personnel dedicated to the BMGR. There currently are seven law enforcement/security personnel, but this stipulation would ensure a considerable future effort to monitor compliance with established rules regarding non-military uses of the range.

Data are limited but indicate that about 10 percent of the archaeological and historical sites on the BMGR have been damaged by ORV use. Therefore, prohibiting off-road travel would have a beneficial impact on cultural resources.

Diffuse recreational activities on the BMGR are a largely undocumented, but a probable source of impacts resulting from inadvertent damage and intentional vandalism. Available data indicates that vandalism has occurred at less than 2 percent of the recorded archeological and historical sites. This relatively low frequency probably reflects the exclusion of the public from many parts of the BMGR over the last 60 years. Elements of the proposed action include collection of recreational use statistics and implementation of a monitoring program for cultural resources based on a limits-of-acceptable-change framework. These actions would have the potential for major benefits for addressing the impacts on cultural resources of diffuse recreational uses of the BMGR, which have not been previously addressed in any substantial way. The proposed action also would ban the use of metal detectors, primarily because of safety issues related to expended ordnance, but would have the added beneficial effect of preventing use of a tool that hobbyists or vandals sometimes use for unauthorized collection of artifacts from historical sites.

#### **5.16.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

The only real difference between Management Strategy C and Strategy D is the requirement for a special use permit for a single party with 20 or more vehicles under Strategy C and 10 or more vehicles under Strategy D. Data are limited but suggest that few groups of more than 10 vehicles use the BMGR. Neither strategy would ban larger group sizes, but would require special use permits for larger groups of vehicles. Therefore, impacts on cultural resources are likely to be similar under both strategies.

Alternative Management Strategy B would forego some of the beneficial impacts that the proposed action would have on cultural resources. Major differences include the elimination of (1) any enhancements to educational programs regarding protection of cultural resources, (2) a limits-of-acceptable-change monitoring program, (3) collection of recreational use statistics, (4) assessment of measures to control entry and enforce road closures, and (5) the ban on use of metal detectors. Strategy B also could potentially decrease the number of dedicated full-time law enforcement personnel from a minimum of six to two, but does allow for additional measures to address compliance issues that might be identified.

Alternative Management Strategy B also would allow motorized travel in designated washes when dry. This would essentially expand the road network and accordingly lead to indirect impacts on archaeological sites through inadvertent damage or intentional vandalism. There are unlikely to be any intact archaeological resources in the wash bottoms themselves, but archaeological sites are likely to be relatively dense along wash corridors. The extent of impacts would be proportionate to the number of miles of washes designated for motorized travel.

Alternative Management Strategy B also would require an evaluation of the need for public access to ORV travel in designated areas. Cultural resource surveys and effect assessments would be part of such an evaluation and any significant cultural resources would be appropriately considered in compliance with the ICRMP. Therefore, if ORV travel areas were designated, any identified adverse effects would be avoided, minimized, or partially mitigated.

### **5.16.5.3 No-Action Alternative (Strategy A)**

Management Strategy A, the no-action alternative, would forego some of the beneficial impacts that the proposed action would have on cultural resources. Major differences include the elimination of (1) a limits-of-acceptable-change monitoring program, (2) collection of recreational use statistics, (3) assessment of measures to control entry and enforce road closures, and (4) the ban on use of metal detectors. Strategy A stipulates that access permit regulations would be enforced and an interagency law enforcement plan would be developed, but does not specify a minimum number of dedicated full-time law enforcement personnel.

Management Strategy A also would allow unrestricted motorized travel in dry streambeds and wash bottoms in BMGR—East in accordance with the Draft Barry M. Goldwater East HMP. This could lead to an increase in inadvertent damage and intentional vandalism of cultural resources. These potential negative impacts might be offset, at least in part, by an environmental education program that would be established under Management Strategy A.

Management Strategy A would require special use permits for a single party of 50 or more vehicles, in contrast to 10 or more vehicles (or 20 or more vehicles in Unit 2) for the proposed action. This is likely to have negligible impacts on cultural resources.

### **5.16.6 Rockhounding**

#### **5.16.6.1 Proposed Action (Strategy C in Management Units 2 and 3 and Strategy D in All Other Units)**

The proposed action (Strategy C in Management Units 2 and 3, and Strategy D in Units 1 and 4 through 7) would prohibit rockhounding in all management units except Units 2 and 3. Rockhounding would be limited to surface removal of up to 25 pounds for non-commercial use, and would be allowed in only those parts of Management Units 2 and 3 outside the proposed Mohawk Mountains and Sand Dunes special natural/interest area. Other areas of sensitive cultural resources could also be designated as restricted from rockhounding. This management strategy would eliminate rockhounding from about one-half the currently available area, and perhaps concentrate such activity in localized rocky outcrops or abandoned mine sites in the Copper and Gila mountains and Wellton Hills.

Authorized rockhounding is unlikely to have any measurable impacts on cultural resources, but sometimes rockhounding can lead to unauthorized collection of artifacts or the collection of obsidian and geode sources that are part of archaeological sites. Data are limited, but suggest few recreation users visit the BMGR solely for the rockhounding opportunity, and minerals and gemstones typically sought by rockhounds are not known to be plentiful on the BMGR. Although the proposed action would allow rockhounding in Units 2 and 3 and includes an objective to restrict this activity from special natural/interest areas and other designated natural and cultural resource areas that are sensitive to impacts arising from human-induced disturbances, the proposed rockhounding management strategy is unlikely to have impacts on cultural resources that would measurably differ from the existing condition. A more definitive assessment of potential impacts cannot be made due to a lack of cultural resource survey data.

#### **5.16.6.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

In management Units 2 and 3, the alternative actions are Strategy B and Strategy D, and in Units 1, 3, 4, 5, 6 and 7 the alternative actions are management Strategy B and Strategy C. In contrast to Strategy C, Strategy B would allow rockhounding in all areas open to the public as long as no compliance issues arise, and Strategy D prohibits all rockhounding. The level of recreational rockhounding is low and Strategy C allows for designating areas as restricted from rockhounding to protect cultural resources and Strategy B allows for any issues regarding protection of cultural resources to be addressed as compliance issues. However, these stipulations would provide little protection because of the lack of cultural resource survey data. Therefore, Strategy D would be

preferred from the perspective of potential adverse effects on cultural resources, and Strategy B would be less desirable than the proposed action.

### **5.16.6.3 No-Action Alternative (Strategy A)**

The no-action alternative, Management Strategy A, would not reduce the area of rockhounding on the BMGR as the proposed action would. The limitation on surface rock removal would remain at 24 pounds plus one piece, rather than the slightly more restrictive limit of no more than 25 pounds stipulated by the proposed action. This strategy also would not allow for designating restricted areas if rockhounding were found to be adversely affecting cultural resources. This strategy offers less protection for cultural resources and therefore is less desirable from the perspective of cultural resource preservation, but the extent of rockhounding does not appear to be on a scale that would result in measurable impacts on cultural resources under the no-action alternative.

## **5.16.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

### **5.16.7.1 Proposed Action (Strategy D in Unit 1 and Strategy C in All Other Units)**

Currently, collection of dead and downed wood is prohibited within the expired ACECs and within 150 feet of El Camino del Diablo. Under the proposed action, wood gathering and cutting and native wood campfires would be prohibited within Management Unit 1 (Strategy D). Use of dead and downed wood would be allowed in campfires in the remaining areas of the BMGR (Strategy C), including within the expired ACECs and along El Camino del Diablo outside of Unit 1. However, native wood supplies would be monitored and wood collection would be restricted if warranted. The proposed action also prohibits collection and salvage of native plants except for protected American Indian purposes or in accordance with the Arizona Native Plant Law. This exception for the allowance of traditional cultural uses would be beneficial from the perspective of preservation of traditional cultural practices, but no such uses have been identified. Other authorized collection may affect traditional plant gathering areas that have not yet been identified by the Air Force or Marine Corps. Collecting downed and dead firewood could result in inadvertent damage or unintentional vandalism of archaeological sites. Under the proposed action, cultural resources in public use areas where collection of dead and downed wood would be allowed (predominantly Units 2, 3 and 6) would potentially be more vulnerable than those in other areas of the range.

### **5.16.7.2 Alternative Actions (Strategy B, Strategy C, and Strategy D, Depending on Unit)**

All of the alternative actions include provisions for protected American Indian use of native plants, and other aspects of the alternative actions are unlikely to have effects on cultural resources. Therefore cultural resources are not a crucial factor in choosing among alternatives for this resource management element.

### **5.16.7.3 No-Action Alternative (Strategy A)**

Management Strategy A, the no-action alternative, includes provisions for protected American Indian use of native plants as do all the other management strategies. Other aspects of Management Strategy A are unlikely to have effects on cultural resources. Therefore cultural resources are not a crucial factor in choosing among the action and no-action alternatives for this element.

## **5.16.8 Hunting**

### **5.16.8.1 Proposed Action (Strategy B)**

Authorized hunting and collection of non-game species are unlikely to have any measurable impacts on cultural resources, but sometimes these activities, like other dispersed recreation activities, can lead to inadvertent damage and unauthorized collection of artifacts or other vandalism of cultural resources. In 2000, there were 1,692 total hunter use days reported for AGFD Game Management Units 40A and 40B, which overlap the BMGR. The vast majority of those hunting activities probably had no impact on cultural resources; but if even a small percentage of those days result in inadvertent or intentional damage to cultural resources, the adverse effects could be considerable, particularly over the long term. Currently available data do not provide a basis for assessing hunting impacts on cultural resources.

### **5.16.8.2 Alternative Actions (Strategy C and Strategy D)**

There is no difference between the proposed action and Alternative Management Strategy C. Alternative Management Strategy D is the same as the proposed action, but also would prohibit non-game species collection, subject to Arizona Game and Fish Commission approval of the proposed petition. The extent of this activity is not well documented.

### **5.16.8.3 No-Action Alternative (Strategy A)**

Management Strategy A, the no-action alternative, would continue hunting and collection of non-game species in accordance with existing game management programs. This strategy does not include an assessment of the need for a special hunting fee program, or an evaluation of the effects of non-game species collection, and the associated potential reduction in hunting and non-game collection that might result from such studies. Impacts on cultural resources of the no-action alternative are not likely to be measurably different than the proposed action.

### **5.16.9 Recreational Shooting**

#### **5.16.9.1 Proposed Action (Strategy C)**

Authorized recreational shooting is unlikely to have any measurable impacts on cultural resources, but sometimes recreational shooting, like other recreational activities, can lead to inadvertent damage or intentional vandalism, such as using petroglyphs for targets or unauthorized collection of artifacts. Recreational shooting also could result in intrusive noise that may adversely affect some types of National Register-eligible resources. Because there are few data about the extent of recreational shooting on the BMGR, there is no adequate basis for assessing recreational shooting impacts on cultural resources.

Management Strategy C, the proposed action, addresses the lack of information by assessing the importance and character of recreational shooting on the BMGR. The results of this study could lead to continuing current policies, prohibiting recreational shooting, or restricting recreational shooting to a designated area or areas. Because this assessment would include a consideration of potential impacts on cultural resources, it would be beneficial.

#### **5.16.9.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Management Strategy B would continue current regulations regarding recreational shooting, but does allow for restrictions if significant resource issues were identified. Identifying such resource efforts would require survey efforts. Alternative Management Strategy D would prohibit recreational shooting (not including hunting) while the appropriateness of designating areas for recreational shooting is assessed. Alternative Management Strategy B, in contrast to Management Strategies C and D, would forego the benefit of conducting studies to fill the data gap regarding impacts of recreational shooting on cultural resources.

### **5.16.9.3 No-Action Alternative (Strategy A)**

Management Strategy A, the no-action alternative, would allow recreational shooting to continue under existing regulations as long as it is compatible with the military mission and public safety. This alternative would forego the benefits of collecting information and assessing the extent and impacts of recreational shooting on cultural resources that Strategy C and Strategy D would provide.

### **5.16.10 Utility/Transportation Corridors**

#### **5.16.10.1 Proposed Action (Strategy C)**

The proposed action, Management Strategy C, would restrict all future utility or transportation developments to existing corridors, except for applications filed prior to 6 November 2001, which is only the Yuma ASH. All overhead transmission lines would be limited to being immediately parallel to the existing Gila Bend to Ajo transmission line. Impacts of any new utility or transportation projects on cultural resources, which could potentially include adverse visual or auditory effects on some types of cultural resources, would be evaluated in accordance with the ICRMP. Therefore cultural resources would be duly considered and treated in accordance with regulatory requirements and should not result in any unmitigated adverse effects. The restriction of future utility and transportation developments to existing corridors is likely to have a somewhat beneficial effect on cultural resources by not opening up new routes of access into any unroaded areas.

#### **5.16.10.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Management Strategy B would allow consideration of new utility and transportation corridors on a case-by-case basis. Therefore this strategy might forego the somewhat beneficial effect on cultural resources of not opening up new routes of access into any unroaded areas. However, the impacts of any new utility or transportation projects on cultural resources would be evaluated in accordance with the ICRMP. Therefore cultural resources would be duly considered and treated in accordance with regulatory requirements and any identified adverse effects would be avoided, minimized, or partially mitigated.

Alternative Management Strategy D would prohibit new corridors including those for which applications were filed prior to 6 November 2001. This strategy would have less impact on cultural resources than the proposed alternative if the construction of the Yuma ASH would adversely affect cultural resources. However, any adverse effects of the highway would be considered and mitigated in accordance with NHPA and impacts on cultural resources would be similar to the proposed action.

### **5.16.10.3 No-Action Alternative (Strategy A)**

Management Strategy A, the no-action alternative, would restrict overhead and underground utilities and require impact assessments similar to the proposed action. However, this strategy might allow for new transportation corridors. Because impacts of any new transportation corridors on cultural resources would be evaluated in accordance with the ICRMP, cultural resources would be duly considered and treated in accordance with regulatory requirements and any identified adverse effects would be avoided, minimized, or partially mitigated.

### **5.16.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

#### **5.16.11.1 Proposed Action (Strategy C)**

The proposed action, Management Strategy C, incorporates many measures to improve general vegetation, wildlife, and wildlife habitat. Impacts on cultural resources are likely to be minor for most of these measures, but some types of management activities, such as habitat restoration or invasive species eradication, might involve ground disturbance and therefore could potentially affect archaeological and historical sites.

In addition, as many as six wildlife water development projects might be undertaken, and 43 existing wildlife water developments (see Table 4-18) would be maintained and repaired as needed. Many of these existing facilities were installed prior to the passage and implementation of today's environmental and cultural resource protection requirements and thus were installed without the analysis and mitigation of potential impacts to cultural resources that is now required. Many of the subject water developments are at or near rock tanks or charcos that would have been seasonal water sources. Because water sources are rare on the BMGR, the density of aboriginal and historical archaeological sites is likely to be relatively high at such locations. American Indian communities with traditional cultural affiliations to the BMGR also consider water sources in this arid environment as continuing to have traditional cultural importance including ceremonial or religious significance. Impacts of any new developments or repairs on cultural resources would be evaluated in accordance with the ICRMP. Therefore cultural resources would be duly considered and treated in accordance with regulatory requirements and any adverse effects would be avoided, minimized, or partially mitigated.

#### **5.16.11.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Strategy D is the same as the proposed action, with the exception that no new wildlife water developments would be built during the first five-year term of the proposed

INRMP. Alternative Strategy B would authorize construction of up to 17 new wildlife water development projects, rather than six, as proposed. However, it is unlikely that more than about six of these water developments would be constructed in the first five years of this plan, and impacts on cultural resources are unlikely to be measurably different than for the proposed action.

### **5.16.11.3 No-Action Alternative (Strategy A)**

Management Strategy A, the no-action alternative, would have less emphasis on ecosystem management and habitat restoration and instead focus on game species management. Like Alternative Management Strategy B, 17 new wildlife water developments could be constructed as planned in the HMPs, although it is unlikely that more than about six of these would be developed in the first five years of the INRMP. Impacts on cultural resources are unlikely to be measurably different than for the proposed action.

### **5.16.12 Special Status Species**

#### **5.16.12.1 Proposed Action (Strategy C)**

The proposed action, Management Strategy C, incorporates measures to comply with the Endangered Species Act and recovery plans, conduct surveys for special status species, and institute predator control as necessary to protect special status species. This strategy is unlikely to have measurable impacts on cultural resources although some associated activities, such as development of forage plots for Sonoran pronghorn recovery efforts, could involve ground disturbance and potential impacts to archeological resources. Impacts on cultural resources of any such actions would be assessed in accordance with the ICRMP, and any adverse effects would be avoided, minimized, or partially mitigated. In addition, measures to comply with the Endangered Species Act would occur regardless of the management strategies implemented for the proposed INRMP.

#### **5.16.12.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Management Strategy D is the same as the proposed action. Alternative Strategy B does not include predator control and special status species surveys in appropriate habitat areas that are included in the proposed action, but impacts on cultural resources would be similar.

### **5.16.12.3 No-Action Alternative (Strategy A)**

Management Strategy A, the no-action alternative, would not include the special status species surveys of the proposed action, but impacts on cultural resources would be similar.

### **5.16.13 Soil and Water Resources**

#### **5.16.13.1 Proposed Action (Strategy D)**

Management Strategy D, the proposed action for soil and water resources, would restrict motorized vehicles and heavy equipment to established roads and previously disturbed areas, except when related to approved projects. In addition, groundwater tables would be monitored, groundwater development would be limited in environmentally sensitive areas, and areas of problem erosion would be addressed, and a range-wide soil survey to NRCS standards would be completed. More than 30 percent of the recorded archaeological and historical sites recorded on the range have suffered from erosion, and the proposed action would have beneficial impacts insofar as the strategy curtails damaging erosion. However, few of the erosion control measures are likely to focus on archaeological and historical sites and the benefits are likely to be slight. The soil survey would require excavation of numerous pits to characterize soils, but this activity would be assessed in accordance with the ICRMP and adverse effects to cultural resources can be avoided.

#### **5.16.13.2 Alternative Actions (Strategy B and Strategy C)**

Alternative Management Strategy B would be a less comprehensive approach to preventing erosion than the proposed action, but specifically allows for restriction or modification of activities to prevent erosion in areas of cultural resource sensitivity. Alternative Management Strategy C includes the Strategy B measures but would include measures to minimize soil and water contamination and erosion from vehicle use or other activities. The impacts of these alternative strategies would be very similar to the proposed action.

#### **5.16.13.3 No-Action Alternative (Strategy A)**

Strategy A, the no-action alternative, is incorporated into Strategies B, C, and D. Strategy A relies considerably on restriction of motorized vehicles and heavy equipment to established roads, but stipulates that measures would be taken to minimize soil disturbances. Impacts of the no-action alternative would be very similar to the proposed action and alternative actions.

### **5.16.14 Air Resources**

#### **5.16.14.1 Proposed Action (Strategy A)**

Management Strategy A, the proposed action, focuses on controlling fugitive dust and use of best management practices for activities generating non-point sources of air pollution. These activities are not expected to have impacts on cultural resources.

#### **5.16.14.2 Alternative Actions (Strategy B, Strategy C, and Strategy D)**

Alternative Management Strategy B has no special management objectives. Alternative Management Strategy C would use palliatives to control fugitive dust on heavily traveled roads. Alternative Management Strategy D would include Strategy C as well as an air quality monitoring program with accompanying restrictions on new activity in areas of deteriorated air quality. None of these alternative strategies are expected to have impacts on cultural resources.

#### **5.16.14.3 No-Action Alternative (Strategy A)**

Management Strategy A is both the no-action and proposed action alternative.

### **5.16.15 Visual Resources**

#### **5.16.15.1 Proposed Action (Strategy B)**

Management Strategy B, the proposed action for visual resources, would continue to manage the scenic resources of the BMGR in a manner that is generally protective of the current conditions, but would also initiate any needed management or mitigation actions. This strategy would result in some beneficial effects by protecting natural landscapes, which are an important element of the integrity of some cultural resources, particularly traditional cultural places. Because most landscapes of the BMGR have not been severely affected, the benefits are expected to be relatively slight.

#### **5.16.15.2 Alternative Actions (Strategy C and Strategy D)**

Alternative Management Strategy C would add a more formal visual resource management classification and evaluate new projects against criteria developed for protecting visual resources. Alternative Management Strategy D incorporates Strategy C and in addition would work to protect and, if necessary, restore visual resources within or visible from unroaded areas,

and restrict non-military activities if necessary to achieve this objective. The alternative actions, like the propose action, would result in some beneficial effects by protecting natural landscapes, which are an important element of the integrity of some cultural resources, particularly traditional cultural places.

### **5.16.15.3 No-Action Alternative (Strategy A)**

Management Strategy A, the no-action alternative, would promote protection of visual resources. Impacts on cultural resources are likely to be similar to those of the proposed and alternative actions.

## **5.16.16 Wildfire Management**

### **5.16.16.1 Proposed Action (Strategy B)**

The proposed action, Management Strategy B, calls for a comprehensive plan for fire prevention, suppression, recovery, mapping, monitoring, and possible mitigation protocols for both human and non-human caused fires in accordance with the threat to human life, property, and natural and cultural resources. Insofar as implementation of the plan provides protection for cultural resources, the effects would be beneficial, but wildfire does not appear to have been a source of major impacts on cultural resources and the benefits are expected to be modest.

### **5.16.16.2 Alternative Actions (Strategy C and Strategy D)**

The alternative actions, Management Strategies C and D, are identical to the proposed action.

### **5.16.16.3 No-action Alternative (Strategy A)**

Management Strategy A, the no-action alternative, would suppress wildfires to achieve the lowest acreage loss in the most cost-effective and efficient manner. This strategy is less comprehensive than the proposed action and there would be no specific consideration of impacts on cultural resources.

### **5.16.17 Perimeter Land Use, Encroachment, and Regional Planning**

#### **5.16.17.1 Proposed Action (Strategy D)**

The proposed action, Management Strategy D, entails comprehensive efforts to identify and evaluate land uses adjacent to the BMGR and coordinate resource management when beneficial to do so. This effort explicitly would involve consideration of potential impacts of adjacent land uses on the cultural resources of the BMGR, which should promote conservation of such resources. However, adjacent land uses do not appear to be a major source of impacts on cultural resources and the benefits are likely to be modest.

#### **5.16.17.2 Alternative Actions (Strategy B and Strategy C)**

Alternative Management Strategies B and C incorporate parts of the proposed action, including specific consideration of cultural resources, and thus should have similar benefits for those resources.

#### **5.16.17.3 No-Action Alternative (Strategy A)**

Strategy A, the no-action alternative, offers no special management objectives for perimeter land use, encroachment, and regional planning, and would forego the benefits of the proposed or alternative actions.

### **5.16.18 Aggregate Effects on Cultural Resources**

#### **5.16.18.1 Proposed Action**

The two elements of the proposed action that are projected to have most beneficial impacts on cultural resources are (1) resource inventory and monitoring, and (2) recreation services and use supervision. These elements of the plan would work together to better characterize and address sources of impacts and address them accordingly. The assessment of the impacts of dispersed recreation on cultural resources has not been previously assessed and would be a major benefit, as would the implementation of a monitoring strategy based on a limits-of-acceptable-change framework.

Two other elements of the proposed action that are projected to have beneficial effects on cultural resources are (1) special natural/interest areas, and (2) motorized access and unroaded area management. Redesignation of the expired Tinajas Altas Mountains ACEC as a special natural/interest area is likely to promote continuing protection of the sensitive cultural resources

in that area. Reducing motorized access is expected to lead to a decline in indirect inadvertent damage and intentional vandalism that commonly correlates with motorized access. The extent of such impacts is not well documented, but they are impacts that typically are not mitigated and any reduction would be an important benefit.

The six elements of the proposed action that are projected to result in slightly beneficial impacts on cultural resources are (1) recreational shooting; (2) utility/transportation corridors; (3) soil and water resources; (4) visual resources; (5) wildfire management; and (6) perimeter land use, encroachment, and regional planning. All of the proposed actions for these elements would promote conservation of cultural resources but the managed activities do not appear to be sources of major impacts and therefore the benefits are unlikely to be substantial.

The camping and visitor stay limit element of the plan is projected to have slightly adverse impacts on cultural resources. These impacts would stem from the ground disturbance of vehicle-based camping along road margins, and any secondary inadvertent damage or intentional vandalism stemming from camping. The proposed action would involve an assessment of camping activities in order to assess the effects of designating camping areas. There are essentially no data to assess the impacts of one element of the plan—hunting and non-game species collection—but information would be collected under the proposed action.

### **5.16.18.2 Alternative Actions**

#### Management Strategy B

Three elements of Management Strategy B are part of the proposed action—hunting, visual resources, and wildfire management—and would have the same effects on cultural resources as the proposed action, which vary from having no data for an impact assessment to slightly beneficial. Like the proposed action, Strategy B is projected to have beneficial effects for the resource inventory and monitoring element of the plan. Similarly, Strategy B is projected to result in slightly beneficial impacts, like the proposed action, with regard to the following resource management elements: (1) utility/transportation corridor; (2) soil and water resources; (3) visual resources; (4) wildfire management; and (5) perimeter land use, encroachment, and regional planning. Like the proposed action, the elements of Strategy B that are projected to have no effect on cultural resources include (1) rockhounding; (2) wood cutting, gathering, and firewood use, and collection of native plants; (3) general vegetation, wildlife, wildlife habitat, and wildlife waters; (4) special status species; and (5) air resources.

From the perspective of cultural resource conservation, four elements of Alternative Management Strategy B are less preferred than the proposed action. The recreation services and use supervision element of Strategy B is projected to have more adverse than beneficial impacts compared to the proposed action. Also, the special natural/interest areas and motorized access

and unroaded area management elements of Strategy B are projected to result in slightly adverse impacts rather than the beneficial impacts of the proposed action. In contrast to the slightly beneficial impacts of the proposed action for the recreational shooting element, Strategy B is rated as having “no data” for an impact assessment, and unlike the proposed action, none would be collected.

### Management Strategy C

From the perspective of cultural resource conservation, the impacts of Management Strategy C are the same as the proposed action.

### Management Strategy D

From the perspective of cultural resource conservation, the impacts of Management Strategy D are the same as the proposed action.

#### **5.16.18.3 No-Action Alternative**

The one element of management Strategy A, the no-action alternative, that is part of the proposed action is air resources, which is not projected to have impacts on cultural resources. For 11 other elements, the effects on cultural resources are the same with Strategy A as they are with the proposed action.

From a cultural resource perspective, Strategy A is less preferred than the proposed action with regard to the five other plan elements. With Strategy A, impacts on cultural resources for motorized access and unroaded area management, and recreation services and use supervision are projected to result in adverse impacts in contrast to the beneficial impacts of the proposed action. The (1) wildfire management, and (2) perimeter land use, encroachment, and regional planning elements of Strategy A are projected to result in slightly adverse impacts instead of the slightly beneficial impacts projected for the proposed action. In contrast to the slightly beneficial impacts of the proposed action for the recreational shooting element, Strategy A is rated as having “no data” for an impact assessment, and unlike the proposed action, none would be collected.

## **5.17 VISUAL RESOURCES**

### **5.17.1 Resource Inventory and Monitoring**

#### **5.17.1.1 Proposed Action (Strategy D)**

The range-wide application of Alternative Management Strategy D for resource inventory and monitoring could potentially lead to indirect benefits on visual resources. The Goldwater Amendment identified interim BMGR visual resource management classes for the range that provide an assessment benchmark for visual resource management planning and mapping. Aside from the general inventory of BMGR visual resources completed in 1998 for the BMGR LEIS, however, no other comprehensive visual resource inventory has been completed for the entire range. While no inventory or monitoring that is specific to visual resources is proposed, an enhanced inventory and monitoring program that provides the information necessary to reduce impacts on the range environment and conserve and protect sensitive resources could also benefit the effort to protect the scenic qualities of the BMGR. Such a benefit may evolve, for example, if limits-to-acceptable change monitoring of road corridors is employed to reduce the loss of vegetation and creation of multiple vehicle trails in the foreground vicinities of roadsides.

#### **5.17.1.2 Alternative Actions (Strategy B or Strategy C)**

Alternative Management Strategies B and C would still result in an increase in monitoring activity compared with the no-action alternative, but of less intensity than the proposed action. Like Strategy D, the increase in inventory and monitoring activity could have favorable indirect visual resource effects, although to a lesser degree because fewer surveys would occur. Comparatively, Strategy C would be of more benefit than Strategy B. Strategy C includes most of the elements of the proposed action, but Strategy B would only include monitoring of compliance actions and no additional inventory beyond that of Strategy A.

#### **5.17.1.3 No-Action Alternative (Strategy A)**

Under Alternative Management Strategy A, resource monitoring activities would essentially be the same as those currently in effect or planned. Thus, there would be no increased potential for indirect visual resource management benefits.

## **5.17.2 Special Natural/Interest Areas**

### **5.17.2.1 Proposed Action (Strategy C)**

The proposed action would not redesignate the El Camino del Diablo Backcountry Byway and the Crater Range and Sentinel Plain Lava Flow SRMA, which expired on 6 November 2001, as special natural or interest areas. The SRMAs were established, in part, for the scenic quality of the areas and the BLM's backcountry byway designation is comparable to the scenic byway programs used by the Forest Service and ADOT. Elimination of the designations, however, would not necessarily result in changes that would affect the visual quality of these areas. Those former special management provisions for these areas that pertained to the visual setting primarily included management of motorized access and utility/transportation corridors. In this EIS, these resource elements are instead addressed under other management objectives associated with the proposed action that would offer similar visual resource benefits.

The ACECs would be redesignated as special natural/interest areas and special management provisions specific to these areas could be developed as needed. However, the major elements that would likely contribute to such management provisions are addressed in the other management objectives of the proposed action (motorized access and unroaded area management; wood cutting, gathering, and firewood use, etc.). As such, the redesignation of the ACECs by itself is not expected to have much influence on visual resources in these areas, but the recognition of the area as having special qualities or attributes and the potential for further management provisions, as necessary, could result in the area receiving a greater level of management attention than the surrounding area and could potentially have indirect beneficial effects on the visual resources for these areas. Redesignation would also have the potential of deferring future proposed military surface uses to range areas outside of the ACECs if those other locations could fully support the intended activity.

The proposed action also provides for evaluating the potential for establishing additional special natural/interest areas based, at least in part, on the scenic qualities of certain unique areas and on factors that contribute to visual interest, such as geologic features and vegetation. This element of the proposed action provides a resource conservation tool that could be employed to protect BMGR areas that are found to have special natural resource qualities requiring such protection.

### **5.17.2.2 Alternative Actions (Strategy B and Strategy D)**

Under Alternative Management Strategy B, the expired ACECs, SRMAs, and backcountry byway would not be redesignated as special natural or interest areas. Potential effects on the visual quality of the former ACECs would likely depend more on the other management strategies applied to these areas than the actual designations, but the lack of designation could potentially leave these areas more vulnerable to change as the areas would be managed without

special management provisions. Another distinction is that, unlike the proposed action, Management Strategy B does not provide for evaluating the potential for establishing new special natural/interest areas. Thus, the related potential benefits for visual resources, as discussed for the proposed action, would not occur.

Strategy D differs from the proposed action in that its implementation would result in the redesignation of the backcountry byway and SRMAs as well as the ACECs as special natural/interest areas. While the application of other management objectives could be equally effective in preserving the visual qualities of these areas, special designations would offer an additional measure to ensure some level of protection for these areas.

### **5.17.2.3 No-Action Alternative (Strategy A)**

Because DoD management in accordance with the Sikes Act does not provide for ACEC, SRMA, and backcountry byway designations, per se, the designations themselves expired on 6 November 2001. However, under the no-action alternative, the BLM special management designations would be retained as special/natural interest areas. Applicable special management provisions from the Goldwater Amendment pertaining to visual resources management within the ACECs, SRMAs, or backcountry byway may be carried forward. As compared with the proposed action, the management provisions for these areas in the Goldwater Amendment were specific to the designated areas, whereas with the proposed action they are more generally applied through the management units, although special management prescriptions for the areas could be developed as needed.

Of note, the Goldwater Amendment calls for the management prescriptions to minimize the visual impacts and maintain scenic values in the Crater Range and Sentinel Plain Lava Flow SRMAs. The establishment of that portion of State Route 85 bisecting the Crater Range SRMA as a Scenic Byway one-mile-wide corridor (by ADOT and BLM standards) was proposed, but never pursued. The Goldwater Amendment also called for management along the State Route 85 transportation-utility corridor through the SRMA to protect all views from the highway and other potential public viewing points. Similarly, for El Camino del Diablo Backcountry Byway the Goldwater Amendment prescribed reclamation of non-mission-essential military use areas along the byway and allowing no new surface disturbing activities within one-quarter mile of the road. While the Goldwater Amendment is now out of date, the actions prescribed in this plan would be continued, or pursued if not previously executed, with selection of the no-action alternative.

### **5.17.3 Motorized Access and Unroaded Area Management**

#### **5.17.3.1 Proposed Action (Strategy C)**

The proposed action (Strategy C) would close a total of 658 miles of redundant roads and also reduce direct vehicle access to some local areas. Of these closures, public use roads would be reduced by 352 miles, from 973 miles to 621 miles. The proposed action road closures would result in direct, long-term beneficial effects on visual resources because the closed roads would eventually revegetate and restore views to a more natural condition. However, by closing roads, some scenic viewpoints in localized areas would no longer be directly accessible to those traveling in vehicles. Although most roads that would be closed are redundant roads, vehicular access in localized areas with foreground and middleground views of landscapes with outstanding or distinctive diversity would be eliminated (although most areas could still be viewed if users were willing to hike to the location). Landscapes with outstanding or distinctive diversity within these units where roads closures could limit views accessible by vehicle are as follows:

- Unit 1: Tinajas Altas Mountains
- Unit 2: Gila, Tinajas Altas, and Copper mountains
- Unit 3: Mohawk Mountains
- Unit 4: San Cristobal Valley apex
- Unit 5: Aguila and Granite Mountains, Crater Range, and the White Hills
- Unit 6: Saucedo Mountains and upland bajadas
- Unit 7: Sand Tank Mountains and upland bajadas

The public is the primary observer of visual resources in areas accessible to the public, which includes most of Units 2, 3, 6, about one-third of Unit 1, a small area in Units 4 (along a road associated with Unit 3), and a small area in Unit 7 (in the Bender Springs area). DoD personnel are the predominant observers in Units 4, 5, 7, and most of Unit 1.

Selecting the proposed action would provide the option to plan and develop two bypass roads within the northwest corner of the Cabeza Prieta NWR, which could be an adverse visual impact if implemented because it would introduce about 7 miles of new road and would modify the affected landscape. It would also provide new opportunities to view landscapes with outstanding diversity, including Coyote Peak, the north end of the Cabeza Prieta Mountains in the refuge, Tinajas Altas Mountains, Raven Butte, and the Copper Mountains, from new perspectives. The proposed bypass roads would be limited to agency use, however, so they would not serve as viewpoints to the public. Further analysis to determine the level of effect and mitigation, if necessary, would be included in the site-specific planning for these roads.

An indirect beneficial effect resulting from road closures under the proposed action is a decrease in risk of non-native, invasive vegetation proliferation. This is because roads are considered

potential pathways for the introduction and spread of invasive species, which can modify the visual elements of native vegetative communities.

### **5.17.3.2 Alternative Actions (Strategy B and Strategy D)**

Regardless of the management unit, if Alternative Management Strategy B were applied, no roads would be closed and future development of new roads could occur depending on the results determined by evaluating the need for and effects of proposed additional roads. If compatible with military activities and safety and security requirements, Strategy B would also promote future motorized public access to roads in currently restricted locations should restrictions on those areas be lifted in the future. Public use of currently restricted roads and development of new roads could introduce new or magnify existing manmade alterations to the natural landscape with a corresponding reduction in the visual quality of the affected areas. Unlike the proposed action, this strategy does not have beneficial effects on visual resources associated with the road closures and restoration (natural or augmented). Alternatively, application of Strategy B would not exclude motorized public access to views within localized areas as discussed for the proposed action.

Range-wide application of Strategy D would close 107 more miles of road than the proposed action. In the long term, as the closed roads naturally revegetate and/or are actively restored, the visual environment would be restored to a more natural condition. In some locations, Strategy D could expedite this process because it includes an objective to restore closed roads where feasible and prudent to remediate a degraded ecological process or enhance wildlife usage. Additional viewpoints in localized areas would no longer be accessible by vehicle. Site-specific planning for the road to bypass the northwest corner of the Cabeza Prieta NWR and the potential consequences relative to these roads as discussed under the proposed action would not occur.

### **5.17.3.3 No-Action Alternative (Strategy A)**

With the no-action alternative, the transportation plan prescribed in the Goldwater Amendment, which was not completed, would require development. The entire existing road network would remain open under Strategy A, at least until the transportation plan were developed and implemented. Roads not meeting the requirements established in that plan to meet land management, public, or government access needs would be closed. Because manmade features, such as roads, generally distract from the visual setting, the consequences on visual resources of applying Strategy A for motorized access and unroaded areas would be less beneficial than the proposed action, at least in the short term. If roads would be closed with the implementation of a transportation plan, the impacts may be similar to those discussed for the proposed action.

#### **5.17.4 Camping and Visitor Stay Limits**

##### **5.17.4.1 Proposed Action (Strategy C)**

Alternative Management Strategy C would support restricting camping along certain road segments to protect sensitive resources and would require all campsites to be more than ¼-mile away from designated natural and cultural resources that are sensitive to impacts arising from human-induced disturbances. To the extent that such restrictions would protect natural features from degradation and maintain the natural views of a given area, this could be beneficial to visual resources, although visitors may also be restricted from observing the benefits.

Strategy C also would include assessing the effects of establishing designated camping areas on the BMGR. Depending on the location and use patterns, designated camping areas could introduce a localized area where manmade changes to the foreground and possibly the middle ground are predominant, at least when the areas are in use by multiple groups of campers. The visual effects of camping, campfire rings, and litter and debris could diminish the visual quality of foreground views in localized areas if used repeatedly. However, establishing areas specifically designated for vehicle-based campers would localize the visual effects to specific areas, rather than allowing the effects to be dispersed throughout the BMGR (although non-vehicle-based dispersed camping would still be permitted).

Defining and prescribing reasonable rules for the disposal of human sewage and solid waste in accordance with applicable laws and regulations could help to control the visibility of such waste with the visual resource effect of eliminating some evidence of human influence.

##### **5.17.4.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Management Strategy D would have essentially the same effects on visual resources as described for the proposed action, although shortening the length of time that campers may stay in one location from 14 days to 7 days may minimize the potential for human disturbance at a given campsite. Long-term camping has not yet emerged, however, as a popular activity within the BMGR.

Alternative Management Strategy B differs from the proposed action in that no restrictions on vehicle-based camping along roadways or within ¼ mile of designated areas would be planned specifically to protect sensitive resources, nor would an assessment be done to determine the effects of establishing designated camping areas. By allowing vehicle-based camping along all public access roads and in areas where natural and cultural resources that are sensitive to impacts arising from human-induced disturbances are known to be located, there is a potential that campers could damage sensitive resources either intentionally or inadvertently; this could potentially have a negative effect on visual resources. Conversely, not establishing designated

camping areas would avoid the visual resource impacts that often occur in areas of concentrated recreational use.

Strategy B would also allow vehicle-based camping to extend out to up to 100 feet of an existing road designated as open to public use. This is 50 feet farther than currently allowed or that would be allowed with Management Strategies C and D. To the extent that this increases evidence of physical disturbance, this could possibly have an adverse affect on visual resource values.

#### **5.17.4.3 No-Action Alternative (Strategy A)**

Management Strategy A would not change camping rules so no change to visual resources would be expected. However, compared to the proposed action, Strategy A would allow for a greater potential for the effects to camping to degrade the visual environment, although such effects would be minor.

#### **5.17.5 Recreation Services and Use Supervision**

##### **5.17.5.1 Proposed Action (Strategy C in Unit 2 and Strategy D in All Other Units)**

There are several aspects of the recreation services and use supervision provisions under the proposed action that could impact visual resources. Direct impacts could result from the placement of signs to indicate road closures and/or additional gates and fencing to control entry. Assessments to determine the need for signs and additional gates and fencing are called for under Management Strategy C (proposed for Unit 2) and Management Strategy D (proposed for all other management units). While there currently are some road closure signs and similar fencing and gates, each additional sign, gate, or fence is a new manmade modification. The degree of localized impacts to visual resources would depend on how these features are designed and erected, but they would be minimal, particularly in context of where such features would be located (along areas where previously manmade modifications are present, even if it is just a road) and the alternative is unauthorized access and inadvertent use of roads that have been closed. Even though the effect would potentially be more pronounced in sensitive settings (e.g., near a unique geologic feature or in the vicinity of a cultural resource site), the level of contrast would probably be weak (i.e., noticeable, but in a manner that does not attract attention and is subordinate to the setting).

Some elements of the proposed action would potentially lessen any temporary visual effects from traces of human influence associated with recreation activity as compared to the existing condition. Both Management Strategies C and D would prohibit motorized public travel in wash bottoms except where the wash is a designated part of the road system open to the public and

dry. This could result in a direct beneficial effect on visual resources by possibly preventing associated visual intrusions consisting of tire tracks (which would wash away with the next rain), litter, and any related damage to xeroriparian vegetation and wash banks. A related but indirect beneficial effect is that prohibiting travel in most washes would reduce the threat of vehicles inadvertently distributing seeds from non-native and invasive vegetative species into these washes. Washes are considered potential pathways for the spread of invasive species, which modify the natural visual elements in native vegetative communities. However, such potential effects would be minor because this activity occurs on the BMGR even though is not currently sanctioned and such effects have not been noted as a resource management concern on the BMGR. Requiring a special use permit for parties with 20 or more vehicles (Strategy C) or 10 or more vehicles (Strategy D) could potentially limit the number of large parties on the BMGR. Large groups in a localized area have a greater temporary and minor impact on visual resources by introducing a greater concentration of visual intrusions (i.e., larger camping sites, human and vehicular activity, dust, etc.). Larger parties also have a greater potential to leave behind evidence of unnatural disturbance, which could have a continued minor negative effect on visual resources.

Although several law enforcement/security positions have recently been added and there are now seven patrol positions dedicated to the BMGR, Strategy C would ensure four law enforcement positions and Strategy D would ensure six law enforcement positions range wide. The presence of law enforcement officers reduces the potential for illegal activity (such as driving off of designated roads), which can cause resource damage that could influence the visual environment.

#### **5.17.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

There would be no measurable difference in consequences to visual resources from Alternative Management Strategies C and D, regardless of management unit. However, implementation of Strategy B in any management unit would allow continued motorized public travel in wash bottoms, resulting in the potential associated minor temporary effects discussed for the proposed action.

Although several law enforcement/security positions have recently been added so that seven individuals now patrol the BMGR, Strategy B would only ensure two law enforcement positions. If budget cuts or other factors reduced the number of law enforcement/security officers on the BMGR, there would be a greater potential for resource damage and associated impacts to visual resources from illegal activity than with Strategies C and D.

### **5.17.5.3 No-Action Alternative (Strategy A)**

Alternative Management Strategy A would not result in changes to the existing recreation services and use supervision. Thus, no change to visual resources would be expected. However, compared to the proposed action, Strategy A is more likely to have low levels of adverse visual effects from allowing the use of washes as travel ways, allowing larger parties (up to 50 vehicles) before a special use permit would be required, and because no minimum number of law enforcement positions would be required. Most potential impacts would likely be minor and temporary.

### **5.17.6 Rockhounding**

Regardless of which alternative is selected, visual resources effects related to surface only rockhounding are not anticipated. Collection of rocks for commercial purposes is not allowed and the quantity of rocks that a party may take is limited to no more than 25 pounds, which is unlikely to result in any noticeable change to the visual environment.

### **5.17.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

#### **5.17.7.1 Proposed Action (Strategy D in Unit 1 and Strategy C in All Other Units)**

Under the proposed action, Alternative Management Strategy D would be applied to Unit 1 and Management Strategy C would be applied to all other areas of the BMGR. Discernible visual resource effects with this management strategy principally relate to how native dead or downed wood is considered a visually appealing resource to some viewers. The proposed action would have a direct beneficial effect on BMGR visual resources in that while the use dead and downed wood for campfires would be allowed within all units except for Unit 1, all other forms of wood cutting, wood collection, or removal of wood from the range would be prohibited. Dead wood, or “snags,” are a readily visible part of the Sonoran desert landscape and also serve as perches for birds and as habitat for various species, thus adding additional visual interest to range visitors. Any effect is expected to be of minor benefit and confined to those areas of the BMGR that are accessible to the public because military and civilian personnel participating in training or support activities are not allowed to collect firewood on the BMGR.

The proposed application of Management Strategy D in Unit1 would ultimately have the greatest direct potential beneficial effect on visual resources related to the presence of native wood because cutting, gathering, and use of native wood for campfires would be prohibited. The southeastern portion of Management Unit 1 in the vicinity of the Tinajas Altas Mountains is open to public visitation, a part of the expired Tinajas Altas Mountains ACEC, an area where depletion of wood resources has been noted in the past, and a popular camping area. Continuing

the existing ACEC prohibition of collecting firewood in this management unit would provide continuing protection to the role that wooden snags and downed and dead wood play in the visual landscape. Although the visual integrity of the BMGR would be more protected from the disappearance of native wood, the viewer audience would remain unchanged regardless of which management strategy is applied.

#### **5.17.7.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

Like the proposed action, regardless of management strategy for this resource element, no visual resource effects are predicted in those areas of the range that are restricted to military use only because military and civilian personnel participating in training or support activities are not allowed to collect firewood on the BMGR.

Management Strategy B would allow wood cutting and gathering for campfires as long as wood is used at a sustainable rate and no regulatory compliance issue arises. Wood cutting, even at a sustainable rate, is potentially problematic for the visual landscape if the practice eliminates individual trees in the vicinity of roadsides where they are important visual foreground and middle ground elements. Strategy B would also allow the collection of dead and downed wood for firewood within the expired ACECs and within 150 feet of the expired El Camino del Diablo Backcountry Byway, where firewood collection was prohibited under the Goldwater Amendment. Compared to the proposed action, Management Strategy B would allow for a greater consumption of wood, including the cutting of live trees in publicly accessible portions of the range, resulting in a more detrimental effect on visual resources.

Application of Alternative Management Strategy C to Management Unit 1 would differ from the proposed action by allowing the use of dead and downed wood for campfires in this area. Because the southeastern portion of Management Unit 1 is publicly accessible and is a popular camping area, there is a potential for negative impacts to the visual landscape through the consumption of wooden snags and dead and downed wood for campfires. However, this area would likely be considered a high-use area and, thus, in accordance with the corresponding management objective, wood supplies would be monitored and restrictions potentially imposed as resource conditions dictate. The result is that any visual resource value related to wood resources in this unit would be potentially less protected (but to a small degree) under this strategy than under the proposed action, where the activity would be flatly prohibited.

The application of Management Strategy D to Management Units 2 through 7 would have a direct beneficial effect on visual resources in these areas in that native wood would not be consumed for campfires, which would protect the long-term visual integrity of the vegetative landscape in these areas.

### **5.17.7.3 No-Action Alternative (Strategy A)**

Because the terms of wood cutting, gathering, and firewood use would remain unchanged with the no-action alternative, it can be presumed that native wood consumption would continue at the existing rate. The rate at which native wood supplies are being depleted as a result of the cutting, gathering, and use of firewood have not been determined or monitored. As recreation pressure within the BMGR increases, fueled by population growth in the Southwest and the popularity of four-wheel-drive vehicles, campfire use could lead to a depletion of native wood from the visual landscape. This effect would likely be most pronounced around popular camping areas within BMGR—West where tree densities are lower than in management units 6 and 7 where higher precipitation rates occur. Compared to the proposed action, Strategy A would potentially consume more native wood, particularly in Management Unit 1, where native wood fires would be prohibited under the proposed action.

### **5.17.8 Hunting**

Regardless of which alternative is selected, no associated visual resource effects related to hunting are anticipated as game management programs do not affect the visual integrity or viewpoints.

### **5.17.9 Recreational Shooting**

#### **5.17.9.1 Proposed Action (Strategy C)**

Alternative Management Strategy C would sanction continued recreational shooting within the BMGR under certain conditions (i.e., daytime only and automatic weapons use by special use permit only). This activity does lead to the expenditure of spent cartridge cases and shotgun shells as well as target materials that some shooters discard as litter. Recreational shooting using sporting firearms, however, has not occurred on the range either in concentrated locations or at high rates that have led to prevalent build-ups of litter and debris from shooting. Based on this experience, the effects of continued recreational shooting with sporting firearms would not appear to result in effects that would measurably differ from the existing visual resource conditions of the BMGR.

The proposed action also provides for the consideration of designating specific shooting area(s) on the BMGR, and the effects on visual resources would be included in the consideration of such an area. Designating specific recreational shooting area(s) would confine litter and debris from shooting to localized areas and would therefore limit the amount of surface area affected, resulting in a direct beneficial effect on BMGR visual resources. The concentration of

recreational shooting would further benefit visual resources by controlling unsightly vandalism of signs, saguaro cacti, and historical resources that have been observed in various range locations being used as targets. The shooting area itself, however, would concentrate impacts into a localized area where manmade changes would be more evident than they are currently as they occur in a widely dispersed fashion. These effects would be more prevalent if automatic weapons use were authorized within designated shooting areas relative to the rapid rate fire and heavier caliber ammunition expended by some automatic weapons.

#### **5.17.9.2 Alternative Actions (Strategy B and Strategy D)**

The visual resource effects of sanctioning recreational shooting under Strategy B with sporting firearms throughout those areas of the BMGR open to the public would be no different than those under the proposed action. Although automatic weapons use would not be specifically controlled under Strategy B of the proposed INRMP objectives, concerns for the compatibility of this activity with the ongoing military overflights and operations involving ground personnel as well as public safety issues have resulted in a determination by the Air Force and Marine Corps that a special use permit would be necessary for the recreational use of automatic weapons. Under these terms, the visual resource effects of automatic weapons use under Strategy B would be the same as the proposed action.

The prohibition of recreational shooting activities under Management Strategy D would potentially benefit the protection of visual resources because litter and debris from shooting could not accumulate. There would also be less damage to natural and cultural resources that are intentionally or inadvertently damaged by recreational shooting.

#### **5.17.9.3 No-Action Alternative (Strategy A)**

Under the no-action alternative for this resource management element, recreational shooting would be allowed to occur under existing regulations as long as it is compatible with military use and public safety issues do not arise. Visual resource effects would be similar to those described for Strategy B.

### **5.17.10 Utility/Transportation Corridors**

#### **5.17.10.1 Proposed Action (Strategy C)**

With the application of Management Strategy C, the only new utility/transportation corridor allowed within the BMGR would be the proposed Yuma ASH. Any other new non-military transportation or utility proposals would be limited to the existing State Route 85 corridor

(overhead transmission lines immediately parallel to the existing Gila Bend to Ajo transmission line and non-military underground facilities to the west side of and parallel to the Tucson Cornelia and Gila Bend Railroad). Concentrating utilities (particular those above ground) within existing transportation corridors typically preserves views in most areas and focuses the visual change within an area that has already been modified. While visual impacts and any required mitigation associated with the proposed construction of the Yuma ASH are being evaluated in a separate NEPA document, the new Yuma ASH transportation corridor is expected to create a new manmade visual modification within the westernmost portion of the BMGR—West. In addition, the highway corridor would also create new public viewpoints of the range. Although the relative use of this road would be greater than other BMGR roads, views would not be expected to be particularly sensitive, as they would be of a transient nature. To the degree that existing or future manmade modifications would be apparent from the highway corridor, there could be some new visual resource management concerns.

An indirect visual effect of the Yuma ASH could be the subsequent introduction of non-native species like Sahara mustard, which can out compete other caches of native wildflowers and result in less aesthetically interesting vegetation in terms of line, form, color, and texture. Sahara mustard is of particular concern because a healthy population is present along the Interstate 8 corridor, to which the Yuma ASH would connect and provide a potential pathway for the carrying and dispersal of seed into dry, sandy soils that are suitable for this species (Malusa and others 2001). This potential impact may be addressed or mitigated in the Yuma ASH planning process.

#### **5.17.10.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would evaluate any future proposal for utility/transportation corridors on a case-by-case basis. Because this alternative may allow utility/transportation corridors in addition to the existing State Route 85 corridor and Yuma ASH, there would be a direct negative effect on BMGR visual resources if such proposals were approved for development. Visual impacts, similar to those described for the Yuma ASH, could occur with each new corridor, and there could be resultant additive effects to visual resources. There would also not necessarily be the same restrictions as currently imposed for development of utilities in the State Route 85 corridor.

Alternative Management Strategy D would restrict all future utility/transportation corridor development to existing corridors, i.e., the State Route 85 corridor under current conditions. This action alternative would prohibit construction of the Yuma ASH within BMGR—West. As such, Management Strategy D would have a direct beneficial effect on visual resources within BMGR—West as compared to the proposed action by preventing this manmade addition to the visual landscape.

Management Strategy D would not affect the proposed Gila Bend to Ajo 230 kV Transmission Line Project because it is within an existing utility/transportation corridor.

### **5.17.10.3 No-Action Alternative (Strategy A)**

The no-action alternative for utility/transportation corridors (Strategy A) would not represent a change from existing conditions. Thus, the Yuma ASH could be constructed as planned and the potential would remain for the development of additional utility/transportation corridors through the BMGR. Any such proposed corridor, however, would have to be compatible with the military mission of the range and the protection and conservation of natural cultural resources as specified in the proposed INRMP. There are few, if any, locations within the BMGR where the level of necessary compatibility would appear to be achievable. Aboveground transmission lines and underground utilities within the State Route 85 corridor would continue to be restricted to specific parameters. New utility/transportation corridors would create new visual intrusions within the BMGR landscape, but the proposals for these corridors, including potential visual effects, would have to be fully renewed under the NEPA and other applicable environmental regulations.

## **5.17.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

### **5.17.11.1 Proposed Action (Strategy C)**

Strategy C introduces a number of new programs including conducting surveys and monitoring for invasive species, developing strategies to eradicate or control the spread of invasive species, restoring damaged habitats where a prior land use has been discontinued, protecting sensitive habitat areas, implementing up to six high-priority wildlife water developments, and conducting studies and reviewing the available scientific data to better understand the effects of wildlife water developments. Some of proposals would create both beneficial and negative direct visual resource impacts.

Restoring damaged habitat would directly benefit visual resources in localized areas, particularly if the efforts reestablish visually defining characteristics of color, form, line, and texture to a more natural condition. Also having a direct beneficial effect on visual resources would be the proposed activities to control the spread of invasive, non-native vegetation species. If not controlled, these species could potentially adversely alter the composition of native Sonoran Desert viewsheds.

The potential visual effects of new wildlife waters are difficult to assess. Some recently installed waters in the Gila Mountains blend effectively into the background landscape and they cannot be observed except in close proximity. Other existing waters involved the construction of

catchment/collection devices or aboveground water storage tanks that are visually intrusive within these localized affected areas. A common visual problem at water development sites has been the creation of access roads during the construction of the site. Roads tend to become visual scars because they often contrast with the surrounding landscape, particularly with respect to roads leading to high-elevations where soils and/or vegetation of the surrounding lands dramatically contrast in terms of line, color, form, and/or texture. Environmental planning under the NEPA will be required before the approval to proceed with the development of any of the six proposed new wildlife waters. Depending on the location and mode of construction, the proposed new waters may or may not be an adverse visual impact. Even if all six waters would have adverse impacts on the visual environment, the overall effects on visual resources of the BMGR would be minimal. The visual quality of these proposals would be determined through the NEPA documentation. Additional waters would potentially be approved following the study and research called for during the first five years of the INRMP.

#### **5.17.11.2 Alternative Actions (Strategy B and Strategy D)**

Application of Management Strategy B for this resource element would include most of the new studies and programs that would be established with the proposed action. Strategy B would allow for the additional wildlife water developments including and beyond those identified in the Lechuguilla-Mohawk and Draft Barry M. Goldwater East HMPs (up to 17 new water developments and the repair, redesign, or redevelopment of 16 existing water developments). Although more waters would be authorized than the six authorized under the proposed action, it is unlikely that more water development projects would be implemented under this strategy during the first five years. Therefore, the foreseeable potential effects to visual resources related to wildlife water developments would be the same as noted with the proposed action, at least for the first five years of the INRMP. If the study and research called for under the proposed action results in the implementation of fewer wildlife water development projects than this strategy, Strategy B would have a greater potential for adverse effect on visual resources than the proposed action. However, Strategy B provisions to restore some damaged areas and to eradicate and/or control the spread of invasive species would be beneficial to visual resources in the same manner as the proposed action.

Strategy D includes the same programs as identified for the proposed action that would be beneficial to visual resources and the effects would be the same. This strategy differs from the proposed action in that all wildlife water developments would be suspended for the first five years of the INRMP; the results of literature review and other studies would be used to determine beneficial and adverse effects of developed waters. A determination would then be made on whether to continue suspension of wildlife water development, remove existing waters, or add new developments. The temporary suspension of water developments would be favorable to visual resources in the short term compared to the other management strategies. The long-term effects on visual resources would depend on the study findings and the decision made with

regard to development or removal of water developments and the methods used to implement the decision.

### **5.17.11.3 No-Action Alternative (Strategy A)**

Under the no-action alternative for this resource management element, the Draft BMGR—East HMP would be finalized and implemented. As described for Strategy B, this could include developing up to 17 new wildlife waters under the Lechuguilla-Mohawk and BMGR—East HMPs and, if necessary, associated access roads. Because it is unlikely that more than six developments would be implemented during the first five years of the INRMP, foreseeable effects to visual resources (during the first five years of the INRMP) would be similar to those of the proposed action. Depending on the location and mode of construction, the proposed new waters may or may not be an adverse visual impact in localized areas and, overall, any adverse impact would be minimal on a range-wide basis. Compared to the other strategies, the no-action alternative would not include restoration of damaged former use areas nor methods to control or eradicate invasive species. Consequently, this alternative would result in the most evidence of manmade modification and physical disturbance and be the least favorable with regard to visual resources.

### **5.17.12 Special Status Species**

Regardless of the management strategy selected, none of the objectives for special status species are expected to affect visual resources. Some of the compliance requirements to protect and conserve special status species, such as habitat improvement projects, could potentially have beneficial or adverse effects depending on the types of environmental changes that might be required. Those that restore views to a more natural setting would be beneficial while those that introduce manmade developments could be adverse. However, such projects and their associated effects are the result of other compliance requirements that are relatively independent of the proposed INRMP (e.g., biological opinions, recovery plans, etc.). Compliance with the law is required and is not an option based on the management strategies addressed in this EIS.

### **5.17.13 Soil and Water Resources**

#### **5.17.13.1 Proposed Action (Strategy D)**

Range-wide implementation of Alternative Management Strategy D for soil and water resources would include taking measures to minimize soil erosion, restricting vehicular and construction activities when soils are susceptible to a heightened risk of erosion, and restoring areas where vehicle use has caused excessive surface damage. To some degree, each of these objectives

would have a direct beneficial effect, albeit minor, on visual resources. Preventing soil erosion would maintain the visual integrity of the landscape, including the preservation of the native vegetation that relies, in part, on soil stability. Restoring damaged areas would re-establish the natural setting, which would improve views.

#### **5.17.13.2 Alternative Actions (Strategy B and Strategy C)**

Range-wide implementation of Management Strategy B or C for soil and water resources would result in less emphasis on soil erosion prevention practices than Management Strategy D, but would still result in direct minor beneficial effects on visual resources, as these alternatives still provide for soil erosion prevention measures.

#### **5.17.13.3 No-Action Alternative (Strategy A)**

Under the no-action alternative for this resource management element, soil and water resource programs would continue to be managed under the existing objectives. Actions identified in the Goldwater Amendment include taking measures to minimize soil disturbances, particularly in areas that have not historically been disturbed and generally restricting the operation of motorized vehicles and heavy equipment to established roads and previously impacted areas. Such actions would help to maintain visual integrity. Compared to Strategy D, which includes actions to restore past damage, the no-action alternative would have fewer minor beneficial effects on visual resources.

### **5.17.14 Air Resources**

#### **5.17.14.1 Proposed Action (Strategy A)**

Range-wide implementation of Management Strategy A would continue the existing fugitive dust control practiced at construction sites and authorize these measures for use at recreation activity areas. Strategy A would also support developing Best Management Practices for activities generating non-point source air pollution. Because the proposed action is to continue the existing strategies (that is, the same as the no-action alternative), no change in air quality would be expected. The objectives defining Strategy A would be expected to retain the overall good quality of the air within the BMGR, which would contribute positively to the visual environment to a minor degree.

#### **5.17.14.2 Alternative Actions (Strategy B, Strategy C, and Strategy D)**

No special management objectives are proposed with Management Strategy B as the existing condition is in compliance with current regulations and standards. By not requiring the control of fugitive dust or the use of Best Management Practices, air quality could degrade, which could have a negative effect on visual resources if the air quality deteriorates and detracts from mountain vistas and scenic viewpoints, but any great level of effect is regarded as unlikely.

Management Strategies C and D would result in the use of dust palliatives to control excessive fugitive dust on heavily traveled roads and at construction sites. Management Strategy D would also include monitoring air quality trends so areas of deteriorated air quality could be avoided when new activities are proposed. These proactive objectives would benefit visual resources by helping to control dust, which would help to retain visibility of background views. However, because the air quality in the BMGR region is generally considered to be good and fugitive dust is typically a temporary condition, the effects with Strategies C and D would not be measurably different from the proposed action.

#### **5.17.14.3 No-Action Alternative (Strategy A)**

The no-action alternative (Management Strategy A) has been identified as the proposed action and would therefore have the same effects on visual resources.

### **5.17.15 Visual Resources**

#### **5.17.15.1 Proposed Action (Strategy B)**

Range-wide application of Management Strategy B for visual resources would continue the current practice of protecting mountain vistas; lessening, preventing, or mitigating degradation of visual resources; and using previously disturbed lands for new activities when possible. In addition, Strategy B would require new actions be evaluated for their effects on visual resources so that appropriate management or mitigation actions could be applied. The assessment of new actions would be beneficial to visual resources at low to moderate levels in localized areas by helping to retain visual integrity.

#### **5.17.15.2 Alternative Actions (Strategy C and Strategy D)**

The range-wide application of Management Strategy C or Management Strategy D for visual resources would increase the number of visual resource-related objectives as compared to the proposed action, including adopting the interim VRM classifications and, with Strategy D,

restoring visual resource impacts within unroaded areas. Adopting and applying VRM classifications would provide a more consistent analysis basis for the assessment of the visual effects from new activities. Restoring visual impacts would have a favorable direct visual resource effect by re-establishing a more natural setting. As compared to the proposed action, these strategies could be more beneficial to visual resources at low to moderate levels in localized areas.

### **5.17.15.3 No-Action Alternative (Strategy A)**

While the no-action alternative does not include a formalized assessment of the visual effects from new activities, the current objectives still provide for protection of visual resources. Effects would be similar to those described for the proposed action, although there would be less assurance of the application of mitigation measures for new activities that affect visual resources.

## **5.17.16 Wildfire Management**

### **5.17.16.1 Proposed Action (Strategy B)**

Management Strategy B for wildfire management could potentially have beneficial indirect effects of varying degree on visual resources if the proposed fire management plan (not existing under current conditions) prevents or suppresses the extent of wildfires that otherwise would have visually marred the scenic quality of affected areas.

### **5.17.16.2 Alternative Actions (Strategy C and Strategy D)**

Management Strategies C and D for wildfire management (the alternative actions) are identical to the proposed action and would have the same visual resource effects.

### **5.17.16.3 No-Action Alternative (Strategy A)**

Wildfire management suppression would continue with the no-action alternative for this resource element. Although no additional wildfire prevention objectives are proposed with this alternative, continuance of wildfire suppression would have a beneficial indirect impact of varying degree on BMGR visual resources.

### **5.17.17 Perimeter Land Use, Encroachment, and Regional Planning**

Regardless of which action alternative is selected for this resource management element, no affect on the visual landscape of the BMGR is likely.

### **5.17.18 Aggregate Effects on Visual Resources**

#### **5.17.18.1 Proposed Action**

Selection and implementation of the proposed action would be unlikely to have measurable adverse effects on the existing visual resources of the BMGR and would provide resource management direction that would help to conserve and protect the visual qualities of the range. Two major types of aggregate effects from the proposed action were identified: (1) changes to the visual setting and viewer expectations and (2) changes in resource management policy that would have a secondary visual resource effect.

Road closures in combination with provisions for recreation use and supervision (e.g., user education, installation of signs, enforcement provisions, discouragement of larger group sizes, etc.) would have the greatest singular impact on the visual setting and viewer expectations. The proposed action would change viewsheds principally by eliminating roads from the landscape, allowing and/or promoting natural restoration of these areas, and creating larger blocks of unroaded areas. In doing so, it would also eliminate some viewpoints that are currently accessible by vehicle. In general, the change in the visual setting would be from a more semi-primitive setting, where roads and associated modifications are more obvious, towards a more primitive condition, where there are larger areas that are unmodified.

The proposed development of up to six new wildlife waters and the potential establishment of designated camping areas and/or recreational shooting areas could visually affect some local areas potentially moving them towards a semi-primitive type of visual resource setting. The level and type of localized impact would depend on the type of facilities constructed and how they would alter or contribute to the visual environment in terms of form, color, line, and texture. In general, the modifications would probably detract from the natural conditions, but the impact would also likely be balanced in that viewer expectations would equate with the given use. Further evaluation of these issues would presumably be included in the environmental impact studies called for under the proposed action.

Lastly, allowing the establishment of the Yuma ASH transportation/utility corridor would create a new modification within and public view of the westernmost portion of BMGR—West in an area that is currently closed to public access.

Changes in resource management policy that would have a secondary visual resource effect include provisions for resource monitoring, solid waste disposal, vegetation and wildlife habitat restoration, invasive species control, use of downed and dead wood, erosion management, best management practices to reduce particulates, and wildfire management. These effects are expected to primarily benefit natural resources by reestablishing visually defining characteristics of color, form, line, and texture to a more natural condition. Special natural/interest areas would be managed in a manner that is protective of scenic quality. Although SRMAs would be allowed to expire, other special/natural interest areas could be established to recognize areas of high scenic quality in need of protection. The proposed visual resource management objectives for the BMGR not only provide for the current protection of mountain vistas and prevention of visual resources degradation, but also propose to assess the visual effects of new actions. Generally, these resource management policies continue the theme of visual setting and viewer expectation shifting toward a more primitive setting. These effects, individually and in aggregate, would be minor.

#### **5.17.18.2 Alternative Actions**

##### Management Strategy B

With the range-wide application of Management Strategy B, the aggregate visual resource impacts would differ from the proposed action in that manmade modifications would potentially be more evident. Although most ongoing natural and cultural resource management practices would be continued, resource protection and conservation measures would more generally be limited to those necessary to achieve basic regulatory compliance. Application of this management strategy would allow public access and use opportunities to increase, compatible with sustaining a healthy natural environment. Adverse visual resource impacts would not be expected to be measurably different from the existing conditions on a range-wide basis, but they would be expected to be greater than those associated with the proposed action in localized areas. As with the proposed action, the two major types of aggregate effects that were identified include: (1) changes to the visual setting and viewer expectations and (2) changes in resource management policy that would have a secondary visual resource effect.

This strategy would not consider the creation of either designated camping and recreational shooting areas or provisions for recreational supervision and use. Over the term of the INRMP, Strategy B would allow for future development of a higher number of wildlife waters than authorized by the proposed action (or Management Strategy D) during the first five years of the INRMP as well as consideration for new wildlife water developments beyond the numbers that are proposed in the existing habitat management plans. As opposed to the proposed action, which would implement road closures and would promote a change in the character or setting from a more semi-primitive setting to a more primitive condition, Management Strategy B would allow

for the creation of new roads, thus contributing to a visual resource setting where manmade changes are more predominant than under both the current conditions and the proposed action.

As with the proposed action, development of the Yuma ASH would create a new modification within and public view of the westernmost portion of the BMGR—West in an area that is currently closed to public access. Additional utility/transportation corridor projects that may be approved in the future with Strategy B could have visual effects similar to those of the Yuma ASH.

Changes in resource management policy that would have a secondary visual resource effect include provisions for resource monitoring, solid waste disposal, vegetation and wildlife habitat restoration, invasive species control, use of downed and dead wood, erosion management, wildfire management, and coordinating land use efforts with adjoining communities. Unlike the proposed action, best management practices to reduce particulates would not be implemented and may therefore create adverse visual resource conditions in the future. The SRMAs have expired; however, establishment of other special/natural interest areas would not be evaluated in order to recognize areas of high scenic quality in need of protection. Nonetheless, visual resource management objectives for the BMGR would not only provide for the current protection of mountain vistas and prevention of visual resources degradation, but would also assess the visual effects of new actions under this strategy.

These effects, individually and in aggregate, would be minor. However, as compared to the proposed action, this strategy would have greater potential for adverse effects to visual resources than the proposed action.

### Management Strategy C

There would be very little difference between the visual resource aggregate effects described for the proposed action and those that would result with the range-wide application of Management Strategy C. Resource management categories that would experience somewhat less of a degree of resource protection include resource monitoring, erosion management, and public education. Within Unit 1, the consumption of dead and downed wood would be regulated to a slightly lesser degree with Strategy C than with the proposed action. These aggregate differences between the proposed action and Strategy C would not result in measurable differences in potential effects to visual resources.

### Management Strategy D

As compared to the proposed action, the range-wide application of Management Strategy D would result in more objectives for the visual resources management element. With these

Strategy D management objectives, there would be a greater potential for visual resource protection as compared to the proposed action.

Because this management strategy maximizes resource protection and conservation management practices at the expense of some public access and use opportunities, it would eliminate vehicle access to some additional viewpoints in scenic areas across the range. However, road closures would allow for the re-vegetation of roads, eventually having an overall positive effect on visual resources. Visual resource impacts associated with the development of wildlife waters would be suspended, at least for five years, a potential short-term benefit to visual resources. All future utility/transportation corridor developments would be restricted to existing corridors, precluding the planned construction of the Yuma ASH on the western edge of the range, a direct beneficial effect on visual resources within BMGR—West and a potential long-term benefit to BMGR visual resources. Any additional transportation/utility corridor modifications to the visual landscape would be precluded and development of the State Route 85 corridor would continue to be restricted according to existing terms.

Viewer expectations and visual setting would ultimately change with regard to camping on the BMGR if designated camping sites were established. Visual foreground evidence of human intrusions often becomes more evident when campers are restricted to designated sites. The trade-off is visual impacts from camping in dispersed areas would diminish.

In aggregate, the management practices proposed under Management Strategy D would have a favorable effect on the protection of the existing scenic quality of the range to a minor degree greater than the proposed action.

### **5.17.18.3 No-Action Alternative**

The visual resource impact of the range-wide application of Management Strategy A for each of the resource management elements would differ from the proposed action in that there would be fewer studies, evaluations, and assessments than called for with the proposed action. Existing visual resource management would continue under the Goldwater Amendment, although the visual management objectives in the Goldwater Amendments were never funded. Although site-specific projects on the BMGR would be assessed for visual resource impacts through the associated NEPA process, additional assessments or inventories beyond regulatory compliance would not be planned. Visual resource related special management provisions prescribed in the Goldwater Amendment for the Crater Range SRMA and El Camino del Diablo Backcountry Byway may be deemed applicable. However, because DoD does not have the same mandate for visual resource management as the BLM, visual resource management would probably be a low priority and not necessarily adhere to BLM visual resource management guidelines.

## **5.18 HAZARDOUS MATERIALS AND WASTE**

### **5.18.1 Resource Inventory and Monitoring**

#### **5.18.1.1 Proposed Action (Strategy D)**

The proposed strategy for resource inventory and monitoring (Strategy D range-wide) would be of potential benefit to better identify when hazardous materials and wastes are potentially affecting BMGR resources. For example, the concern that wildcat dumping is becoming more prevalent—both along Interstate 8 and State Route 85, as well as along the southern border of the BMGR—could be addressed through the collection of data to better understand the extent of the problem and use the findings to develop an appropriate adaptive management response.

#### **5.18.1.2 Alternative Actions (Strategy B and Strategy C)**

The effects of the resource inventory and management objectives of Strategy C on hazardous materials and waste would not differ from the effects of the proposed action. Inventory and monitoring under Strategy B, however, would not be as beneficial as the proposed action as it would be largely limited to monitoring the effect of compliance actions. Because threshold values for hazardous materials and waste must be exceeded prior to requiring compliance, there would be minimal, if any, monitoring for hazardous materials and waste that would occur under Strategy B that would exceed existing compliance programs.

#### **5.18.1.3 No-Action Alternative (Strategy A)**

The no-action alternative for this resource category (Strategy A) would not provide the potential benefits for identification of hazardous materials and waste of the proposed action. No inventory or monitoring involving hazardous materials and waste is established or planned under the Goldwater Amendment RMP or the two HMPs for the BMGR.

### **5.18.2 Special Natural/Interest Areas**

The proposed action, alternative, and no-action management strategies for special natural/interest areas would have no effect on hazardous materials and waste.

### **5.18.3 Motorized Access and Unroaded Area Management**

#### **5.18.3.1 Proposed Action (Strategy C)**

Because motorized vehicles have the potential to release petroleum, oil, and lubricants and persons traveling on the roads may not dispose of litter appropriately, any motorized access within the BMGR has the potential to result in the release of hazardous materials and waste. Because the proposed action would result in the closure of approximately 658 miles of road, any incidental or accidental releases of these materials would be more limited in where they would occur than the existing condition. The quantity of hazardous materials and waste from use of roads would not be expected to change, but the distribution would potentially be altered to correspond with the road network that would remain following the implementation of the proposed road closures.

#### **5.18.3.2 Alternative Actions (Strategy B and Strategy D)**

The effects of any of the alternatives for motorized access and unroaded area management would be the same as described for the proposed action commensurate with the alternative road networks that would be implemented. If Strategy B were implemented range-wide, the potential area of contamination from an incidental waste release could increase by the potential addition of 7 miles of road (i.e., Cabeza Prieta NWR bypass roads) beyond the existing road network. If Strategy D were implemented range-wide, the area potentially exposed to the risk of a waste release would be minimized the most through the closure of approximately 765 miles of road.

#### **5.18.3.3 No-Action Alternative (Strategy A)**

With the implementation of the no-action alternative, the road network would remain unchanged until such time as a transportation plan were developed and implemented. There would be no effect on the potential distribution of hazardous materials and waste in the short term, but the same effect described for the proposed action would likely occur in the long term.

### **5.18.4 Camping and Visitor Stay Limits**

#### **5.18.4.1 Proposed Action (Strategy C)**

There would be two predicted effects on hazardous materials and waste from implementing the proposed management objectives for camping and visitor stay limits (Strategy C range-wide). The first would be the proposed definition and prescription of reasonable rules for the disposal of

human sewage and solid waste in accordance with applicable federal, state, and local regulations. Currently, the general rules of conduct for BMGR visitors, as provided in the permit application states that all garbage must be packed out, individual human waste should be buried well below the soil surface and at least 200 feet from water sources and camp areas, and discharge of portable toilets or holding tanks is prohibited. Revisiting these rules and regulations and defining and prescribing new rules in a manner that they can be enforced to the maximum extent would be beneficial. This is especially true for wildcat dumping (i.e., typically, the illegal disposal of large amounts of waste generated in urban environments), which has become increasingly problematic in the BMGR region.

The second is continuing the policy of limiting vehicle-based camping stays to 14 days within a 28-day period without a special use permit. This would be expected to continue to act as a deterrent to long-term camping use on the BMGR. This is beneficial in that waste accumulation and disposal becomes more problematic in long-term camping than it is for short-term camping.

#### **5.18.4.2 Alternative Actions (Strategy B and Strategy D)**

The effects with Strategy B would be the same as described for the proposed action. The only difference between the proposed action and Strategy D in this resource category is the limits on consecutive days of vehicle-based camping stays within a 28-day period without a special use permit. With Strategy C, the limitation is 14 consecutive days, whereas with Strategy D it is 7 consecutive days. While the benefit of limitations on long-term camping stays on hazardous materials and waste is noted for the proposed action, there is no discernible difference in consequences to hazardous materials and waste if the limitation is 7 days rather than 14 days.

#### **5.18.4.3 No-Action Alternative (Strategy A)**

The no-action alternative does not include the proposed prescription of rules for human sewage/solid waste disposal, and visitor stay limits would remain the same (as proposed). Thus, other than the potential effects related to the establishment of designated camping areas discussed for the proposed action, there would be little difference between the level of effect of the no-action alternative and the proposed action for camping and visitor stay limits on hazardous materials and waste.

## **5.18.5 Recreation Services and Use Supervision**

### **5.18.5.1 Proposed Action (Strategy C in Unit 2 and Strategy D in All Other Units)**

The proposed action for recreation services and use supervision would have several potential indirect effects on hazardous materials and waste. Although Strategy C would be applied in Unit 2 and Strategy D would be applied elsewhere, these two strategies differ only in regard to when the number of vehicles in a single party would trigger the requirement for a special use permit (20 or more vehicles under Strategy C and 10 or more vehicles under Strategy D) and the minimum number of law enforcement officers (which is irrelevant because this is range-wide objective). Both strategies would continue to require compliance with general vehicle operating rules, which prohibit the operation of vehicles in a manner that is reckless, careless, negligent, or likely to cause damage to natural or cultural resources. Thus, in the event that a vehicle leaks fuel, oil, or hydraulic or radiator fluid, the owner would continue to be responsible for the proper containment of the spill and remediation of the resulting contamination. Similarly, if a tire is damaged and changed, it must be removed from the BMGR and properly disposed of. This policy, in combination with the continuation of a permit policy, the increased public education and recreation use information programs, and the minimum number of law enforcement officers that are proposed with both strategies, would minimize the potential for environmental contamination from such occurrences.

Requiring a special use permit for larger sized groups could discourage large parties from recreating on the range, although there are no data to confirm this assumption. Although larger parties would be expected to generate larger quantities of waste, they would not necessarily be more or less likely to inappropriately dispose of that waste. In areas where large parties remain for extended periods, however, the effects from disposal of human sewage and wastewater from cooking and washing can become more problematic, even if it is done properly (this is further addressed in the management objectives for camping and visitor stay limits). In addition, the proposed assessment of the need for and effects of additional gates and fencing to control entry and use could reduce any existing problems or potential future problems with wildcat dumping on the BMGR.

### **5.18.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

As noted in the effects of the proposed action, the main difference between Strategy C and Strategy D is the number of vehicles in a single party that would require a special use permit so if either of these strategies were applied, regardless of the management unit, the effects would be essentially the same.

Compared to the proposed action, pertinent differences with Strategy B are that this strategy would require a special use permit for a single party with 30 or more vehicles, retain a permit system and public education and recreation use information programs (but implement measures to make the permits easier to obtain), and retain a minimum of two full-time law enforcement positions dedicated to the BMGR. Although there are no data regarding the issue, problems that are currently occurring or could potentially occur in the future with improper waste disposal on the BMGR would more likely be worse under this management strategy than the proposed action, particularly in that there would be no additional recreation information programs and there could be reduced law enforcement.

### **5.18.5.3 No-Action Alternative (Strategy A)**

The no-action alternative for this resource management element would be the least beneficial of the strategies considered in terms of potential hazardous materials and waste consequences. This is because existing recreation user information programs would remain unchanged, a special use permit would not be required for a single party until it involves 50 or more vehicles, and because there is no minimum number of law enforcement positions required.

### **5.18.6 Rockhounding**

There would be no effect on hazardous materials and waste from the proposed action, alternative actions, or no-action alternatives for rockhounding. Rockhounding would continue to be limited to surface collection by hand only; the use of chemicals (i.e., for the extraction of ore deposits) would continue to be prohibited.

### **5.18.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

There are no effects for hazardous materials and waste relative to the proposed, alternative, or no-action management objectives for wood cutting, gathering, and firewood use, and the collection of native plants.

### **5.18.8 Hunting**

The management objectives for hunting would have no effect regardless of whether the proposed action, an alternative action, or the no-action alternative were selected and implemented for this resource management element.

## **5.18.9 Recreational Shooting**

### **5.18.9.1 Proposed Action (Strategy C)**

Under the proposed action, recreational shooting would be allowed to occur under existing regulations as long as it is compatible with military use, public safety, and no significant resource issues are identified. There would be an assessment of the importance and character of recreational shooting to determine the appropriateness of this activity on the BMGR and, based on the findings, a decision would be made and implemented. The designation of specific shooting area(s) would be considered. Automatic weapons would be prohibited, unless authorized by special use permit. These actions would have beneficial effects in regard to hazardous materials and waste in that actions could be taken to assess the effects of this activity and provide the needed information on which to base appropriate management actions, if necessary.

Waste associated with recreational shooting is typically in the form of expended lead bullets, shell casings, target remains, and other waste residue. The primary concern is the accumulation of lead at levels that could be harmful to wildlife or humans. The EPA has taken the position that RCRA regulatory jurisdiction does not apply to products that are deposited onto the land in their ordinary manner, including the discharge of ammunition in the intended use of the product. Thus, this waste does not meet the regulatory definition of solid waste under RCRA. Nonetheless, there are other compliance requirements that apply with regard to potential for lead contamination, including the statutory definition of solid waste in RCRA when the debris constitutes an imminent and substantial endangerment to health and the environment, Clean Water Act, and CERCLA (U.S. Court of Appeals for the Second Circuit 1993).

Lead contamination from recreational shooting has risen to the level of concern at shooting ranges where lead is concentrated from frequent use over long periods of time. These concerns are not associated with the dispersed recreational shooting that currently occurs at the BMGR. No data are available to indicate where and how often this activity occurs on the BMGR and where accumulation of waste may be problematic, but there are no known popular shooting areas within the BMGR where recreational shooting has occurred at a level equivalent to a defacto range. Potential lead accumulation would be a potential concern should a designated shooting area be established within the BMGR, particularly if the use of automatic weapons, which fire prodigious volumes of ammunition, were approved at this site. The proposed assessment of recreational shooting, while not focusing on lead contamination, would provide some additional information in understanding the character of recreational shooting on the BMGR.

### **5.18.9.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would allow recreational shooting to continue under existing regulations as long as it is compatible with military use, public safety, and no significant resource issues are identified. The assessment called for in the proposed action would not be conducted and range managers would not have the associated benefit of identifying impacts.

Strategy D would initially prohibit recreational shooting, and would include an assessment of the appropriateness of allowing the activity in designated areas. Hunting, which is considered a separate issue from recreational shooting, would not be affected by this prohibition. This strategy would provide the maximum amount of control over recreational shooting and the waste it generates. Although designated shooting areas (if determined appropriate) would concentrate the waste in one area, the waste could be managed according to best management practices to minimize the impact of lead on the environment.

### **5.18.9.3 No-Action Alternative (Strategy A)**

The no-action alternative would not provide the benefits for hazardous materials and waste management as described for the proposed action. The activity would be permitted to occur as it does presently and little information would be available about use patterns and concentrated use areas.

## **5.18.10 Utility/Transportation Corridors**

### **5.18.10.1 Proposed Action (Strategy C)**

Transportation corridors are associated with management concerns for hazardous materials and waste primarily because they may be used for the transport of these materials by rail or highway or, in the event of natural gas, by pipeline. There are a host of federal, state, and local regulatory requirements for the proper transport of hazardous materials and waste, pipeline distribution systems, and proper response in the event of an accidental release of such materials. Currently, such materials are transported on State Route 85, as it bisects the range, and on Interstate 8 and the Southern Pacific Railroad to the north of the range. Although the Tucson Cornelia and Gila Bend Railroad is currently inactive, it could be reactivated and used for such purpose. Under the proposed action (Strategy C), the State Route 85 and Tucson Cornelia and Gila Bend Railroad corridor would continue to be used and managed as it is currently and the Yuma ASH would likely be constructed as planned and, thereby, a new corridor would be introduced where hazardous materials and waste would potentially be transported. However, all future transportation/utility development would be restricted to existing corridors. There are currently

no gas pipelines within the BMGR, but one could be proposed for construction within existing transportation/utility corridors in the future.

There is also a management concern from the potential use of polychlorinated biphenyls in electrical transformers along electrical transmission lines. The potential hazard occurs when older transformer units that may contain this chemical compound are damaged and the chemical is released. Over the past few years, most units containing polychlorinated biphenyls have been upgraded with oil that does not contain this chemical. Similarly, newly manufactured units typically contain no polychlorinated biphenyls. The only electrical line within existing transportation/utilities corridor on the BMGR is the Arizona Public Service Company's Gila Bend to Ajo 69 kV transmission line paralleling State Route 85. The utility company is responsible for the proper management of polychlorinated biphenyls along this route.

Another related issue of transportation corridors is that roadside littering and wildcat dumping can become problematic along them. As noted in Section 4.18.1.2, illegal dumping of solid waste has been noted along both State Route 85 and Interstate 8. Similar problems could develop along the Yuma ASH.

#### **5.18.10.2 Alternative Actions (Strategy B and Strategy D)**

Strategy B would potentially allow the development of additional transportation/utility corridors, which, if developed, would have similar consequences on hazardous materials and waste as described for the proposed action. Given the constraints of the current military mission performed on the range, however, there appears to be little potential that utility/transportation corridors other than State Route 85/railroad/transmission line corridor or the proposed Yuma ASH would be compatible with military operations in the foreseeable future.

Strategy D would differ from the proposed action in that it would not allow for the construction of the Yuma ASH on the BMGR and would confine all future transportation/utility corridor development, and associated hazardous materials and waste consequences, to existing corridors.

#### **5.18.10.3 No-Action Alternative (Strategy A)**

The potential consequences of the no-action alternative for hazardous materials and waste would differ from the proposed action in the same manner as Strategy D.

### **5.18.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

The management objective to locally eradicate and/or control the spread of invasive species included in the proposed action (Strategy C) and alternative actions (Strategy B and Strategy D) could involve the judicious use of herbicidal chemicals. Hazardous materials and waste, if any, would be managed in accordance with integrated pest management techniques. The no-action alternative does not include this objective, but invasive species management or simple vegetative management could involve the continued use of herbicides in developed areas of the BMGR (i.e., Gila Bend AFAF, Cannon Air Defense Complex, State Route 85 corridor). These programs and potential consequences of the proposed action and alternatives is further detailed in Section 4.9, Existing Conditions for Grounds Maintenance and Section 5.9, Environmental Consequences for Grounds Maintenance.

### **5.18.12 Special Status Species**

There are no consequences for hazardous materials and waste predicted for the proposed action, alternative actions, or no-action alternatives for special status species.

### **5.18.13 Soil and Water Resources**

#### **5.18.13.1 Proposed Action (Strategy D)**

Some of the management objectives for soil and water resources under Management Strategy D may pertain to hazardous materials and waste. These include the objectives to take measures to minimize soil/water contamination from vehicle use or other activities and to restrict or modify activities as necessary to comply with statutory requirements for soil and water resources. The specific actions that may be taken to implement these objectives and their potential impacts on hazardous materials and waste use or management cannot be determined at this time.

#### **5.18.13.2 Alternative Actions (Strategy B and Strategy C)**

While Strategy C does not include as many management objectives as the proposed action, the additional objectives do not pertain to hazardous materials and waste; thus, there is no difference in consequences between this strategy and the proposed action.

Strategy B, however, does not include the objective to take measures to minimize soil/water contamination from vehicle use or other activities as the proposed action does and would

therefore potentially result in more soil and/or water contamination from hazardous material and waste (of an undeterminable amount) than the proposed action.

### **5.18.13.3 No-Action Alternative (Strategy A)**

The no-action alternative would not include the management objectives for soil and water resources called out in the proposed action or their potential impact. As the impacts of the proposed action cannot be accurately assessed at this time, so too, the comparative impact on hazardous materials and waste of implementing the no-action alternative rather than the proposed action for soil and water resources cannot be determined. Nevertheless, the potential identified effects from the management objectives for the proposed action would not occur with Strategy A.

### **5.18.14 Air Resources**

Under all alternatives, hazardous air pollutants would be managed in accordance with federal and state regulatory requirements. Strategies A, C, and D all include provisions for controlling fugitive dust, with Strategies C and D calling specifically for dust palliatives. If chemical dust palliatives were used to control fugitive dust, there could be potential hazardous materials and waste if the palliatives were handled or disposed of improperly. However, with proper use and storage of these chemicals, no hazardous material or waste effects would be anticipated.

### **5.18.15 Visual Resources**

None of the alternative management strategies for visual resources would affect the occurrence or management of hazardous materials and waste within the BMGR.

### **5.18.16 Wildfire Management**

Regardless of alternative, chemical retardants would potentially continue to be used in fire suppression to reduce the flammability of combustibles or in a wet line (a line of water, or water and chemical retardant, sprayed along the ground, that serves as a temporary control line from which to ignite or stop a low-intensity fire). Several types of chemicals, grouped into two categories (retardants and foams) are used to suppress wildfires. The retardants are combinations of several ingredients: water, fertilizer salts, thickeners that provide stability to the solution and make it cling to fuels (dry organic matter), corrosion inhibitors to minimize damage to equipment, viscosity stabilizers and bactericide to improve stability, and coloring agents. Foam

suppressants are similar to soap. They make water denser and help take oxygen out of the fire. They are applied directly to a fire to suppress flames or are used in areas already burned to cool and dampen hot surfaces (Shaw 2000). Research on the environmental effects of fire retardants shows they harm fish if they seep into waterways. Their effect on vegetation and terrestrial invertebrates appears to be minimal, but existing data are scarce (USGS 2000).

The proposed and alternative actions for this resource category are all the same and a benefit in terms of hazardous materials and waste in that the plan could set protocols for the use of retardants and foams to fight fires in accordance with the threat to human life, property, and natural and cultural resources. The no-action alternative, however, does not include the development of a range-wide fire management plan, although retardants and foams could still be used to suppress wildfires.

### **5.18.17 Perimeter Land Use, Encroachment, and Regional Planning**

The proposed action (Strategy D) and alternative actions in this resource category (Strategy B and Strategy C) include varying degrees of potential benefits for hazardous materials and waste management. All strategies include coordination with other land managers and owners in the region regarding actions outside the BMGR that could affect BMGR resources. Strategy C and Strategy D are both slightly more comprehensive in scope. One item, in particular, included in Strategy D (the proposed action) that would be of particular benefit for hazardous materials and waste is the objective to work with county agricultural extension agents to determine the extent and danger of pesticide drift into the BMGR and any associated soil or water quality issues.

### **5.18.18 Aggregate Effects on Hazardous Materials and Waste**

#### **5.18.18.1 Proposed Action**

Taken in aggregate, the effects of the proposed action in the 17 resource management elements could have additive impacts affecting the information base and management approach for hazardous materials and waste at the BMGR. The proposed management objectives for resource inventory and monitoring along with management objectives for camping and visitor stay limits; recreation services and use supervision; recreational shooting; vegetation (invasive species); wildfire; soil and water resources; and perimeter land use, encroachment, and regional planning could all impact the ways in which hazardous materials and waste are used and managed on the BMGR. An example of an aggregate impact would be the combined reduction in waste management use from long-term camping with large groups as visitor stays would continue to be limited to 14 days within a 28-day period and a special use permit that would be required for single parties with more than 10 vehicles (20 vehicles in Unit 2).

In addition, some management objectives could reduce the area potentially exposed to hazardous materials and waste by reducing the road network by approximately 658 miles (because littering and incidental chemical releases from vehicles would no longer accumulate along closed roads) and by possibly establishing designated areas for recreational shooting and camping. Although dispersed camping would still be permitted, hazardous materials and waste from some vehicle-based camping and from recreational shooting could become more concentrated in localized areas. Conversely, by allowing the Yuma ASH to be constructed as planned, there would be a new transportation route potentially used for hazardous materials and waste transport and an associated potential for accidental releases within the BMGR.

### **5.18.18.2 Alternative Actions**

#### Management Strategy B

The potential expansion of the road network by about 7 miles for the Cabeza Prieta NWR bypass roads could expose new areas to incidental releases of hazardous materials from vehicles and litter from motorized users. This strategy would also evaluate the need for additional roads so there is a potential for an even more expanded road network. New proposals for additional transportation/utility corridors would be evaluated on a case-by-case basis; if any new corridors were approved, there could be an increased potential risk of a release, particularly for a transportation corridor that would allow the transport of hazardous materials or waste.

Strategy B would allow for large groups (up to 30 vehicles without a special use permit) and for use in a larger area. The area in which vehicles would be allowed would be increased because vehicle-based campers would be allowed to pull their vehicles up to 100 feet off of existing roads and travel would be allowed in designated washes when dry. In addition, there would potentially be more recreational opportunities to attract larger numbers of range visitors by allowing recreational shooting, rockhounding, and wood collection for campfires throughout the range. To the extent that vehicles might release petroleum, oils, or lubricants or that travelers might dispose of trash or human waste inappropriately, the area and quantity of exposure could be increased. Because only two law enforcement officers would be ensured with Strategy B and because there would be a greater area to patrol, law enforcement efforts to prevent waste releases (including wildcat dumping) would be minimal.

#### Management Strategy C

There are limited differences in aggregate impacts between the proposed action and this management strategy. One difference is that a special use permit would not be required unless

there were more than 20 vehicles in a single party. To the extent that vehicles might release petroleum, oils, or lubricants or that travelers might dispose of trash or human waste inappropriately, the area and quantity of exposure could be greater than with the proposed action. Because only four law enforcement officers would be ensured with Strategy C (as opposed to six with the proposed action) and because there would be a greater area to patrol, law enforcement efforts to prevent waste releases (including wildcat dumping) would be reduced compared to the proposed action.

The proposed use of dust palliatives to control fugitive dust on heavily traveled roads could be a potential hazardous materials and waste management issue that would not be included in the proposed action.

### Management Strategy D

The application of Management Strategy D range-wide would have similar aggregate impacts as identified for the proposed action except it would be more likely to limit the risk of a release of hazardous materials or waste. There would be a greater reduction in the road network (approximately 765 miles of road would be closed, which is about 107 miles more than the proposed action).

Group size, length of stay, and recreational opportunities to attract range visitors would all be reduced compared to the proposed action and the existing condition. A special use permit would be required when there were more than 10 vehicles in a single party in Management Unit 2, the visitor stay limit would be 7 days rather than 14 days within a 28-day period, recreational shooting (if it were allowed at all) would only occur in designated areas, rockhounding would be prohibited, and there would be no new transportation/utility corridors (including the Yuma ASH). To the extent that vehicles might release petroleum, oils, or lubricants or that travelers might dispose of trash or human waste inappropriately, Strategy D would be the most effective of all the alternatives in limiting the extent of area potentially exposed to hazardous material or waste releases and also in the number of people on the range to cause such releases.

Like Strategy C, the proposed use of dust palliatives to control fugitive dust on heavily traveled roads could be a potential hazardous materials and waste management issue that would not be included in the proposed action.

#### **5.18.18.3 No-Action Alternative**

The aggregate impacts for this management strategy would differ from the proposed action in that there would not be any change in existing hazardous materials and waste practices. There

would be no change in the road network in the short-term and no localization of impacts from camping and recreational shooting activities to designated areas.

## **5.19 SOCIOECONOMICS**

### **5.19.1 Resource Monitoring**

#### **5.19.1.1 Proposed Action (Strategy D)**

The proposed action, which is to apply resource monitoring Management Strategy D range-wide, could potentially result in direct and indirect beneficial socioeconomic effects. Potential direct effects could include additional resource monitoring work and expenditures for DoD or contractor personnel. Potential indirect effects could result from an increase in the purchase of goods, services, and sundries in nearby communities during the course of additional monitoring visits. (For additional detail on these two effects, see Section 5.19.18). As indicated by public input during the INRMP planning process, resource monitoring as a continuing component of BMGR stewardship is generally consistent with the majority of social attitudes and values.

#### **5.19.1.2 Alternative Actions (Strategy B and Strategy C)**

With the alternative actions, the range-wide application of Management Strategy B or Management Strategy C, there would still be an increase in monitoring activity compared with the no-action alternative, and this would also have the potential for favorable direct and indirect socioeconomic effects similar to those described for the proposed action. However, these impacts would be less than those of the proposed action to a degree commensurate with the level of resource monitoring proposed in those strategies. Similarly, the alternative actions would be less supportive of the majority of social attitudes and values than the proposed action.

#### **5.19.1.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, resource monitoring activities would essentially be the same as those currently in effect or planned. Thus, associated socioeconomic impacts would not be expected to differ greatly from the existing conditions. By comparison, this alternative would potentially have less socioeconomic effects than that of the proposed or alternative actions.

### **5.19.2 Special Natural/Interest Areas**

There is no discernible direct socioeconomic impact from either the proposed action, alternative actions, or no-action alternative attributable to special natural/interest area management. The selection and range-wide application of Management Strategy C (proposed action), Strategy B or C (alternative actions), or Strategy A (no-action alternative) is not expected to correlate with the number of persons who visit the range or with the amount of DoD, contractor, or local employment or expenditures.

The only notable exception is with regard to the indirect impacts from an alternative action that implements Strategy B for special natural/interest areas, not as it relates to economics, but as it relates to social attitudes and values. During scoping and throughout the EIS and INRMP planning processes, the public has frequently expressed support for the continued protection of special designation areas, particularly ACECs (see Table 1-3). By allowing most of the subject areas to expire, Strategy B may result in negative impacts in that it would not be representative of these attitudes and values.

### **5.19.3 Motorized Access and Unroaded Area Management**

#### **5.19.3.1 Proposed Action (Strategy C)**

The proposed action would reduce the total miles of road within the BMGR from 2,222 miles to 1,564 miles through the selection of Alternative Management Strategy C range-wide. Discernible socioeconomic effects with this management strategy principally pertain to how the motorized recreational opportunities would be potentially affected. The proposed action would also reduce the number of miles of road available for public use by 36 percent, from 973 miles to 621 miles. With implementation of the proposed action, almost 72 percent of the road mileage available for public use is located in BMGR—West in the southeastern portion of Management Unit 1 and throughout Management Units 2 and 3. Almost 93 percent of the road mileage available for public use in BMGR—East is located in Management Unit 6. As discussed in Section 4.12.1.4, available recreation use data indicate that more visitation occurs in BMGR—West than in BMGR—East.

The majority of the roads that would be closed in the areas open to public use are redundant. Many of these redundant roads within Management Unit 2 are parts of dense networks in relatively small local areas located west of the Gila Mountains near the northern boundary of the BMGR, east of the Gila Mountains also near the northern boundary of the BMGR, north and east of the Wellton Hills, and along the eastern front of the Gila Mountains (see Figure 3-2). Another area with a redundant local road network is located in Management Unit 1 in the vicinity of the Tinajas Altas Mountains. The road closures in all of the management units would continue to

provide vehicle access to these areas for recreational purposes but would likely discourage activities in which driving a vehicle within a local area on recirculating roads becomes the recreational activity. Any potential reduced visitation would be limited to those who frequent the publicly accessible areas in order to utilize the entire road network, including redundant roads. The proposed action road closures should not adversely impact hunter access as one of the objectives that the Core Planning Team pursued in selecting the proposed action was ensuring vehicle access to those locations of the range that are open to public use and that are also of interest to hunters. The extent to which the proposed action road closures alone would reduce public visitation of all types to the BMGR, if at all, cannot be predicted based on available information.

Indirect economic impacts that could result from a decrease in range visitation would be some reduction in the purchasing of goods, services, and sundries in local communities such as Ajo, Gila Bend, Wellton, Tacna, Dateland, and Yuma. These potential effects are expected to be minimal as the tourism/recreation economies of these communities are much more closely correlated with recreation opportunities in areas surrounding the BMGR than they are with the BMGR (see Section 5.19.18, Aggregate Effects, for more information).

Because this strategy also allows future motorized public access to currently restricted locations if changes in military activities eliminate safety or security restrictions in those locations, there is also a parallel potential for increased visitation. Increased visitation would likely, at best, be minimal as changes in the safety and security restrictions would be expected to affect only small areas of the range, if any. An alternative that implements Management Strategy C in these units would have nearly the same to perhaps a slightly positive socioeconomic effect associated with purchases made in nearby communities.

Although government mission-essential roads would remain open with the proposed action, the net reduction in motorized access to some areas could result in increased cost and time for agencies to conduct certain agency activities (e.g. natural and cultural resource surveys) if the work area would need to be accessed by foot as a result of the road closures. Little information is available to further assess this effect, but economic impacts would be expected to be minimal.

As represented by scoping comments, the public attitudes and values with regard to roads and unroaded areas on the BMGR are conflicted, with generally equal representation of those who support and those who oppose the closing of roads. Many of those who expressed opposition to road closures correlate road closure with reduced access (see Table 1-3). While the proposed action strikes a balance between these differing attitudes to some extent, it generally favors those who value the closing of roads and preservation of unroaded areas, but preserves public access to most areas.

### **5.19.3.2 Alternative Actions (Strategy B and Strategy D)**

If Alternative Management Strategy B were applied range-wide, it would allow for the potential development of new roads for public access and/or future motorized public access to currently restricted areas if there is a change in military security restrictions. Therefore, there could be increased visitation to those units currently accessible to the public (Units 2, 3, 6, and part of Units 1 and 7) as compared with the proposed action. Assuming that there is a positive correlation between the number of roads and the amount of public visitation, such an alternative could result in positive indirect economic impacts (although minimal) from the increased purchasing of goods, services, and sundries in local communities. This strategy would also be favorable to those who value existing and potentially increased levels of motorized public access.

The application of Management Strategy D would reduce the publicly accessible road network by 419 miles, which is 67 miles, or 7 percent, more than the proposed action. The primary effect of the closure of these 67 miles would be reduced vehicle access to a number of locations on both the east and west sides of the Gila Mountains, locations in the vicinity of the Wellton Hills, several locations within the northern Tinajas Altas Pass area, and one small segment within the Ajo Radar Station area in BMGR—East that may be frequented by certain recreational users, such as hunters (see Figures 3-1 and 3-2). These reductions could result in a decrease in the number of people who visit the range for the purposes of fully utilizing or having the opportunity to fully utilize the current road network to visit selected sites. The socioeconomic impact would probably be similar to those assessed for the proposed action in publicly accessible units. However, based on the other opportunities for recreational access within this unit and elsewhere on the BMGR, no measurable decrease in use is expected. Furthermore, because there are other opportunities for recreational access in the state of Arizona (including the region surrounding the BMGR), a decrease in the amount of recreational activity in the region would be unlikely.

It is difficult to compare public attitudes associated with each alternative when there are opposing views in the values given to road closures and unroaded areas. Based on the comments received, it generally appears that the number of persons favoring roads closures is balanced with the number of persons opposing road closures. However, even those opposing road closures are mostly interested in retaining access and generally are not opposed to the elimination of redundant roads, which are the primary types of roads that would be eliminated through the selection of Alternative Management Strategy C (see Figure 3-2).

### **5.19.3.3 No-Action Alternative (Strategy A)**

With the no-action alternative, Management Strategy A, the development of a transportation management plan for the BMGR road network as currently planned, would be applied range-wide. Any associated road closures that would result from this alternative would likely be similar to those prescribed in Strategy C. As compared with the proposed action, this alternative would have too small of a potential for indirect economic impact from visitor use of the range to project a noticeable effect on employment or consumer activity. Similarly, this alternative is consistent with those who favor retaining access to most areas, but are not opposed to the elimination of redundant roads.

### **5.19.4 Camping and Visitor Stay Limits**

#### **5.19.4.1 Proposed Action (Strategy C)**

The proposed action, the range-wide application of Strategy C, would not result in any substantive change from the existing conditions in allowable camping locations or terms of stay, and would therefore not result in a noticeable socioeconomic effect within the study communities.

#### **5.19.4.2 Alternative Actions (Strategy B and Strategy D)**

An alternative action implementing Strategy D would restrict vehicle-based camping stays to 7 consecutive days, as opposed to 14 consecutive days with the other three alternatives. Long-term camping is not known to be popular on the BMGR and a seven-day stay limit would not be expected to affect many visitors. Those wanting to stay longer would still have the option to request a special use permit granting authority for that longer stay. No socioeconomic effects would be anticipated as a result of the camping stay limits of Strategy D.

As with the proposed action, an alternative action implementing Strategy B would not result in a change in camping stay limits. Although vehicle-based camping would be allowed within 100 feet of designated roads (rather than 50 feet) with this alternative, this change would presumably not result in a change in the number of campers or the products they purchase in nearby communities; therefore, no change in socioeconomics would occur.

#### **5.19.4.3 No-Action Alternative (Strategy A)**

Because the camping locations and terms of stay would remain unchanged with the no-action alternative, no changes in camping patterns would occur; therefore, no effect on socioeconomics would occur.

#### **5.19.5 Recreation Services and Use Supervision**

Regardless of which management strategy is applied to the range, the existing number of law enforcement/security positions for the BMGR (seven positions) exceeds the number that is proposed in each of the alternatives (see Section 4.14 for more information), although the security guards are not authorized to enforce the law but could detain persons while waiting for law enforcement officers to arrive. Management Strategy C (the proposed action) provides for a minimum of four full-time law enforcement positions to manage natural resource issues range-wide, while Management Strategy B and Management Strategy D (the alternative actions) provide for a minimum of two and four full-time law enforcement positions, respectively. All strategies are consistent with social values and attitudes expressed during scoping (see Table 1-3).

Plans to increase public education, assess the need for additional gates and fences, and develop recreation use records with the proposed action could result in some additional work and expenditures for DoD or contractor personnel. These actions would be expected to also occur with Alternative D, but not with Alternatives A or B, except to the extent that fences or signs are needed for safety or compliance reasons.

#### **5.19.6 Rockhounding**

Regardless of which alternative is selected, no associated socioeconomic effects related to rockhounding are anticipated. Per the MLWA of 1999, the BMGR "...shall not be open to any form of appropriation under the general land laws, including the mining laws and the mineral leasing and geothermal leasing laws, until the Secretary of the Interior publishes in the Federal Register an appropriate order stating the date upon which such lands shall be restored to the public domain and opened." As such, no commercial gain or loss would be felt if the proposed action were selected because the collected rocks are not intended for commercial sale. Therefore, no economic effects would be incurred by the study communities. Further, there is no clear social value or attitude with regard to rockhounding as both public support for and opposition to the practice was expressed during scoping (see Table 1-3).

### **5.19.7 Wood Cutting, Gathering, and Firewood Use, and Collection of Native Plants**

There are no socioeconomic impacts anticipated for wood cutting, wood gathering, and firewood use with any of the alternatives. Woodcutting or wood collection for commercial or domestic use is prohibited per the MLWA of 1999. Similarly, although the use of dead and downed wood for campfires would be allowed with all strategies except for Strategy D, removal of this wood from the range is prohibited. As such, woodcutting and gathering does not serve a profit-oriented purpose. Further, public attitudes or values both support and oppose cutting and gathering of native wood for fires (see Table 1-3).

A notable exception to this assessment of no effect regardless of the alternative is the impact that would occur with Alternative Management Strategy D within publicly accessible management units, in that recreational users would be required to supply their own wood rather than collect dead and downed wood for campfires. Recreational users would incur the costs and local suppliers could benefit from expenditures, which would both be expected to be minimal.

### **5.19.8 Hunting**

#### **5.19.8.1 Proposed Action (Strategy B)**

With the proposed action of implementing Management Strategy B for the entire range, the need for a special hunting permit program for the BMGR that requires payment of nominal fees to be used for the protection, conservation, and management of wildlife (including habitat improvement and related activities) would be assessed. If such a program were established as a result of this assessment, fewer hunters may visit the BMGR—at least in the short term—following the implementation of the fees. All three of the action alternatives call for a study to assess the need for a fee program. This study would potentially create additional work for DoD or contractor employees. The amount of the fee, if charged, would be determined as part of the assessment study. There are no data available for the BMGR that is indicative of whether this alternative would be consistent with public attitudes and values. However, such fee programs are common on other public lands. When they are initiated, the majority of the public often oppose them, but attitudes are more favorable when it is recognized that funds would be used to support wildlife management, as this is a valued resource.

Non-game species collection currently occurs within publicly accessible portions of the range on a small-scale and under AGFD permit. Commercial sale of these species or anything collected under an AGFD permit is prohibited. The study to evaluate the effects of this activity on wildlife, habitat, and other resources could create additional work for DoD or contractor personnel. There are no clear data available regarding public attitudes or values for this activity

on the BMGR. Thus, any socioeconomic impact resulting from these limitations or restrictions would be expected to be minimal.

### **5.19.8.2 Alternative Actions (Strategy C and Strategy D)**

Alternative Management Strategy C would be identical to the proposed action and would likewise have the same impact on socioeconomic resources as described in Section 5.19.8.1.

If an alternative action that implements Strategy D were selected, a petition would be submitted to the Arizona Game and Fish Commission to close the BMGR to the collection of non-game species without first evaluating the effects of this activity on wildlife, wildlife habitat, and other resources. Unlike the other alternatives, additional work associated with the evaluation would not be created.

### **5.19.8.3 No-Action Alternative (Strategy A)**

Implementation of the no-action alternative would follow Strategy A for hunting, which is to continue existing game management programs. Therefore, this alternative would not have an effect on the current socioeconomic conditions of the study communities.

## **5.19.9 Recreational Shooting**

### **5.19.9.1 Proposed Action (Strategy C)**

The proposed action, implementing Strategy C range-wide, may result in additional work for DoD or contractor personnel and/or expenditures for the proposed evaluation/study assessing the importance and appropriateness of recreational shooting as an activity on the BMGR (see Section 5.19.18, Aggregate Effects, for more information). The study to evaluate the importance and character of recreational shooting as an activity/issue and to determine the appropriateness of this activity on the BMGR could eventually change current recreational shooting opportunities and result in a potential increase or decrease in BMGR visitation for this activity. This, in turn, could potentially cause an increase or decrease in the gun and ammunition sales in the socioeconomic study area communities. These effects would likely be small, however, because available BMGR visitor use data indicate that recreational shooting comprises a relatively small amount of overall BMGR recreation. Although comments have been received for and against recreational shooting on the BMGR, there have been few persons commenting on the subject. The study called for in the proposed action would presumably provide better information about

and assess public attitudes and values for this activity and, thus, be more responsive to the full range of public opinion and prevailing attitudes and values.

The Air Force has found that recreational shooting involving the use of automatic weapons is incompatible with their aviation training mission in BMGR—East. The Marine Corps had similar mission compatibility concerns regarding previous feature rallies within BMGR—West involving the use of automatic weapons, but is willing to consider sanctioning this activity under special use permit. The Marine Corps would require the results of a careful safety and environmental impact assessment, however, on a proposal for automatic weapons shoots within BMGR—West before deciding on a special use permit application for this activity. A dedicated study on the recreational use of automatic weapons could result in additional work for DoD or contractor personnel.

#### **5.19.9.2 Alternative Actions (Strategy B and Strategy D)**

An alternative that implements Strategy B would allow for recreational shooting on the range as long as it is compatible with military use, public safety, and (unlike Strategy A), no significant resource issues are identified. Although additional studies may occur in the event that a significant resource issue arises, it is unlikely that additional work or expenditures would be created.

An alternative that implements Strategy D, on the other hand, would prohibit all recreational shooting activities on the range in the short term. An assessment to determine the appropriateness of allowing the activity in designated areas would be conducted to determine if recreational shooting should be allowed in designated areas. Like the proposed action, implementation of an alternative that implements Strategy D could potentially cause a decrease in the number of recreational shooters who utilize the range for their activities and decrease in the number of gun and ammunition sales in the socioeconomic study area communities. There would also be potential beneficial impacts in additional work for DoD or contractor employees for the study to determine the appropriateness of allowing the activity to occur in designated areas and, if areas are designated for recreational shooting, there could be additional expenditures for signs and other shooting area features. This study would presumably further assess public attitudes and values associated with recreational shooting opportunities at the BMGR.

### **5.19.9.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, recreational shooting would be allowed under the existing regulations. Thus, there would be no change in existing socioeconomic impacts related to this activity.

### **5.19.10 Utility/Transportation Corridors**

#### **5.19.10.1 Proposed Action (Strategy C)**

The proposed action, which implements Management Strategy C, for the entire range, would allow for new utility/transportation corridor construction projects that were proposed prior to 6 November 2001. There is only one such project: the proposed Yuma ASH. Any future proposals to develop new utility/transportation corridors would be rejected, eliminating the potential for any associated positive or negative socioeconomic impacts. Any new non-military transportation and utility proposal on the BMGR would need to be within the existing State Route 85 transportation and utility corridor. Socioeconomic impacts associated with future development within the existing corridors would be evaluated for compliance with the NEPA, which is consistent with the current requirement (refer to Section 5.19.18 for more details).

#### **5.19.10.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Management Strategy B would evaluate Yuma ASH and potentially other future projects for new utility/transportation corridors on a case-by-case basis. The assessment that can be made on Strategy B effects is extremely limited because socioeconomic effects cannot be reliably predicted without a definitive determination on the potential for new corridors. Establishing a protocol for reviewing and approving proposed actions within existing transportation/utility corridors on the BMGR could create additional work for DoD or contractor personnel. Given the constraints of the current military mission performed on the range, however, there appears to be little potential that utility/transportation corridors other than State Route 85 or the proposed Yuma ASH would be compatible with military operations in the foreseeable future.

An alternative action that implements Strategy D would restrict all future utility/transportation corridor development to existing corridors. Because the proposed Yuma ASH is to be constructed within a new transportation corridor on the western edge of the range, its development would be prohibited with such an alternative action. Because design of the Yuma ASH has already begun, changing the alignment to avoid the BMGR would be costly and negatively affect the project budgets for the Yuma Metropolitan Planning Organization and

ADOT. The delays associated with redesigning part of the roadway and redoing all the associated studies would have a negative effect on the traveling public in this area. Because the Yuma ASH is needed to promote international commercial trade, delaying the project to change the alignment could also adversely affect international commerce with Mexico and would increase traffic congestion on existing routes. Changes in highway alignments and construction data could also affect associated growth patterns in the area; in the short term, developers would continue to focus on existing transportation routes until the Yuma ASH is built.

Implementing Strategy D would not affect the proposed Gila Bend to Ajo 230 kV Transmission Line Project because it is within an existing utility/transportation corridor.

### **5.19.10.3 No-Action Alternative (Strategy A)**

The no-action alternative, which implements Strategy A for utility/transportation corridors, would not represent a change from existing conditions. Thus, the Yuma ASH would be constructed as planned and potentially other future utility projects would continue to be restricted to established utility corridors and be required to be reviewed through appropriate field examinations and/or environmental assessments. There would be few differences in the socioeconomic effects compared to the proposed action.

## **5.19.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

### **5.19.11.1 Proposed Action (Strategy C)**

A number of new programs are included in the proposed action, which implements Strategy C, as compared to the no-action alternative. Proposed activities include conducting surveys and monitoring, developing strategies to control the spread of invasive species, restoring habitats, and identifying sensitive habitat areas. These activities would create new work for DoD or contractor personnel (see Section 5.19.18 for more information).

As represented by scoping comments, the majority of public attitudes and values with regard to wildlife waters are conflicted, with generally equal representation of those that support and those that oppose the construction of new wildlife waters on the range. In general, those who oppose the construction of new wildlife waters are concerned about whether artificial water developments are beneficial, or perhaps even detrimental, to native wildlife (see Table 1-3). The proposed action provides for the development of high-priority wildlife water development projects, but includes a literature review and studies to determine the beneficial and/or adverse effects of wildlife waters. The findings would then be used to determine the value of developing, maintaining, or removing water developments in the future.

### **5.19.11.2 Alternative Actions (Strategy B and Strategy D)**

Because the alternative actions, Management Strategies B and D, also involve the implementation of additional survey and monitoring work, these activities would create new work for DoD or contractor personnel, as addressed in Section 5.19.18.

### **5.19.11.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, the focus of new work would be on finalizing and implementing the BMGR—East HMP, which address new wildlife water developments. Implementing this plan and continuing implementation of the completed Lechuguilla-Mohawk HMP would result in work and expenditures to develop the waters and to operate and maintain them. While more wildlife water projects could potentially be developed with the no-action alternative when compared to the proposed action, the other studies and project plans called for with the proposed action would be expected to have greater positive economic effect than the no-action alternative.

## **5.19.12 Special Status Species**

### **5.19.12.1 Proposed Action (Strategy C)**

The proposed action, which is to apply Management Strategy C range-wide, could potentially result in beneficial socioeconomic effects. Additional survey work, projects to support protected species recovery, and regulatory compliance activities would result in work for DoD or contractor personnel and related expenditures. Potential indirect effects could result from an increase in the purchase of goods, services, and sundries in nearby communities during the course of these surveying, monitoring, and project implementation visits. However, it should be noted that those compliance-related activities would occur regardless of whether or not the proposed INRMP is implemented.

Public scoping comments indicate that social attitudes and values toward special status species are generally in favor of programs designed to protect and monitor special status species, which is consistent with the provisions in the proposed action.

### **5.19.12.2 Alternative Actions (Strategy B and Strategy D)**

Because Management Strategy D is identical to Management Strategy C, application of this alternative action would have the same direct and indirect effects as described above for the proposed action.

Range-wide application of Management Strategy B would have similar socioeconomic effects as those of the proposed action, but to a lesser degree, commensurate with the reduction in special status species management activities.

### **5.19.12.3 No-Action Alternative (Strategy A)**

In comparison to the proposed action, the no-action alternative would result in less work and expenditures for special status species beyond compliance requirements. However, the continued evaluation and implementation of special status species programs and continued support of Sonoran pronghorn monitoring and recovery efforts could potentially result in work or expenditures.

## **5.19.13 Soil and Water Resources**

### **5.19.13.1 Proposed Action (Strategy D)**

The proposed action of implementing Management Strategy D range-wide would include conducting a range-wide soil survey and restoring areas where vehicle use has caused excessive surface damage. These projects could result in additional work and expenditures for DoD or contractor personnel (see Section 5.19.18, Aggregate Effects, for more detail). Potential indirect effects could result from an increase in the purchase of goods, services, and sundries in nearby communities during the course of doing this work. The limitations on groundwater development and exploration could have eventual socioeconomic consequences within the 25-year time-frame of this plan, but cannot be foreseen at this time other than to observe that currently groundwater development on the BMGR has not been pursued due to the MLWA of 1999 restrictions on appropriate resource developments, incompatibility of groundwater development projects with the ongoing military mission, and the poor quality of the groundwater reserves. The proposed action is generally consistent with the attitudes and values expressed by public during the scoping process in comments to evaluate soils and watersheds to determine if BMGR activities are contributing to erosion or subsidence issues (see Table 1-3).

### **5.19.13.2 Alternative Actions (Strategy B and Strategy C)**

The selection of Management Strategy B or Management Strategy C range-wide would result in less additional DoD or contractor work or expenditures than the proposed action. For the most part, additional work involved in implementing these strategies are limited to the completion of unfinished actions planned in the Goldwater Amendment. Therefore, there would be little beneficial or adverse socioeconomic effects.

### **5.19.13.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, soil and water resource programs would continue to be managed under the existing objectives. Actions identified in the Goldwater Amendment that were not completed would be pursued. Little if any change in socioeconomic effects are anticipated.

### **5.19.14 Air Resources**

There is no discernible direct socioeconomic impact from either the proposed action, alternative actions, or no-action alternative regarding air resources. The selection and range-wide application of Management Strategy A (proposed action as well as the no-action alternative) or Management Strategies B, C, or D (alternative actions) is not expected to correlate with the number of persons who visit the range or the amount of DoD, contractor, or local work and expenditures. All strategies are consistent with social values and attitudes expressed during scoping (see Table 1-3). Thus, regardless if the proposed action, alternative actions, or no-action alternative were selected, there would be no measurable socioeconomic effect within the study communities.

### **5.19.15 Visual Resources**

#### **5.19.15.1 Proposed Action (Strategy B)**

The proposed action of implementing Management Strategy B range-wide would present future requirements for assessing the effects of new actions on visual resources, as specified by regulatory compliance processes, as well as the implementation of needed management or mitigation actions. Typically, the visual resources assessments would likely be a component of NEPA compliance documentation. Assessment, management, or mitigation activities could potentially result in additional work and/or expenditures for DoD or contractor personnel (see Section 5.19.18 for more detail), or an increase in the purchase of goods, services, and sundries

in nearby communities during the course of completing this work. These effects are not quantifiable given the number and types of new actions are unknown.

In addition, indications are that the proposed action is generally consistent with the majority of social attitudes and values, which as indicated by public input during the scoping process, favors the protection of mountain vistas from visual intrusions as well as the protection of the visual quality of lands adjacent to El Camino del Diablo (see Table 1-3).

#### **5.19.15.2 Alternative Actions (Strategy C and Strategy D)**

The alternative actions, the range-wide application of Management Strategy C or Management Strategy D, would increase the number of visual resource-related activities when compared to the proposed action. This would also have favorable direct and indirect socioeconomic effect similar to those described for the proposed action, but to a higher degree commensurate with the level of visual resource management called for in these strategies.

#### **5.19.15.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, visual resource programs would continue to be managed under the existing objectives. No additional work or expenditures would likely occur and thus, no direct or indirect socioeconomic effects would be expected.

### **5.19.16 Wildfire Management**

#### **5.19.16.1 Proposed Action (Strategy B)**

Implementation of the proposed action, Management Strategy B, could potentially have beneficial direct effects on socioeconomics if new DoD or contractor work and expenditures were created for the additional fire prevention, suppression, recovery, mapping, monitoring, and possible mitigation protocols that would be enacted. Indirect effects would include the purchase of goods and sundries in the nearby BMGR communities during the time work was performed on the range. In addition, the proposed action is consistent with the general attitudes and values represented by the public during public scoping, which favors implementation of the appropriate level of fire suppression as well as implementation of wildfire risk evaluations.

### **5.19.16.2 Alternative Actions (Strategy C and Strategy D)**

Management Strategies C and D (the alternative actions) are identical to the proposed action and would have the same socioeconomic effects.

### **5.19.16.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, wildfire management suppression would continue to be managed under the existing objective. No additional work or expenditures would likely occur and thus, no direct or indirect socioeconomic effects would be expected.

## **5.19.17 Perimeter Land Use, Encroachment, and Regional Planning**

### **5.19.17.1 Proposed Action (Strategy D)**

The proposed action, which is to apply Management Strategy D range-wide, could potentially result in beneficial direct effects through increased work and expenditures for the proposed additional perimeter land use monitoring activities, and potential indirect beneficial effects through the increase in purchase of goods, services and sundries in nearby BMGR communities. In addition, during public scoping and workshops, the majority of those who were concerned about perimeter land use, encroachment, and regional planning issues stated that future perimeter land use evaluations should focus on issues including Interstate 8 development, flight patterns over nearby communities, and the impacts of noise from BMGR activities on humans and wildlife (see Table 1-3). Because the proposed action provides for numerous assessments and coordination activities regarding the interrelationship of the BMGR and perimeter communities and future development, it is consistent with these social attitudes and values.

### **5.19.17.2 Alternative Actions (Strategy B and Strategy C)**

With the alternative actions, the range-wide application of Management Strategy B or Management Strategy C, there would still be an increase in perimeter land use studies compared to the no-action alternative, and this would also have beneficial direct and indirect socioeconomic effects, similar to those of the proposed action. However, these effects would be smaller due to the lesser amount of studies and evaluations proposed in those strategies.

### **5.19.17.3 No-Action Alternative (Strategy A)**

Under the no-action alternative, perimeter land use, encroachment, and regional planning activities and studies would be the same as those currently in effect or planned. Thus, associated socioeconomic impacts would not be expected to differ from the existing conditions.

### **5.19.18 Aggregate Effects on Socioeconomics**

#### **5.19.18.1 Proposed Action**

Three types of socioeconomic consequences would result from the proposed action that have additive and/or interactive aggregate effects: (1) those that relate to the creation of additional work and/or expenditures in the socioeconomic study area communities, (2) those that would potentially have indirect economic impacts due to a decrease in BMGR visitation, and (3) those that may be grouped as generally in support of or contrary to public attitudes and values. Other individual effects identified in the previous subsections are reiterated here to provide an overall aggregate assessment of socioeconomic effects of the proposed action.

The resource categories that would potentially prompt an increase in work and/or expenditures through implementation of their respective proposed management strategies include the following:

- Resource Monitoring—inventory and monitoring field work and post-field analysis
- Recreation Services and Use Supervision—law enforcement officers; recreation impacts monitoring; public education and information programs; and additional gates, fencing, and signs
- Hunting—hunter fee assessment study
- Recreational Shooting—recreational shooting assessment study and special use permit assessments for recreational automatic weapons use
- General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters—survey and control procedures for invasive species, habitat and restoration projects, wildlife water studies, and wildlife water repair and construction projects
- Special Status Species—studies and projects for special status species recoveries
- Soil and Water Resources—range-wide soil survey and soil restoration projects
- Visual Resources—visual resource impact assessments
- Wildfire Management—wildfire management plan preparation and wildfire suppression
- Perimeter Land Use, Encroachment, and Regional Planning—land use monitoring and coordination activities

As a result of implementation of the proposed action and the associated increase in work, it would be expected that the operating budgets of the Air Force and Marine Corps range

management functions would be adjusted to implement the plan as proposed. DoD has historically been responsible for regulatory compliance, but operating budgets have increased and may increase further to respond to the added natural and cultural resource responsibilities transferred from the BLM to the Air Force and Marine Corps with the MLWA of 1999.

The Air Force 56 FW RMO staff and budget have not increased since the transfer of natural resources management from the BLM to the DoD, as they had previously employed four permanent staff positions, two GIS contractors, and five non-permanent (four-year term) employees. Between FY 2001 and FY 2002, MCAS Yuma hired five additional staff members (one in the range management office and four in the environmental office.) However, the provisions for natural and cultural resources management on the BMGR, as presented in this EIS for the proposed INRMP (as well as the ICRMP), would determine the future level of permanent staff for both agencies. However, it is expected that both staffing and operating budget would remain constant or increase as a result of the plan implementation (Garcia 2002 and Pearce 2002).

It is important to note that these proposed budgets are subject to DoD funding priorities and Congressional budget allocations. Operating budgets could be reduced or components not funded so that other DoD funding requirements or needs can be met. However, recognition of the need for a management objective, program, and/or planned project in the proposed INRMP would improve the chances of projects and/or programs being funded, in part or in whole. This is because the previous management plans were prepared under FLPMA, but the proposed INRMP is to be prepared under the Sikes Act and the MLWA of 1999. Unlike FLPMA, the Sikes Act requires the Secretary of Defense to “review the extent to which integrated natural resources management plans were prepared or were in effect and implemented...in the preceding year, and submit a report on the findings of the review” (16 U.S.C. § 670a(f)(1) ). Also unlike FLPMA, the Sikes Act requires an update to the plan at least every five years.

The Sikes Act also includes provisions that authorize funding for management functions performed by the USFWS, AGFD, or contractors as a part of implementing and enforcing INRMPs. The Sikes Act states that “...neither Office of Management and Budget Circular A-76 [federal policy and procedures for determining whether commercial activities should be performed under contract with commercial sources or in-house using government facilities and personnel] nor any successor circular thereto applies to the procurement of services that are necessary for that implementation and enforcement; and (2) priority shall be given to the entering into of contracts for the procurement of such implementation and enforcement services with Federal and State agencies having responsibility for the conservation or management of fish or wildlife” (16 U.S.C. § 670a(d)).

A related but indirect beneficial effect within the socioeconomic study area would be the expected increase in expenditures from the purchase of goods, services, sundries, and field

equipment and supplies, which would be associated with the increased DoD and/or contractor work to be performed at the BMGR. Although the purchase of goods, services, and sundries would likely increase within communities located adjacent to the BMGR (Gila Bend, Ajo, Wellton, Tacna, Dateland, etc.), the majority of equipment such as tools, technological equipment, and machinery would most likely be purchased in the greater Phoenix and Yuma metropolitan areas.

Indirect adverse socioeconomic effects would result if a decrease in range visitation and recreation use occurred in response to the implementation of the motorized access and unroaded area management, recreation services and use supervision, hunting, and/or recreational shooting resource management elements. Both individually and in aggregate, however, such a decrease is not expected to correlate with measurable socioeconomic impacts. Any potential decrease would be limited to those people who visit the range for the purposes of fully utilizing or having the opportunity or opportunities (1) to fully utilize the current road network for recreational driving and/or hunter access, (2) to hunt in an area that does not have hunting fees, and/or (3) for recreational shooting as currently permitted.

If indeed BMGR visitation decreases due to the proposed action, indirect economic impacts could result from a decrease in the purchasing of goods, services, and sundries in local communities such as Ajo, Gila Bend, Wellton, Tacna, Dateland, and Yuma. However, this impact is expected to be minimal as the tourism/recreation economies of affected communities are much more closely correlated with recreation opportunities in areas surrounding the BMGR than they are with the BMGR as indicated by the relative visitation reported for areas such as Cabeza Prieta NWR, Organ Pipe Cactus NM, and Imperial Sand Dunes Recreation Area/North Algodones Dunes Wilderness (see Section 4.12.1.4). Service-related business located closest to points of entry to the BMGR (gas stations, convenience stores, automotive repair shops, etc.) would be affected the most. Gila Bend and Ajo would be the most likely communities to be impacted because of the implications on visitation to Management Unit 6 that may result from the proposed action. However, since recreation use trends indicate that BMGR visitation would likely increase proportionate to increases in population in the socioeconomic study area, these effects, if they occur, would most likely be short term.

With regard to public attitudes and values, the proposed action is generally consistent with most of those resource categories where there is clearly expressed public opinion, such as resource monitoring; special natural/interest areas; recreation services and use supervision; vegetation and wildlife; special status species; soil and water resources; and perimeter land use, encroachment, and regional planning.

Individual aggregate effects that are described more fully in the subsections above but are reiterated here from completeness include the include the following:

- The net reduction in motorized access to some areas could result in increased cost and time for agencies to conduct certain agency activities (e.g. natural and cultural resource surveys) (see Section 5.19.3.1 for more details).
- The proposed action for utility/transportation corridors would allow for the establishment of the Yuma ASH and further development of the State Route 85 corridor, but reject any future proposals to develop new utility/transportation corridors for the 25-year period of the proposed INRMP. Utility/transportation corridor development generally has positive socioeconomic impacts. The positive socioeconomic impacts from any future development would be an indirect impact of the proposed action (refer to Section 5.19.10 for more details).

In summary, although implementation of the proposed management strategies would likely create direct beneficial socioeconomic effects by increasing work and expenditures within the socioeconomic study area, the aggregate increase in employment and profit resulting from the purchase of goods and services for the area is not expected to result in an appreciable change from the existing conditions. Furthermore, if visitation and recreational use of the range decreases in response to implementation of any of the proposed actions, it is not likely to have measurable socioeconomic consequences. It should not result in a perceptible change in visitor use, number of jobs, or consumer activity in the area. Socioeconomic effects related to recreational opportunity are lessened in that there is plentiful and similar recreational opportunity available elsewhere in the BMGR region.

### **5.19.18.2 Alternative Actions**

#### **Management Strategy B**

With the range-wide application of Management Strategy B, the aggregate beneficial socioeconomic impacts from additional work and expenditures would be less than those assessed for the proposed action. Although most ongoing natural and cultural resource management practices would be continued, resource protection and conservation measures would more generally be limited to those necessary to achieve basic regulatory compliance. Management Strategy B, however, calls for an evaluation of the foreseeable need for and generalized effects of establishing additional roads; allowing recreational ORV use in designated areas; studying the feasibility of allowing public entry to mines, which the proposed action does not include; and also includes the assessment of a special hunting program requirement for the payment of nominal fees; certain vegetation, wildlife, and wildlife habitat studies; and perimeter land use, encroachment, and regional planning assessments that the proposed action also includes. Employment, earnings, and expenditures would not be expected to appreciably differ from the

existing conditions, but would be expected to be less than those associated with the proposed action.

With regard to indirect socioeconomic impacts related to visitation, there would be less potential negative impacts from decreased visitation compared to the proposed action and possibly positive indirect impacts from increased visitation compared to the no-action alternative. While both the proposed and alternative actions would support a wide spectrum of recreation opportunities, Strategy B would not change current motorized access or recreational shooting as long as they are compatible with military operations or do not create a compliance issue. In addition, Strategy B would also consider such measures as establishing additional roads for public access to locations not currently served, ORV use in designated areas, and entry to mines.

With regard to public attitudes and values, this alternative management strategy is overall less consistent with those views expressed during scoping than the proposed action. This strategy reflects public viewpoints expressed during scoping that generally support the philosophy of allowing public access and use opportunities to increase, remaining compatible with a sustained healthy natural environment, and continuing most existing conservation management practices. Of all management strategies considered, this alternative is most consistent with the contingent that opposes road closures and supports ORV use; however, as stated previously, there was an equally large contingent that supports road closures and opposes ORV use. While views with regard to public road closures and ORV use are disparate, there was wide-ranging support for continued special management designations, especially the ACECs. Strategy B would retain the HMA, but allow the ACECs, SRMAs, and Backcountry Byway to expire. With the exception of the HMA, the former special designated lands would be managed without special provisions and future special natural/interest area designations would be limited to those necessary to meet environmental compliance requirements and support continuation of the military mission. Thus, this strategy is inconsistent with the majority of public opinion with regard to special natural/interest areas.

### Management Strategy C

There would be very little difference between the socioeconomic effects described for the proposed action and those that would result with the range-wide application of Management Strategy C. The greatest difference is that there would potentially be slightly less work and expenditures with the application of Strategy C than with the proposed action, particularly with regard to soil and water resource management and perimeter land use, encroachment, and regional planning. Under the proposed action, Strategy C was applied to most management units accessible to the public and, thus, has the same potential corresponding socioeconomic consequences related to visitation. The philosophy of this strategy, a balance between access and use opportunities with a shift toward resource protection and conservation management practice,

is probably the most reflective of the public scoping comments; however, because the proposed action incorporates Strategy C for many of the management issues and because data on social attitudes and values is limited, it is not possible to assess a difference between this strategy and the proposed action.

### Management Strategy D

The application of Management Strategy D would result in work and expenditures to accomplish studies, assessments, and evaluations similar to the proposed action. Although Strategy D includes some evaluations that were not called for in the proposed action for air and visual resources, it does not include some studies that would be conducted under the proposed action for the evaluation of the effects of non-game species collection or the importance and character of recreational shooting as an activity/issue. The minor economic impacts associated with the development of wildlife waters would be suspended, at least for five years. Because this management strategy maximizes resource protection and conservation management practices at the expense of some public access and use opportunities, it would have the potential to decrease BMGR visitation and the secondary socioeconomic impacts of purchases made in the nearby communities to a greater extent than the proposed action, particularly with regard to motorized access and unroaded area management, hunting, and recreational shooting. This management strategy generally supports the contingent whose attitudes and values favor resource protection and conservation over public access and use opportunities to a greater degree than the proposed action.

In comparison to the proposed action, this management strategy has negative socioeconomic impacts with regard to utility/transportation corridors in that it would not allow for the establishment of the Yuma ASH as currently planned (see Section 5.19.10.2 for a detailed discussion).

### **5.19.18.3 No-Action Alternative**

The socioeconomic impact of the range-wide application of Management Strategy A applied for each of the resource categories would differ from the proposed action in that there would be less work and expenditures associated with the studies, evaluations, and assessments called for with the proposed action. Although much of what is called for under this strategy are programs or projects from the 1990 Goldwater Amendment or 1997 Lechuguilla Mohawk HMP that were never funded or the 1999 draft Barry M. Goldwater East HMP, which was never finalized, it should be noted that it is presumed that the funding circumstances for implementation of the no-action alternative would not differ from those of the proposed action. A transfer in funding responsibility was correlated with the transfer of management responsibility from the BLM to

the DoD under the MLWA of 1999 and the corresponding change in funding mechanisms would remain the same regardless of which alternative were selected. In other words, although in the past, programs and projects may not have been funded due to BLM funding limitations, those associated with the no-action alternative would have the same chances of being funded as those associated with the proposed and alternative actions.

As reflected by public scoping comments, the majority of attitudes and values support the development of a new plan that provides for improved conservation and recreation management. The attitude that the existing plans are not flawed, but their funding and implementation has had shortcomings, has been a frequent theme of public and agency input during the INRMP planning process.

## **5.20 NOISE**

### **5.20.1 Resource Inventory and Monitoring**

Resource inventory and monitoring may affect the noise environment within the BMGR in two ways: (1) inventory and monitoring activities involving the use of vehicles, aircraft, or other mechanized equipment could become sources of noise, and (2) a monitoring program could be designed to track the occurrence of noise within the range. Neither of these two outcomes, however, is likely to have an appreciable effect on the range noise environment. Inventory and monitoring activities would likely involve the use of only one or a few vehicles or aircraft and would typically occur on a one-time or periodic, short-term basis in dispersed locations. The level of these activities prescribed by the various alternative management strategies would not vary to such a degree so as to generate measurably different noise conditions. Inventory and monitoring activities would not be expected to contribute measurably to the overall noise conditions of the range.

Although noise is recognized as a factor that may affect humans as well as wildlife, no past or current requirements for long-term noise monitoring programs have been identified as necessary to manage either human health or wildlife within the BMGR. Rather, all previous noise related management issues pertaining to the range—such as concerns about the effects of aircraft overflight noise on Sonoran pronghorn—have been assessed on a case-by-case basis. No evidence was identified during the preparation of this EIS that would indicate any future need at the BMGR for an ongoing noise inventory or monitoring program. As a result, no proposals for noise inventory or monitoring programs have been developed in this EIS. The expectation is that noise will continue to be effectively addressed as a resource management issue through specific research or assessment projects. Should a future need for the development of an ongoing noise inventory or monitoring program be identified, however, such a program would be supported by

the selection of any of the alternatives for inventory and monitoring programs being examined for this EIS.

## **5.20.2 Special Natural/Interest Areas**

### **5.20.2.1 Proposed Action (Strategy C)**

Noise has not been a management issue of concern within the ACECs, SRMAs, or Backcountry Byway established under the Goldwater Amendment or within the Flat-tailed Horned Lizard HMA. Redesignating the ACECs and HMA as special natural/interest areas under the proposed action (Alternative Management Strategy C) could have the effect of deferring future military missions that could involve noise generating ground-based activities such as vehicle use or target development to other BMGR locations if those locations can provide adequate support for the intended mission. Redesignation, however, would not preclude future use of the affected areas for military surface uses and would have no effect on military overflights. Noise generated by military activities is compatible with the purposes of the BMGR as a military training range. A requirement that special natural/interest areas, if designated, be managed for natural quiet is incompatible with the purposes of the BMGR. Allowing the SRMAs and Backcountry Byway to expire would have no effect on the noise environment, as these designations did not defer military or civilian activities.

### **5.20.2.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Management Strategy D would have the same effect on the noise environment as the proposed action.

With Alternative Management Strategy B, only the HMA would be redesignated as a special natural/interest area, but such a designation would not defer military or civilian activities so the noise environment would not be expected to change. Because the ACEC, SRMA, and Backcountry Byway designations did not include provisions for quiet, the elimination of these special management designations would not change the noise environment in these areas.

### **5.20.2.3 No-Action Alternative (Strategy A)**

The effect of the no-action alternative (Strategy A) for special natural/interest areas on the BMGR noise environment would be the same as the proposed action.

### **5.20.3 Motorized Access and Unroaded Area Management**

#### **5.20.3.1 Proposed Action (Strategy C)**

The proposed action would affect the noise environment of the BMGR by generally reducing the range-wide number of miles of road available for vehicle use by almost 30 percent. The proposed road closures should have little or no effect on vehicle noise generated by government activities because the proposed action, and all other alternatives, are designed to retain all of the roads normally required to support these activities. The option under the proposed action to potentially implement development of the two Cabeza Prieta NWR bypass roads in Management Unit 2 would introduce government vehicular traffic to these locations adjacent to the Cabeza Prieta NWR and Wilderness (see Figure 3-2). Because the purpose of these bypass roads would be to reduce the requirement for Border Patrol officers to use roads within the Cabeza Prieta Wilderness during their regular patrols, the effect of this option would be to relocate vehicle noise from within the wilderness areas within the refuge to BMGR locations adjacent to the wilderness with no net change in the overall noise environment.

Closing roads that are currently available for public use would have the largest effect on vehicle noise because the closures would eliminate recreational driving from some locations and would change recreational driving patterns in others. The largest impact of this reduction on the generation of vehicle noise would consequently occur in BMGR—West where over 57 percent of all of the road mileage and 91 percent of the road mileage available for public use that are proposed for closure are located. Within BMGR—West, the effect of road closures on noise would be most pronounced at several locations in Management Unit 2 and in Management Unit 1 in the vicinity of the Tinajas Altas Mountains, where several dense networks of redundant roads would be reduced to a few roads (see Figures 3-1, 3-2, 3-3, and 3-4). These closures would continue to provide recreational access but would likely reduce vehicle noise by discouraging recreational driving activities that involve recirculating vehicle traffic within a localized area. Road reductions would also eliminate vehicular noise in many areas where vehicle access would be eliminated, including in the interiors of what would become new unroaded areas. All noise reduction effects that result from road closures would be localized in scope and would not appreciably change the overall noise environment of the BMGR.

#### **5.20.3.2 Alternative Actions (Strategy B and Strategy D)**

The noise effects of Alternative Management Strategy D would be similar to those of the proposed action. This alternative would result in the closure of a total of 765 miles of road, which is 107 more miles of roads than would be eliminated under the proposed action. This is a 34 percent reduction in the total road network (4 percent more than the proposed action). In addition to the roads closed with the proposed action, Strategy D would eliminate vehicle use in

some local areas, such as along the eastern side of the Copper Mountains, in Tinajas Altas Pass, in some areas in the vicinity of Fortuna Mine, and between the Mohawk Mountains and Sand Dunes (see Figures 3-1 and 3-2). Alternative Management Strategy D would not include the Cabeza Prieta NWR bypass roads, so no changes in the noise environment would occur in this location as a result of rerouted Border Patrol traffic. The noise reduction resulting from these closures would be localized in scope and would not appreciably change the overall noise environment of the BMGR.

There would be no change in the overall BMGR noise environment as a result of vehicle use under Alternative Management Strategy B. This strategy would retain the entire existing road network within the BMGR and potentially add the Cabeza Prieta NWR bypass roads. The public would continue to have motorized vehicle access to roads in all BMGR locations that are allocated to public use. The Cabeza Prieta NWR/Wilderness bypass roads would reduce noise from Border Patrol vehicle traffic inside the wilderness by providing an alternate route for this traffic outside of the wilderness in adjacent BMGR areas. There would be no net change in the overall noise environment of the BMGR under Alternative Management Strategy B.

### **5.20.3.3 No-Action Alternative (Strategy A)**

The effect of the no-action alternative (Strategy A) for motorized vehicle access on the BMGR noise environment would be the same as that of Alternative Management Strategy B except that the option for the Cabeza Prieta NWR/Wilderness bypass roads could not be pursued.

## **5.20.4 Camping and Visitor Stay Limits**

### **5.20.4.1 Proposed Action (Strategy C)**

The proposed range-wide management action for camping and visitor stay limits would have several localized effects on the noise produced by public visitors to the BMGR, but would be unlikely to affect the overall noise environment of the range. The proposal to allow dispersed camping to continue in all areas of the range open to the public would have the effect of giving visitors the opportunity to seek campsites in quiet locations away from noise generated at the camp sites of other visitors. The proposal to continue the current practice of limiting vehicle-based camping stays within the range to 14 consecutive days within each 28 day period would have the effect of limiting the time over which a localized area would likely be subject to noise associated with visitor camping activities. Long-term camping by concentrated numbers of winter visitors has occurred at a number of nearby locations outside of the BMGR. This visitation pattern has not been prevalent on the range, however, and the proposal to continue the existing stay limit, particularly in combination with the proposed limits on party size (see Section

5.12.5), would prevent noise generated by concentrated groups of long-term campers from occurring.

The portion of the proposed action that would prompt an assessment of the benefits and effects of establishing designated camping areas could lead to the effect of increasing noise in the localized camping areas where visitors would be concentrated. The extent to which designated camping areas would increase visitor produced noise in a local area and the consequences of that increase for the environment would have to be determined through the planned future assessment.

#### **5.20.4.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Management Strategy D would have the same effect on the noise environment as the proposed action except that the seven-day camping stay limit would further restrict long-term camping and correspondingly decrease the potential noise effects of this activity.

Alternative Management Strategy B for camping and visitors stay limits would have the same effect on the noise environment as the proposed action except that no proposal for establishing designated camping areas and potentially concentrating visitor noise effects would be contemplated.

#### **5.20.4.3 No-Action Alternative (Strategy A)**

The effect of the no-action alternative (Strategy A) for camping and visitor stay limits on the BMGR noise environment would be the same as that of the proposed action except that no proposal for establishing designated camping areas and potentially concentrating visitor noise effects would be contemplated.

### **5.20.5 Recreation Services and Use Supervision**

#### **5.20.5.1 Proposed Actions (Strategy C in Unit 2 and Strategy D in All Other Units)**

Although the proposed action recreation services and use supervision includes managing Units 1 and 3 through 7 under Strategy D and Unit 2 under Strategy C, the likely noise effects of these management strategies are nearly indistinguishable. Only the first five provisions of Strategies C and D have the potential to affect the range noise environment (see Table 3-3). The provisions that would continue the ongoing practices of prohibiting (1) public ORV travel, (2) on- and off-road racing, and (3) vehicle use in washes that are not part of designated roads would prevent

recreational vehicle noise from being generated in many locations that are not directly accessible via established roads. The prohibition against on- and off-road racing would have the further effect of preventing the considerable noise that is generated by high-speed travel and high-performance racing engines. Continuing to require that all vehicles operated by the public on the BMGR be licensed for highway use in Arizona would ensure that the noise generated by these vehicles is attenuated to the degree provided by legally mandated muffler systems.

The provision that would govern the number of vehicles permitted in a single party without a special-use permit would have the effect of either deterring visitors from operating large numbers of vehicles in concentrated groups or regulating the use of such groups of vehicles when they are permitted. This provision would have the effect of limiting the volume and duration of vehicle noise that may be generated in a localized area by the activities of a single group. The noise limiting effect of this provision would be greater under Strategy D, which would generally limit single parties to 9 vehicles, than Strategy C, which would generally permit single parties to operate up to 19 vehicles. Both of these strategies represent a relatively great numerical reduction from the current single party limit of up to 49 vehicles.

#### **5.20.5.2 Alternative Actions (Strategy B, Strategy C, and/or Strategy D, Depending on Unit)**

The general single party limit of 29 vehicles under Management Strategy B would have the effect of reducing the volume of vehicle noise that could potentially be produced by a single party in a concentrated area when compared to the 49 vehicle limit of the no-action alternative. Management Strategies C and D would offer greater limits on the volume of vehicle noise that could potentially be generated by the activities of a single party.

Strategy D is the second alternative for Management Unit 2 and Strategy C is the second action alternative for the remaining management units. The consequences of implementing either of these two management strategies on the noise environment is discussed in Section 5.20.5.1.

#### **5.20.5.3 No-Action Alternative (Strategy A)**

The no-action alternative differs from the action alternatives in that it would continue to limit the numbers of vehicles that a single party could operate to no more than 49. There would be no change in the existing noise environment of the BMGR as a result of implementing the no-action alternative.

### **5.20.6 Rockhounding**

There would be no effect on the existing noise environment of the BMGR as a result of implementing either the no-action alternative or the action alternatives for rockhounding.

### **5.20.7 Wood Cutting, Gathering, and Firewood Use**

The no-action and action alternatives for regulating wood cutting, gathering, and firewood use as well as the collection of native plants would have no appreciable effect on the noise environment of the BMGR. Strategy B would allow the cutting of firewood on the range, which may prompt some visitors to use chainsaws for this purpose. The use of chainsaws would not be expected to be either frequent or widespread, however, as wood could only be cut for use in personal campfires and could not be removed from the range. No commercial wood cutting activities would be permitted.

### **5.20.8 Hunting**

The use of firearms for hunting is a seasonal, widely dispersed, and relatively infrequent activity on the BMGR. This activity is not an important contributor to the overall noise environment of the range. The no-action and action alternatives for hunting would have no effect on the times or locations at which this activity is practiced. Consequently, none of these alternatives would have a notable effect on the noise environment of the BMGR.

### **5.20.9 Recreational Shooting**

#### **5.20.9.1 Proposed Action (Strategy C)**

The noise environment of the BMGR would not be changed appreciably by the proposed action (Strategy C) for recreational shooting. Two general types of recreational shooting have occurred within the BMGR—dispersed target shooting by individuals or small groups of individuals using sporting firearms and organized shoots by large groups in a concentrated location using a wide variety of firearms including fully automatic weapons. Shooting by small numbers of target shooters using sporting firearms would continue under the proposed action. Gunfire noise produced by this dispersed and sporadic activity, however, is not an important contributor to the overall noise environment of the BMGR. Those participating in shooting are advised to wear ear protection to protect their hearing. Non-participating visitors to the range may be disturbed by gunfire noise but the noise would not be expected to adversely affect their hearing. Noise from this type of recreational shooting would also not be expected to affect the general health of

wildlife populations. The closure of those portions of the BMGR that are within the range of the Sonoran pronghorn to general public entry from 15 March through 15 July of each year eliminates the potential that recreational shooting noise could adversely disturb this endangered species during the spring fawning season.

Shooting using automatic weapons could also occur under the proposed action but only when sanctioned by special-use permit. The use of automatic weapons would be prohibited between sunset and sunrise unless specifically authorized under the permit. Automatic weapons fire can be a source of intense localized noise and could affect the hearing of anyone in the immediate shooting area that is not wearing hearing protection. Recreational automatic weapons shoots have not occurred on the BMGR for several years, but the pattern of activity during the earlier once per year shoots was for frequent firing to occur in one location over a two- to three-day period. Noise from this intense level of firing may be disruptive to the normal behavior patterns of wildlife in the local area. Normal wildlife activities would likely resume shortly after the end of the firing event. Noise from automatic weapons fire may also be disturbing to non-participating visitors to the BMGR, who would likely avoid the shooting area by some distance. The hearing of non-participants, however, would not likely be affected by this activity. The requirements for issuing a special-use permit for automatic weapons shooting have not been determined by this EIS. Additional environmental impact documentation would be needed before a special-use permit for this activity could be issued. Among other assessments, this impact documentation would have to more fully examine the noise consequences of automatic weapons shooting.

#### **5.20.9.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Management Strategy D would at least temporarily eliminate all recreational shooting activities, not including hunting, on the BMGR until a future assessment determined that the activities could be resumed in designated areas. Although this alternative action would at least temporarily eliminate gunfire noise caused by recreational shooting, the overall effect on the noise environment of the range would not be measurably different than the existing BMGR noise condition because of the relative infrequency and low intensity with which recreational shooting is currently known to occur. The subsequent future assessment would determine the extent to which recreational shooting noise would affect the BMGR noise environment if the activity were to be resumed.

Recreational shooting noise would continue to be generated on the BMGR under Alternative Management Strategy B, but initially would be functionally limited to shooting by small numbers of target shooters using sporting firearms. Further environmental analysis would still be necessary, however, before approval for automatic weapons shoots could be granted because of

continuing concerns about how these activities may affect natural and cultural resources as well as public safety. This situation would be no different than the existing conditions on the range. Management Strategy B would not have a measurable effect on the overall noise environment of the BMGR.

### **5.20.9.3 No-Action Alternative (Strategy A)**

The effect of the no-action alternative (Strategy A) for recreational shooting on the BMGR noise environment would be the same as that of the proposed action. Special use permits would not be required for automatic weapons shoots under this alternative; however, questions about how these activities may affect natural and cultural resources as well as public safety have raised sufficient public concern that further environmental analysis would be necessary before approval for these activities could be considered.

### **5.20.10 Utility/Transportation Corridors**

#### **5.20.10.1 Proposed Action (Strategy C)**

Highway noise would continue within the BMGR along the State Route 85 corridor under all utility transportation corridor management alternatives. The proposed action (Strategy C) would also support development of the Yuma ASH. If constructed, this highway would introduce highway traffic-generated noise to the most northwestern corner of the range. The environmental assessment being prepared for this project will examine the noise effects of the proposed highway. The proposed highway would be well away from those areas of the BMGR that are open to the general public and should not have a noise effect on visitors to the range. Strategy C would close the range to the development of other new civilian transportation or utility corridors, thus eliminating the potential for transportation or utility associated noise effects in other range locations. Increased noise associated with new or upgraded transportation or utility projects could still occur within the State Route 85 corridor. The magnitude and significance of these potential noise effects would have to be assessed in the environmental documentation that would be required before new transportation or utility projects could be considered for approval.

#### **5.20.10.2 Alternative Actions (Strategy B and Strategy D)**

Alternative Management Strategy D would restrict development of any new utility or transportation corridors including the proposed Yuma ASH. This management strategy would consequently limit the area of the BMGR interior that could be affected by noise associated with

civilian surface utility or transportation projects to the existing State Route 85 corridor. Increased noise associated with the new or upgraded transportation or utility projects could occur within that corridor, but, as indicated for Strategy C, the noise effects of those projects would have to be assessed through new environmental documentation before the projects could be considered for approval.

The noise effects of Alternative Management Strategy B would not differ from the proposed action except that this strategy would permit case-by-case consideration of the development of utility and transportation corridors within the BMGR in addition to the proposed Yuma ASH. Thus, new noise effects within the interior of the range associated with highway or utility corridors could emerge under Alternative Management Strategy B. The noise effects of those projects would have to be assessed through new environmental documentation before the projects could be considered for approval.

### **5.20.10.3 No-Action Alternative (Strategy A)**

The noise effects of the no-action alternative (Strategy A) would be the same as those for Management Strategy B.

### **5.20.11 General Vegetation, Wildlife, Wildlife Habitat, and Wildlife Waters**

The noise effects of the alternative strategies for managing vegetation, wildlife, wildlife habitat, and wildlife waters would be similar to each other and would not measurably alter the overall noise environment of the range. Some noise associated with management projects (such as population surveys or monitoring, habitat evaluations, or construction of wildlife waters) that require the use of vehicles or aircraft or other motorized equipment may be generated under all of these strategies. These activities would occur, however, on a sporadic, short-term, and dispersed basis and would not be likely to have a measurable effect on the BMGR noise environment.

### **5.20.12 Special Status Species**

The noise effects of the alternative strategies for managing special status species would be similar to each other and would not measurably alter the overall noise environment of the range. Some noise associated with management projects (such as population surveys or monitoring, or habitat evaluations) that require the use of vehicles or aircraft or other motorized equipment may be generated under all of these strategies. These activities would occur, however, on a sporadic,

short-term, and dispersed basis and would not be likely to have a measurable effect on the BMGR noise environment.

#### **5.21.13 Soil and Water Resources**

The noise effects of the alternative strategies for managing soil and water resources would be similar to each other and would not measurably alter the overall noise environment of the range. Noise associated with management projects, such as soil or water resource surveys or soil stabilization remediation that may require the use of vehicles or other motorized equipment, could be generated under any of these strategies. These activities would occur, however, on a sporadic, short-term, and dispersed basis and would not be likely to have a measurable effect on the BMGR noise environment.

#### **5.20.14 Air Resources**

The noise effects of the alternative strategies for managing air resources would be similar to each other and would not alter the noise environment of the range.

#### **5.20.15 Visual Resources**

The noise effects of the alternative strategies for managing visual resources would be similar to each other and would not alter the noise environment of the range.

#### **5.20.16 Wildfire Management**

The noise effects of the alternative strategies for managing wildfires would be similar to each other and would not alter the noise environment of the range. The action alternatives all specify the development of a range-wide wildfire management plan. Because of the great infrequency of dangerous wildfires within the BMGR, it is not likely that the fire prevention measures specified in the plan would require the use of noise generating mechanized equipment, such as would be required for fire break construction. If fire suppression were needed, aerial tankers, vehicles, and possibly other types of noise generating mechanized equipment would be employed, as necessary, regardless of the management strategy selected in the INRMP. Although fire suppression and any needed post action cleanup and mitigation measures may generate noise as a result of mechanized activities, these actions would be isolated in both location and time and would not be likely to adversely affect the overall noise environment of the BMGR.

### **5.20.17 Perimeter Land Use, Encroachment, and Regional Planning**

Each of the action alternatives calls for monitoring of land use activities within the lands adjacent to the BMGR perimeter. Monitoring could alert BMGR managers of plans for off-range land uses that may generate significant noise. This prior knowledge would afford these managers an opportunity to try to persuade the off-range land owners or managers to modify their plans or mitigate their land-use actions so that adverse noise effects would not occur. BMGR managers, however, would not have the authority to require implementation of these measures.

### **5.20.18 Aggregate Effects on Noise**

#### **5.20.18.1 Proposed Action**

The quality of the BMGR noise environment is determined predominantly by noise produced by military activities of which aircraft overflights are the foremost noise sources. Explosive ordnance detonations and heavy vehicle and generator use, among other activities, are contributing sources that are more limited in time and location of occurrence. During periods when military operations are inactive, the prevailing noise condition of most of the range is one of natural quiet. The provisions of the proposed action would have no effect on the noise conditions produced by military activities or other government actions.

The most likely aggregate effects of the proposed action on the noise environment would include some localized reductions in the volume of noise produced by some recreation activities, including recreational vehicle use, and potential local increases in noise from both highway traffic and recreational shooting. Some of these effects would be additive. All of the noise effects of the proposed action, which includes potential noise decreases and increases, would be localized in scope. None of the proposed actions would have effects, either alone or in aggregate, that impact widespread portions of the BMGR or measurably alter the overall noise environment of the range relative to any of the standards used to protect public health and welfare with an adequate margin of safety (see Section 4.20.1.2.).

As indicated, the proposed action would principally affect noise generated through the use of vehicles as a result of the elimination of certain roads from the BMGR road network. Although the noise generated by vehicular traffic on roads within the range most certainly does not rise to a level of significance relative to established standards for protecting human health, welfare, and comfort, road noise would likely be an annoyance to some range visitors who are seeking an experience of solitude and natural quiet. As explained in Section 4.20.1.2, however, natural quiet is not an acceptable management standard for the BMGR and visitor annoyance from noise that

does not exceed the threshold levels that are protective of health, welfare, and comfort is not considered an impact on the noise environment.

Noise reductions would result, in part, from road closures that would eliminate public vehicle use in local locations where road access is eliminated, reduce public vehicle travel in areas where redundant roads are eliminated, and discourage recreational vehicle use that involves recirculating traffic. These effects would occur principally in localized areas of Management Units 1, 2, and 3 where 91 percent of the public access road closures would occur. These localized noise reducing effects would be enhanced by additional vehicle-use provisions of the proposed action that would (1) continue to prohibit off-road driving and on- and off road vehicle racing, (2) prohibit off-road driving in washes, (3) limit single parties to no more than 9 or 19 vehicles, depending on the management unit, and (4) continue to require that vehicles be equipped with mufflers as required by Arizona vehicle regulations. Noise generated by vehicle-related recreational use would be potentially further diminished in localized areas by the proposed action that would limit vehicle-based camping stays to no more than 14 consecutive days. The additive effects of these provisions would reduce some localized noise effects as a result of recreational vehicle use but would not appreciably affect the overall noise environment of the BMGR in which military aircraft operation would continue to be the predominant noise source.

Potential noise increases would occur as a result of the proposed action if the Yuma ASH were constructed across the northwestern corner of the BMGR and if special use permits for the recreational use of automatic weapons within the range were issued. Construction of the Yuma ASH appears likely, although environmental compliance and design work must still be completed before a decision approving this project can be reached. Construction and use of the highway would likely increase the volume of noise in the local highway area over the existing condition by a considerable margin. The location of this highway project on the northwestern edge of the range, however, would preclude this action from combining with other provisions of the proposed action to create additive effects.

Permitting recreational shooting with automatic weapons would lead to the generation of locally intense noise levels for the duration of the shooting periods. This activity, if approved, would most likely be located in Management Units 1 or 2 where public access is currently authorized. The noise generated from automatic weapons shooting would be additive with other sources of recreational noise in the affected local vicinity. As already noted, the proposed action would have the overall aggregate effect of reducing the noise generated from these other recreation activities. Thus, the aggregate effect of noise generated from the recreational use of automatic weapons, when added to that produced by other recreational activities, would be less under the proposed action than under the existing conditions.

The proposed action provision to redesignate the Tinajas Altas Mountains and the Mohawk Mountains and Sand Dunes ACECs as special natural/interest areas would have the potential effect of deterring the location of new noise generated military activities within these areas. This action, which would potentially preclude new noise producing activities, when added to the noise limiting effects of the motor vehicle access and recreation use provisions of the proposed action would potentially reserve these ACECs as areas where surface noise generation is kept to a minimum.

#### **5.20.18.2 Alternative Actions**

The aggregate noise effects of Alternative Management Strategy D would generally be similar to those of the proposed action; however, Strategy D includes several provisions that may reduce the generation of surface noise in local areas to a somewhat greater extent than would the proposed action. Alternative Management Strategy D would redesignate the Sentinel Plain and Crater Range SRMAs as well as the ACECs. Redesignating these SRMAs may have the effect of deterring new ground-based military activities from these locations; thus, this action may prevent the introduction of a new source of surface noise in these areas. This effect in the SRMAs, however, would be unlikely to have an aggregate effect on noise when added to the effects of the other provisions of Alternative Management Strategy D.

The aggregate noise effects of Alternative Management Strategy D provisions on motorized recreational access and other vehicle-associated recreation activities would not differ greatly from those of the proposed action. The 279 miles of road closure that would occur in Management Unit 2 under Strategy D would provide reductions in the noise generated by recreational vehicles in local areas. Reducing the road network in Management Unit 2 by 42 miles more than the proposed action would not be notable except in local areas where vehicle access is eliminated. The seven-day camping stay limit under Strategy D, as compared to the 14-day stay limit under the proposed action, would also have the potential for reducing visitor generated noise in local areas. However, because long-term camping has not been a frequent activity within the BMGR, this difference would not appear to be important in terms of aggregate noise effects. Alternative Management Strategy D would have the positive noise prevention benefits of foreclosing the possibilities for authorizing recreational use of automatic weapons or constructing the Yuma ASH on the BMGR. The aggregate noise effects of Alternative Management Strategy D would not differ from the proposed action in terms of its other provisions.

The aggregate effects of Alternative Management Strategy C cannot be measurably differentiated from those of the proposed action or Strategy D.

The overall noise effects of the Alternative Management Strategy B provisions would represent a potential increase over the aggregate effect of the proposed action, but would not differ from the existing conditions. Alternative Management Strategy B would retain the entire existing road network, potentially support off-road recreational vehicle use areas, allow ORV use in washes, allow up to 30 vehicles per single party, and support recreational use of automatic weapons. The aggregate noise effect of these provisions would be manifest principally in local areas of Management Units 1 and 2 where the most extensive and dense public use road networks are located (see Figure 3-2). Alternative Management Strategy B would also have the effect of not redesignating ACECs or SRMAs, which would eliminate the potential for deferring new noise generating military surface uses from these areas. In addition, Alternative Management Strategy B would support the consideration of new transportation corridors within the BMGR. The potential that such corridors would be either proposed or approved seems remote, but this provision could potentially introduce additional highway noise within the BMGR interior. Barring the development of extensive highway corridors under this alternative through the range, Alternative Management Strategy B would not have an appreciable aggregate effect on the overall noise environment of the BMGR.

### **5.20.18.3 No-Action Alternative**

The aggregate noise effects of the no-action alternative (Strategy A) would be essentially the same as those for Alternative Management Strategy B.

## **5.21 ENVIRONMENTAL JUSTICE**

The Final Guidance for Incorporating Environmental Justice Concerns in EPA's NEPA Compliance Analyses (EPA 1998) sets forth a screening process for the identification and analysis of potential environmental justice concerns. The first step is a screening-level analysis prior to scoping, to determine the existence of a low-income and/or minority population within the area of potential effect. Because there is no population within the BMGR, the area of potential effect for this EIS is limited to those communities on the BMGR perimeter that may be influenced by BMGR management practices and those who visit the BMGR for outdoor recreation or other compatible uses. While the proposed INRMP was foreseen as having few direct effects or indirect effects on any population, there are some communities within this area of potential effect that are disproportionately minority or low-income, including three Native American tribes and the U.S./Mexico border element. Thus, in accordance with EPA guidance, the Air Force and Marine Corps enhanced their outreach efforts during the scoping process for this EIS to ensure that the potentially affected communities were informed of the initiation and intent of the project, including a news release to three newspapers in Mexico, distribution of newsletters to tribal leaders and special interest groups (including groups involved in

international border issues), and distribution of a flyer within the Tohono O'odham Nation, and locating one of the public scoping meetings within a centralized Tohono O'odham location. The intent of this increased scoping was to assure that low-income and minority populations were engaged in public participation and to identify and assess any unforeseen potential impacts to these communities.

The next step in this process is to evaluate whether or not the environmental impacts are likely to fall disproportionately on minority and/or low-income members of the community and/or tribal resources. Based on the detailed analysis of the 18 other resources evaluated in the preceding sections of this chapter, most of the identified potential effects of this EIS would not extend beyond the BMGR boundary. Those that would be limited to the direct and indirect impacts from natural resource management jobs and expenditures and to the population that visits the BMGR. The potential socioeconomic impact is expected to be positive. With the proposed action, there would be a mixed effect for those that visit the BMGR because there would be more limited recreation access and use opportunity based on the road closures and other limitations on recreation use; this may be viewed as adverse to some, but this is balanced with a more natural recreational setting that may be viewed as beneficial to some. Based on available data, including the scoping comments and Core Planning Team input through this INRMP planning process, knowledge gained through other environmental justice efforts relative to the BMGR, and the analysis contained in this EIS, there is no indication that the proposed action, alternative actions, or no-action alternatives would disproportionately affect low-income or minority communities. Thus there is no environmental justice effect.

The one specific environmental justice concern that has been identified is adequate consultation regarding impacts to cultural, historical, or protected resources of value to Native American tribes. This concern is first addressed in the range-wide goal that is satisfied with the proposed action, alternative actions, and no-action alternative alike: to provide for Native American access to Traditional Cultural Places and sacred sites, consistent with the military mission and natural resources management goals. As outlined in Section 1.5, the ICRMP addresses the management of cultural resources within the BMGR and was developed to be mutually supportive of the proposed INRMP. In addition, the Air Force and Marine Corps have been engaged in consultation with Native American tribes as outlined in Section 1.6.3 and through the separate ICRMP process. Based on the responses received from this effort, the proposed action and Alternative Management Strategies C and D are regarded as generally consistent with the views expressed by the participating tribal representatives. Alternative Strategy B may be inconsistent with these views in that it would potentially allow for some expanded use opportunities, such as designated ORV use areas, and would implement fewer controls on recreational uses. Alternative Strategy A would also be somewhat inconsistent in that it would not provide for a minimum number of law enforcement officers and would also not have the same extent of controls on recreational uses as the proposed action or Alternative Strategies C and D.

## 5.22 UNAVOIDABLE ADVERSE ENVIRONMENTAL IMPACTS

The programmatic nature of this EIS focuses on approaches that may be used to manage the natural resources of the BMGR. Because all approaches were designed to satisfy the INRMP goals, including allowing for compatible public use of the BMGR in a manner that sustains biodiversity, the focus is on managing the BMGR use and resources in a way that is beneficial rather than adverse. No unavoidable, adverse impacts to endangered species or Air Force and Marine Corps Endangered Species Act compliance and stewardship requirements would result from the implementation of the proposed action or alternatives. To the contrary, the proposed action and alternatives were found to be in support or even beneficial to endangered species and compliance/stewardship requirements.

Some management decisions can include trade offs and may be viewed differently depending on an individual's values and perspective. For example, those that value natural environments with little evidence of man might support management decisions to close roads and to focus recreational activities in specific locations, even if it is at the expense of some kinds of public use opportunity. Others may value the opportunity to explore roads, including those in rough terrain that might lead to places that few people have seen, even if it is at the expense of resource conservation or protection in the affected areas. This influences one's view on whether a management decision might be beneficial or adverse. Aside from the human and individualistic perspective of what is positive or negative, few adverse effects were identified with any of the alternatives.

The only adverse impact identified for the proposed action regards public utilities and transportation corridors. The proposed action would allow development of the Yuma ASH because an application for this highway was filed prior to 6 November 2001. However, no new corridors would be allowed in the future with the proposed action. New utilities and highway improvements would not be precluded, but they would be limited in location to established corridors. This limitation could be adverse, particularly to utility companies, as the least expensive route is typically the shortest route, which may not coincide with the existing corridors.

Alternative Management Strategy A, the no-action alternative, would continue management in accordance with the Goldwater Amendment and the habitat management plans addressing BMGR management. While these plans are not inherently adverse in their management prescriptions, in the context of the range of alternatives considered, some elements are viewed as having more adverse effects than the other management strategies. The level of management associated with Strategy A is viewed as less adequate in satisfying biodiversity goals and in effectively managing ecosystems. The plans focus, in part, on single-species management rather than ecosystem management. In comparison to the other alternative strategies developed for this

EIS, Strategy A includes the fewest number of studies that would further the understanding about biological species and effective ecosystem management. Considering the age of the Goldwater Amendment, the management prescriptions addressed in that plan need to be updated for more effective management.

Strategy A is also viewed as adverse with regard to utilities and transportation corridors (for the same reasons as noted for the proposed action), cultural resources, and noise. Strategy A does not change the recreational opportunities available to range visitors nor does it modify where those activities may occur. As a result, cultural resources would continue to be subjected to inadvertent damage as well as intentional vandalism. Other resources sensitive to human-induced disturbance (e.g., bat roost sites, protected plant populations) would also potentially be disturbed by some types of recreation use. While in the overall context of noise resulting from the military operations, noise from other nonmilitary sources is minor. However, in a comparative context of the alternative management strategies, the higher levels of use and the more extensive locations in which such use can occur with Strategy A would result in increased noise compared to the other management strategies.

Alternative Management Strategy B could result in adverse effects for public utilities and transportation corridors, special natural/interest areas, public health and safety, cultural resources, hazardous materials and waste, and noise. While new utility/transportation corridors could be considered with Strategy B, the requirement to be compatible with the military mission would likely preclude most proposals. Strategy B would allow the ACEC, SRMA, and Backcountry Byway designations to expire without taking action to give these areas special management consideration. The greater opportunities for recreational use offered by Strategy B—such as mine exploration and recreational shooting with automatic weapons—come with increased risk to public health and safety. The retention of the existing road network plus the opportunity to open new areas to motorized access and generally expand the recreational footprint could result in inadvertent damage and intentional vandalism to sensitive natural resources and cultural resource sites. The higher levels of use and greater areas where such uses could occur could potentially result in more waste over a larger area and also more noise in more areas than allowed with some of the other alternatives.

The only adverse effects identified with Alternative Management Strategies C and D are the same as with the proposed action—precluding the development of new utility and transportation corridors. Because construction of the Yuma ASH would not be allowed with Strategy D, this alternative would have the greatest adverse effect for this resource management element.

Despite the potential for adverse effects with the various alternatives, almost none of the effects identified are unavoidable. In most cases, the selection of a different management strategy would avoid the adverse effect. Because of the need to be compatible with the military mission, there would be few opportunities for a new utility or transportation corridor on the BMGR.

None of the alternatives prohibits the installation of additional utilities or highway improvements as long as such activities occur within existing corridors. The primary legal framework for the proposed INRMP (the MLWA of 1999 and Sikes Act) sets forth that the INRMP must provide for compatible non-military use; thus, effects from recreation can only be avoided to a certain extent. The only other effect that might be unavoidable is conflict in public perception. Because different people have different values, some may view the management decisions made as adverse, but any alternative to the decision made could be viewed as adverse by other people.

### **5.23 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES**

No specific land use activity is assessed in this EIS. The provisions identified with some alternative management strategies could lead to a specific land use. For example, the proposed action (and some of the alternatives) could allow the development of additional wildlife waters, designated camping or recreational shooting areas, and new utilities within existing corridors. However, additional environmental assessment would be required before these types of activities would be implemented to address any site-specific effects. Even if such new land uses were introduced, the commitment of resources would not likely be irreversible and irretrievable if the associated facilities that might be developed were later removed.

Alternative Management Strategy B is mostly likely to result in irreversible and irretrievable effects because expanding the use area through potential development of new roads, considering ORV travel in designated areas, allowing motorized access in designated washes, and expanding the allowable footprint for vehicle-based camping could all result in damage or destruction of cultural resources. With any of the alternatives, ongoing recreational use of the BMGR subjects cultural resources to potential risk of damage, but expanding the area exposed increases the risk. The resource inventory, monitoring, and additional surveys and studies proposed could offset the potential for adverse effects, but once a cultural resource site is destroyed, the value of that site is lost forever.

None of the alternatives is expected to put any protected species at risk and none would have an irreversible or irretrievable effect on a special status species.

## CHAPTER 6 CUMULATIVE EFFECTS

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### 6.1 CUMULATIVE EFFECTS METHODOLOGY

Cumulative effects are those additive or interactive effects that would result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions (40 CFR § 1508.7). Interactive effects may be either countervailing—where the net cumulative effect is less than the sum of the individual effects—or synergistic—where the net cumulative effect is greater than the sum of the individual effects. The Council on Environmental Quality handbook for considering cumulative effects advises that focusing the cumulative effects analysis on meaningful cumulative impact issues, rather than on all conceivable impact relationships, is critical to the success of this analysis to support better decisions about the proposed action and alternatives (Council on Environmental Quality 1997). The handbook also advises that cumulative effects need to be analyzed in terms of the specific resources, ecosystem, and human community that may be affected by the proposed action or alternatives. The analysis must consider how cumulative effects may be manifested over short and long time frames and how they may cause meaningful impacts that extend over areas that may exceed political or administrative boundaries. Each affected resource, ecosystem, and human community must be analyzed in terms of its own capacity to accommodate additional effects, based on its own time and space parameters.

This EIS describes proposed and alternative management strategies for each of 17 separate resource management elements for the BMGR designed to protect and conserve its natural and cultural resources and provide for sustainable public access (see Table 3-3). The selected strategies for each of the 17 resource elements comprise the proposed action. In the interest of providing meaningful results, the focus of the cumulative effects analysis incorporating these proposed and alternative management strategies for the 17 resource elements was designed in view of the following six parameters:

- the proposed action and alternatives for each resource element are principally programmatic in scope and, with the exception of the alternative management strategies for motorized access, do not describe site specific actions
- each of these actions, including those that would manage public access and recreation, was designed to be consistent with the military purposes of the BMGR and the goals established for protecting and conserving its resources
- a principal requirement of the INRMP is the implementation of ecosystem management principles to protect and conserve ecosystem components and functions

- the planning time horizon for the INRMP is 25 years, the duration of the BMGR land withdrawal, but the INRMP vision, as expressed through its policy-based goals, is to implement management actions that would support healthy ecosystem functions and protect biodiversity over the expanse of the range for a much longer time span
- with the exception of the alternative management strategies for motorized access, the individual effects of the proposed action and alternatives for each resource element and aggregate effects of the proposed action and alternatives would generally be broad in scope; site specific impacts cannot be predicted
- the aggregate effects of the proposed action and alternatives are beneficial for natural and cultural resources and the protection and conservation of biodiversity within the BMGR and its larger ecosystem

As stated in Section 5.1, cumulative effects analyzed in this chapter should not be confused with aggregate effects analyzed in Chapter 5. Aggregate impacts pertain to the proposed action and alternatives only, while cumulative impacts pertain to the additive or interactive effects that would result from the incremental impact of the proposed action and alternatives when added to other past, present, and reasonably foreseeable future actions.

The following cumulative effects analysis considers impacts that may occur at the individual resource, ecosystem, and human community scales. The six preceding parameters, the programmatic nature of the EIS, and the resulting general degree of specificity with which most of the individual and aggregate effects of the proposed action and alternatives could be predicted indicate that the cumulative impacts that would result from the implementation of the proposed action can only be meaningfully made at an equivalent broad-based level. Meaningful cumulative impacts conclusions can be reached for individual BMGR resources—and for some sensitive resources, such as endangered species, these conclusions will be particularly important—but most of the important cumulative effects results pertain to the ecosystem and human community scales. This perspective is in accordance with the mandates of the MLWA of 1999, Sikes Act, and DoD policy (DoD 4715.3) that specify that the proposed INRMP must provide for the protection of natural and cultural resources and sustainable multipurpose public use of BMGR resources consistent with its military purposes and ecosystem sustainability through a plan that incorporates ecosystem management principles.

The individual resources that may be affected by the proposed action and alternatives have been divided into 20 resource impact assessment categories as described in Chapter 4. Chapter 5 provides the individual and aggregate impact assessments of how the proposed action and each alternative would affect each of these categories of resources. The resource impact assessment categories include:

- earth resources
- water resources
- climate and air resources
- general vegetation
- general wildlife and wildlife habitat
- protected species
- wildfire management
- grounds maintenance
- public utilities and transportation corridors
- special management areas
- outdoor recreation
- public health and safety
- law enforcement
- transboundary and domestic perimeter land use
- cultural resources
- visual resources
- hazardous materials and waste
- socioeconomics
- noise
- environmental justice

Consideration of the cumulative effects of the proposed action and alternatives of this EIS at the ecosystem scale is, in turn, dependent on the scale at which the ecosystem within the BMGR is viewed. At the broadest ecosystem assessment scale, the approximately 1.8 million-acre BMGR may be regarded as a component of the 55 million-acre Sonoran Desert ecoregion. As it occurs within the range, this ecoregion can in turn be divided into the Lower Colorado River and Arizona Uplands subdivisions. At a more refined scale, the 13 natural communities identified by TNC provide the most representative ecosystem-based breakdown to date of the native biodiversity that is found within the BMGR and the contiguous Cabeza Prieta NWR (Hall and others 2001). Depending on the context of the resource being assessed, each of these ecosystem assessment scales have roles in considering the cumulative effects of the proposed action and alternatives presented in this EIS.

The concept of resource connectivity is critical to determining the applicability of ecosystem scales to the consideration of cumulative effects. This concept states that in order for there to be an additive or interactive cumulative relationship between activities or resources in one location or time and those at another location or time that can be meaningfully defined there must be a discernible biological, demographic, hydrological, airborne, geological, sociological, or other type of interrelationship or pathway that will propagate the effect. For example, the health and survival of species are dependent not only on the quality and availability of the environment that supports one phase of their life cycle but are also connected to the condition of those environments that support their other life cycle phases. The long-term survival of a species, such as the flat-tailed horned lizard, that does not migrate, may be dependent on connective relationships in other ways. The quality and availability of habitat both inside and outside of the BMGR is critical to the survival of this species and actions that affect the habitat outside of the range is a cumulative impact issue of concern. Another connective relationship in the case of this species is associated with the level of genetic exchange between lizard populations inside and outside of the BMGR and the degree to which physical barriers may disrupt or prevent that exchange. Thus, the ecosystem scales used to assess the cumulative effects of the proposed action and alternatives in this EIS were varied as appropriate to consider the various connective relationships that could propagate those effects.

The human community examined in the consideration of cumulative impacts includes those government agencies involved in the management of the BMGR or that have other activities on the range, members of the public that visit the range for recreational or other purposes, Native American tribes that have a cultural affiliation to the range or an interest in its management, members of the public or non-governmental groups that have interests in the natural and cultural resources of the range, and local communities in the vicinity of the range as described in Section 4.19.

Four steps have been identified for determining the cumulative effects that would result from the implementation of the proposed action and alternatives under consideration in this EIS. These steps include:

- identify the aggregate effects of the proposed action and the alternatives for each resource impact assessment category considered in Chapter 5
- identify the additive or interactive effects of other past, present, and reasonably foreseeable future actions on each resource impact assessment category
- combine the aggregate effects of the proposed action and each alternative with the additive or interactive effects of past, present, and reasonably foreseeable future actions to define the total cumulative effect on each resource that would result from implementing each alternative
- define the cumulative effects of the proposed action and each alternative—when added together with the effects of other past, present, and reasonably foreseeable future actions—at the ecosystem and human community scales

## **6.2 AGGREGATE EFFECTS OF THE PROPOSED ACTION AND ALTERNATIVES**

The aggregate effects of the proposed action and alternatives on individual resources within the BMGR region are identified in Table 6-1. This table summarizes the conclusions reached in the aggregate effects analysis presented in Chapter 5. The determination shown in each cell represents a summation of the aggregate effects of all 17 resource management elements associated with each alternative on each individual resource assessment category. These overall aggregate effects were defined for each assessment category as being adverse, beneficial, or mixed. Adverse and beneficial effects were further defined according to a scale that rated these effects from being slightly adverse or beneficial to being more adverse or beneficial. These ratings were defined for each alternative and resource impact assessment category relative to the existing resource conditions and other alternatives.

**TABLE 6-1  
SUMMARY OF MEANINGFUL AGGREGATE EFFECTS OF THE PROPOSED ACTION  
AND ALTERNATIVES ON INDIVIDUAL RESOURCES**

Resource Impact Assessment Category	Area of Effect	Type of Effect				
		Proposed Action	Alternative Management Strategy A (No-Action)	Alternative Management Strategy B	Alternative Management Strategy C	Alternative Management Strategy D
Earth Resources	RW	● <sub>B</sub>	○ <sub>B</sub>	○ <sub>B</sub>	● <sub>B</sub>	● <sub>B</sub>
Water Resources	RW	● <sub>B</sub>	○ <sub>B</sub>	○ <sub>B</sub>	● <sub>B</sub>	● <sub>B</sub>
Climate and Air Resources	RW	ME	ME	□ <sub>A</sub>	ME	ME
General Vegetation	>RW	● <sub>B</sub>	ME	ME	● <sub>B</sub>	● <sub>B</sub>
General Wildlife and Wildlife Habitat	>RW	● <sub>B</sub>	ME	ME	● <sub>B</sub>	● <sub>B</sub>
Protected Species	>RW	● <sub>B</sub>	ME	ME	● <sub>B</sub>	● <sub>B</sub>
Wildfire Management	>RW	● <sub>B</sub>	NE	○ <sub>B</sub>	● <sub>B</sub>	● <sub>B</sub>
Grounds Maintenance	<MU	ME	ME	ME	ME	ME
Public Utilities and Transportation Corridors	>RW	□ <sub>A</sub>	□ <sub>A</sub>	□ <sub>A</sub>	□ <sub>A</sub>	□ <sub>A</sub>
Special Management Areas	RW	ME	ME	□ <sub>A</sub>	ME	● <sub>B</sub>
Outdoor Recreation	MU	ME	ME	ME	ME	ME
Public Health and Safety	RW	● <sub>B</sub>	NE	□ <sub>A</sub>	● <sub>B</sub>	● <sub>B</sub>
Law Enforcement	RW	ME	ME	○ <sub>B</sub>	ME	ME
Transboundary and Domestic Perimeter Land Use	>RW	ME	NE	ME	ME	ME
Cultural Resources	RW	● <sub>B</sub>	□ <sub>A</sub>	□ <sub>A</sub>	● <sub>B</sub>	● <sub>B</sub>
Visual Resources	RW	○ <sub>B</sub>	○ <sub>B</sub>	○ <sub>B</sub>	● <sub>B</sub>	● <sub>B</sub>
Hazardous Materials and Waste	RW	ME	NE	□ <sub>A</sub>	ME	○ <sub>B</sub>
Socioeconomics	>RW	○ <sub>B</sub>	○ <sub>B</sub>	○ <sub>B</sub>	○ <sub>B</sub>	○ <sub>B</sub>
Noise	MU	ME	□ <sub>A</sub>	□ <sub>A</sub>	ME	● <sub>B</sub>
Environmental Justice	>RW	NE	NE	NE	NE	NE

Type of Effect: Slightly Beneficial = ○<sub>B</sub>    Beneficial = ●<sub>B</sub>    More Beneficial = ●<sub>B</sub>  
 Slightly Adverse = □<sub>A</sub>    Adverse = □<sub>A</sub>    More Adverse = ■<sub>A</sub>  
 Mixed Effect (Includes mixed beneficial and adverse effects with no clear beneficial or adverse aggregate effect) = ME  
 No Effect = NE

Area of Effect: Smaller Than Management Unit = <MU    Management Unit = MU    Range Wide = RW    Larger Than Range Wide = >RW

## **6.3 EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS**

### **6.3.1 Effects of Past, Present, and Reasonably Foreseeable Future Actions on Individual Resources**

A comprehensive list of past, present, and reasonably foreseeable future actions within the BMGR and its surrounding region was compiled for the September 2001 YTRC Supplemental EIS (U.S. Marine Corps 2001). This Supplemental EIS was prepared by the Marine Corps to address the cumulative effects on Sonoran pronghorn that would result from proposed actions and alternatives for military training activities and support facilities when combined with other past, present, and reasonably foreseeable future actions. Although the scope of this document was limited to an effects analysis on a single target species, the inventory of past, present, and future actions within the greater BMGR region was extensive and thorough. Nearly all of this inventory continues to be current. With minor updates, the inventory is presented in Table 6-2 for use as a basis for identifying past, present, and reasonably foreseeable future actions that are relevant to this cumulative effects analysis. Additional material on these actions and the adopted methodology is available in the September 2001 YTRC Supplemental EIS (U.S. Marine Corps 2001). The locations within the BMGR region where the 68 actions described in the inventory occur is shown in Figure 6-1 by either an identification number from Table 6-2 or by general place name references. The additive or interactive effects of these actions are identified in Table 6-3.

### **6.3.2 Effects of Past and Present Actions on the Ecological Landscape and Human Community**

The current status of individual resources, the indigenous ecosystem, and human communities within the BMGR region has been determined, in large part, by the aggregate effects of human activities, principally since the Gadsden Purchase of 1853 transferred the BMGR region from Mexican to American sovereignty. Chief among these activities in shaping the character of the ecological landscape of the BMGR region are economic development, military training, land use designations, and resource conservation actions. Outdoor recreation has more recently joined the list of key activities affecting natural resources within this area. An overview of these key activities and their environmental effects will provide the best summation of their cumulative effects on the region's ecosystem and human communities that is both (1) commensurate with the level of specificity with which the aggregate effects of the proposed and alternatives in this EIS can be assessed and (2) meaningful to the decisions that are to be made regarding the long-term management of natural and cultural resources within the BMGR. The additive or interactive effects of these activities on individual resources are summarized in Table 6-3.

TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*									
ACTION		LOCATION OF ACTION							SUMMARY DESCRIPTION OF ACTION
No.	Name	See Map	BMGR East	BMGR West	Organ Pipe NM	Cabeza Prieta NWR	Other Areas in Region	Mexico	
1	Historical mining and ranching activities		✓	✓	✓	✓	✓	✓	Fortuna Mine located in northwest Gila Mts. (1894-1925), Ajo Mine located near Ajo (1850s-1900), Betty Lee mine located near Copper Mts. (1920s-1930s), and 218 mines, prospects, claim groups, and mineral deposits within BMGR and adjacent areas prior to World War II, pre-1941. Cattle grazing located throughout BMGR region from Sand Tank Mts. (most intense) to Lechuguilla Desert (least intense), pre-1941.
2	Phelps Dodge Ajo, Inc. Mine	✓					✓		New Cornelia Open Pit (1910-1985).
3	Lower Gila South Resource Management Plan (Goldwater Amendment)		✓	✓					Implemented 1990 and expired November 2001.
4	Lechuguilla-Mohawk HMP			✓					Also includes public lands north and west of BMGR-West, implemented 1995 and expired November 2001.
5	Draft Barry M. Goldwater—East HMP		✓						Also includes Sand Tank Mt. Area, not finalized or implemented.
6	Transportation/utility corridors	✓	✓		✓		✓	✓	Major highways include U.S. 80 (1920s) and Interstate 8 (mid-1970s) from east of Gila Bend to west of Yuma, State Route 85 (1920s) from Gila Bend to Ajo to Mexico, and Highway 2 in Mexico (no date). Railroads include Southern Pacific, from east of Gila Bend to west of Yuma (1870s-present), and Tucson, Cornelia and Gila Bend, from Gila Bend to Ajo (1916 to 1986). Agricultural irrigation canals, along northern BMGR boundary (from 1920s), and utility lines, situated along Interstate 8 and State Route 85, were also developed.
7	Agricultural development	✓					✓	✓	Current croplands are generally interspersed along the lower Gila River and in the Yuma Valley from the 1890s and Mexico south of Organ Pipe NM from the 1970s.
8	BLM livestock grazing allotments	✓					✓		Five livestock grazing allotments include the Cameron, Childs, Coyote Flat, Sentinel and Why allotments. The Sentinel allotment is located south of Interstate 8. The remaining four allotments include all public lands surrounding Why and Ajo, Arizona (1940s-present).
9	Improvements at Childs Mountain	✓				✓			Construction of Air Route Surveillance Radar for FAA and watchable wildlife overlook for Cabeza Prieta NWR (1998-2000).

TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*									
ACTION		LOCATION OF ACTION							SUMMARY DESCRIPTION OF ACTION
No.	Name	See Map	BMGR East	BMGR West	Organ Pipe NM	Cabeza Prieta NWR	Other Areas in Region	Mexico	
10	Past designation and military land use of BMGR		✓	✓					Use of the BMGR from 1941 through MLWA of 1999, also includes overlying restricted airspace.
11	AGFD management activities		✓	✓	✓	✓	✓		AGFD has been and continues to be responsible for management of wildlife resources within the BMGR since before the range was established in 1941.
12	U.S. Border Patrol activities		✓	✓	✓	✓	✓		USBP monitors the passage of illegal aliens along the entire Arizona/Mexico border (long standing continuous operation, sharp increase in activity beginning about 1999).
13	Past recreation within the BMGR		✓	✓					Hunting, camping, four-wheel driving, hiking, exploring are traditional dispersed recreation occurring as compatible with the military mission. Developed recreational areas located at Baker Tanks and the Gila Bend AFAF. Interpretive facilities are located at El Camino del Diablo and Tinajas Altas Mountains ACEC.
14	Cabeza Prieta NWR/Wilderness and Comprehensive Conservation Plan	✓				✓			Refuge established in 1939, 860,010 acres, 95 percent of refuge designated wilderness (1990), plan is under development.
15	Organ Pipe Cactus National Monument	✓			✓				Monument established in 1937, 333,689 acres, 94 percent designated as wilderness (1978).
16	Recreation on the BLM Ajo Block	✓					✓		Ongoing recreation activities within BLM lands in the vicinity of Ajo.
17	Marine Corps TACTS Range Improvements			✓					Includes 17 threat emitters, some of which are mobile units (1996-1999).
18	Interdiction of Drug Smugglers on Organ Pipe Cactus NM				✓				While interdiction of drug smugglers occurs throughout the lands near the international border within the monument, this project includes specific physical features developed to inhibit cross-country vehicle travel.
19	Archaeology and Other Resource Survey Activities		✓	✓	✓	✓	✓		BMGR—West proposed project surveys from 1970s through present; BMGR—East proposed project surveys from 1970s through present, surface use and special area surveys from mid-1990s through present.
20	Sonoran Pronghorn Recovery Plan		✓	✓	✓	✓	✓	✓	Action applies to entire U.S. Sonoran pronghorn habitat area, first plan published 1982, updated 1998, revised plan pending.
21	Biological Monitoring in Association with Tactical Ranges		✓						Air Force biologists check daily for the presence of Sonoran pronghorn within North and South TAC range target areas prior to air to ground bombing and strafing missions, training missions are aborted at targets with pronghorn present (1997-present).

<b>TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*</b>									
<b>ACTION</b>		<b>LOCATION OF ACTION</b>							<b>SUMMARY DESCRIPTION OF ACTION</b>
<b>No.</b>	<b>Name</b>	<b>See Map</b>	<b>BMGR East</b>	<b>BMGR West</b>	<b>Organ Pipe NM</b>	<b>Cabeza Prieta NWR</b>	<b>Other Areas in Region</b>	<b>Mexico</b>	
22	North American Free Trade Act (NAFTA) Related Developments	✓	✓	✓	✓		✓	✓	Mostly affects the U.S. Highway 95 and the proposed Yuma ASH corridors, but traffic has also increased on State Route 85. The primary port of entry would occur at San Luis (1995-present).
23	National Guard Beddown of Apache Helicopters at the Western Army National Guard Aviation Training Site (WAATS)	✓	✓						Between 32 and 50 Apache helicopters are being added to those stationed at the WAATS in Marana, Arizona. WAATS uses the BMGR to support live-fire weapons training needs. Gila Bend AFAF is used as a forward operating area for aircrew changes and helicopter refueling and rearming (beginning 2002).
24	Paving and Repaving of Various Road Segment, Parking, and Pad Areas within BMGR—East and the Gila Bend AFAF		✓						Ten road paving projects totaling about 8.25 miles within the BMGR and 11 paving projects totaling about 3.5 miles and 1.5 acres of parking areas at Gila Bend AFAF have been approved through an environmental assessment dated 20 September 2000. All of the Gila Bend AFAF projects have been completed but only 250 feet of road at Manned Range 2 have been completed within the BMGR.
25	Cleanup of Inactive Air Force Targets		✓						EOD surface clearances and debris cleanups are being considered for 18 inactive target and 3 non-target sites, action pending.

TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*									
ACTION		LOCATION OF ACTION							SUMMARY DESCRIPTION OF ACTION
No.	Name	See Map	BMGR East	BMGR West	Organ Pipe NM	Cabeza Prieta NWR	Other Areas in Region	Mexico	
26	Sonoran Pronghorn Forage Enhancement and Semi-captive Breeding	✓	✓	✓		✓	✓		Plots within the Mohawk, San Cristobal, and Childs valleys within the BMGR, along the Daniels Arroyo and possibly other locations within the Cabeza Prieta NWR, and possibly locations within adjacent BLM lands would be affected by the forage enhancement project to grow supplemental native forage, using irrigation, for Sonoran pronghorn use during spring fawning and summer periods affected by drought. Some of the two to three acre forage enhancement plots may also be used to support semi-captive breeding of Sonoran pronghorn. For this action, the selected plots would be about one-square kilometer, designed to hold pronghorn and fenced around the perimeter. A side of the fence line would be left open until pronghorn have entered the enclosure to utilize the irrigated forage. The open side would then be closed to capture the pronghorn. Forage would be irrigated and free standing water provided as needed to support the captured animals. Potential predators would be excluded from the enclosure by an additional external electrified fence. Successfully reared fawns and adult pronghorn would be released into their surrounding native habitat when the maturity of the fawns and natural forage conditions are favorable. Implementation of these Sonoran Pronghorn Recovery Plan related actions began in the spring of 2002.
27	Man in the Biosphere Program	✓			✓			✓	Two designated biosphere reserves include the Organ Pipe Cactus NM and the El Pinacate y el Gran Desierto de Altar (1976).
28	Arizona State Parks Arizona Trails 2000 Plan		✓	✓	✓	✓	✓		This statewide plan provides information and recommendations to agencies for their management of motorized and non motorized trails. The plan guides the expenditures from the Arizona Off-highway Vehicle Recreation Fund, Arizona Heritage Fund Trails Component, and Federal Recreational Trails Program (1999).
29	BLM National Management Strategy for Motorized Off-Highway Vehicle Use on Public Lands						✓		This national strategy provides guidance and offers recommendations for actions to improve OHV motorized vehicle management on public lands administered by the BLM. Applicable to BLM lands adjacent to the BMGR (2001).

<b>TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*</b>									
<b>ACTION</b>		<b>LOCATION OF ACTION</b>							<b>SUMMARY DESCRIPTION OF ACTION</b>
<b>No.</b>	<b>Name</b>	<b>See Map</b>	<b>BMGR East</b>	<b>BMGR West</b>	<b>Organ Pipe NM</b>	<b>Cabeza Prieta NWR</b>	<b>Other Areas in Region</b>	<b>Mexico</b>	
30	BMGR ICRMP		✓	✓					This rangewide ICRMP describes requirements of the National Historic Preservation Act, as well as those of other heritage preservation statutes, and goals, objectives, and action items for the management of cultural resources on the BMGR (Summer 2002).
31	Air Force Gravel Extraction		✓						Ten extraction sites are proposed in the tactical ranges, in or near Manned Ranges 1 and 3, and along the DART Drop Road near Gila Bend AFAF to provide sand and gravel for the construction and maintenance of targets and other facilities within BMGR—East (2002).
32	Flash Burning of Military Munitions Residue	✓	✓						Flash burning of military missions residue is a recently approved process for insuring that demilitarized munitions that had been recovered from BMGR—East tactical and manned ranges are free of ignitable or explosive residues before being released for recycling as scrap metal (see Appendix B). The flashing of the militarized munitions occurs at the four RMCPs within BMGR—East (2000).
33	Rescheduling of South TAC Annual EOD Clean-up	✓	✓						EOD clearance for South TAC has recently been rescheduled from April through June to the fall to avoid potential disturbances of Sonoran pronghorn during the summer heat.
34	Unmanned Threat Emitters	✓	✓						Includes the proposed installation of four unmanned threat emitters and reconfiguration of 10 target sites (2001).
35	Installing Fences and Signs on the BMGR	✓	✓						Signs, gates, and fences have been installed at each road entry point into East TAC Range from Management Unit 6 and from the Bender Springs area in Management Unit 7 (Fall 2001).
36	Reduced 5-year EOD Clearance Requirements		✓						The Air Force five-year EOD clearance criteria for tactical and manned ranges was reduced from a distance of one nautical mile from each target or until the density of collectible munitions items is five pieces per acre or less, whichever is the greater distance, to one kilometer from each or until the density of collectible munitions items is five pieces per acre or less, whichever is the shorter distance (August 2001).

<b>TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*</b>									
<b>ACTION</b>		<b>LOCATION OF ACTION</b>							<b>SUMMARY DESCRIPTION OF ACTION</b>
<b>No.</b>	<b>Name</b>	<b>See Map</b>	<b>BMGR East</b>	<b>BMGR West</b>	<b>Organ Pipe NM</b>	<b>Cabeza Prieta NWR</b>	<b>Other Areas in Region</b>	<b>Mexico</b>	
37	Transporting New Boilers to Palo Verde Nuclear Generating Station and Related Road Work	✓	✓						Travel route follows State Route 85 from Mexico through Organ Pipe Cactus National Monument and BMGR—East, modification of several at grade wash crossings will be necessary (Summer 2002).
38	Cellular Phone Towers	✓	✓						Four towers =100 feet tall are proposed by American tower Corporation to be installed along State Route 85 at 100 by 100-foot sites named Tenmile Wash, Midway, Blindman Butte, and Childs Ranch. Luke AFB is considering granting leases of five years with nine 5-year extension options for the required lands (2001).
39	Gila Bend to Ajo 230 kilovolt (kV) Transmission Line	✓	✓						Construction of a 230 kV transmission line from Gila Bend to Ajo to support the reopening of the Phelps Dodge Ajo, Inc. Mine has been approved. The transmission line would parallel the State Route 85 and the existing Public Service Co. 69 kV transmission line. There are no immediate plans to construct the new transmission line until economic conditions improve sufficiently to support reopening operations at Ajo (2001).
40	Increased Air Force Night Training Operations Within the Next Several Years		✓			✓			Increases in night attack training are anticipated within the next several years to better prepare pilots for real world combat missions. As much as a two-fold increase in night sortie rates may occur (2002+).
41	Air Force Sensor Training Area/ Mission Support Plan		✓						The Air Force is installing new scoring systems and upgraded target simulations at existing targets to create more realistic training conditions. Plans are also being evaluated for a new electronically scored and recorded target area for training with precision-guided munitions (2003+).
42	Organ Pipe Cactus NM Proposed Projects	✓			✓				More than 100 past, current, and proposed projects; examples include 10 RV camping sites (1983-1984), enlarged parking areas at campgrounds and trailheads (1998-2000), low-level overflight reconnaissance for Sonoran pronghorn (ongoing), and North Puerto Blanco Loop Drive widening (pending).

<b>TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*</b>									
<b>ACTION</b>		<b>LOCATION OF ACTION</b>							<b>SUMMARY DESCRIPTION OF ACTION</b>
<b>No.</b>	<b>Name</b>	<b>See Map</b>	<b>BMGR East</b>	<b>BMGR West</b>	<b>Organ Pipe NM</b>	<b>Cabeza Prieta NWR</b>	<b>Other Areas in Region</b>	<b>Mexico</b>	
43	Phelps Dodge Ajo, Inc. Mine Reopening	✓					✓		New technologies would allow further production from the mine if copper prices reach economically feasible levels. Primary activity would include copper ore mining, milling, and concentrating. Concentrate would be shipped via the Tucson, Cornelia, and Gila Bend Railroad, which would be upgraded. Workforce would include 350 to 400 new employees. Project life is expected to be 10+ years. (Startup pending, date unknown).
44	Future Aircraft and Weapons Systems (F-22A, F-18 E/F, MV-22/CV-22, Joint Strike Fighter, Joint Direct Attack Munitions and other stand-off weapons)		✓	✓					New aircraft and weapons for the Air Force, Marine Corps, and Navy are being developed or entering production. These aircraft and weapons will replace those currently in use throughout the armed forces. BMGR is a likely candidate for continued military training using these new aircraft weapon systems (date unknown).
45	Relocating Unmanned Aerial Vehicle (UAV) to MCAS Yuma	✓		✓					Relocation of a Marine squadron to MCAS Yuma that operates UAVs is under evaluation. The reconnaissance UAV flies at high altitudes and cannot be seen or heard at ground level. Squadron would add up to 195 personnel to MCAS Yuma. UAV operations would likely be conducted out of Cannon Air Defense Complex and AUX-2 (pending).
46	Dewatering of the Gila River and Agricultural Development	✓					✓		Eleven major reservoir or irrigation diversion dams, constructed on the Gila River system from 1891 to 1959, have eliminated perennial or seasonally intermittent flows from the Lower Gila River. Gillespie Dam constructed on the Gila River north of Gila Bend in 1921 provided irrigation diversions via canals to the Gila Bend area for agricultural development. Agricultural development and water diversions from below Painted Rock Reservoir to Yuma have eliminated a once extensive riparian ecosystem. Today, nearly 93,000 acres of irrigated cropland and orchards are located within 5 miles of the northern and western BMGR boundaries.

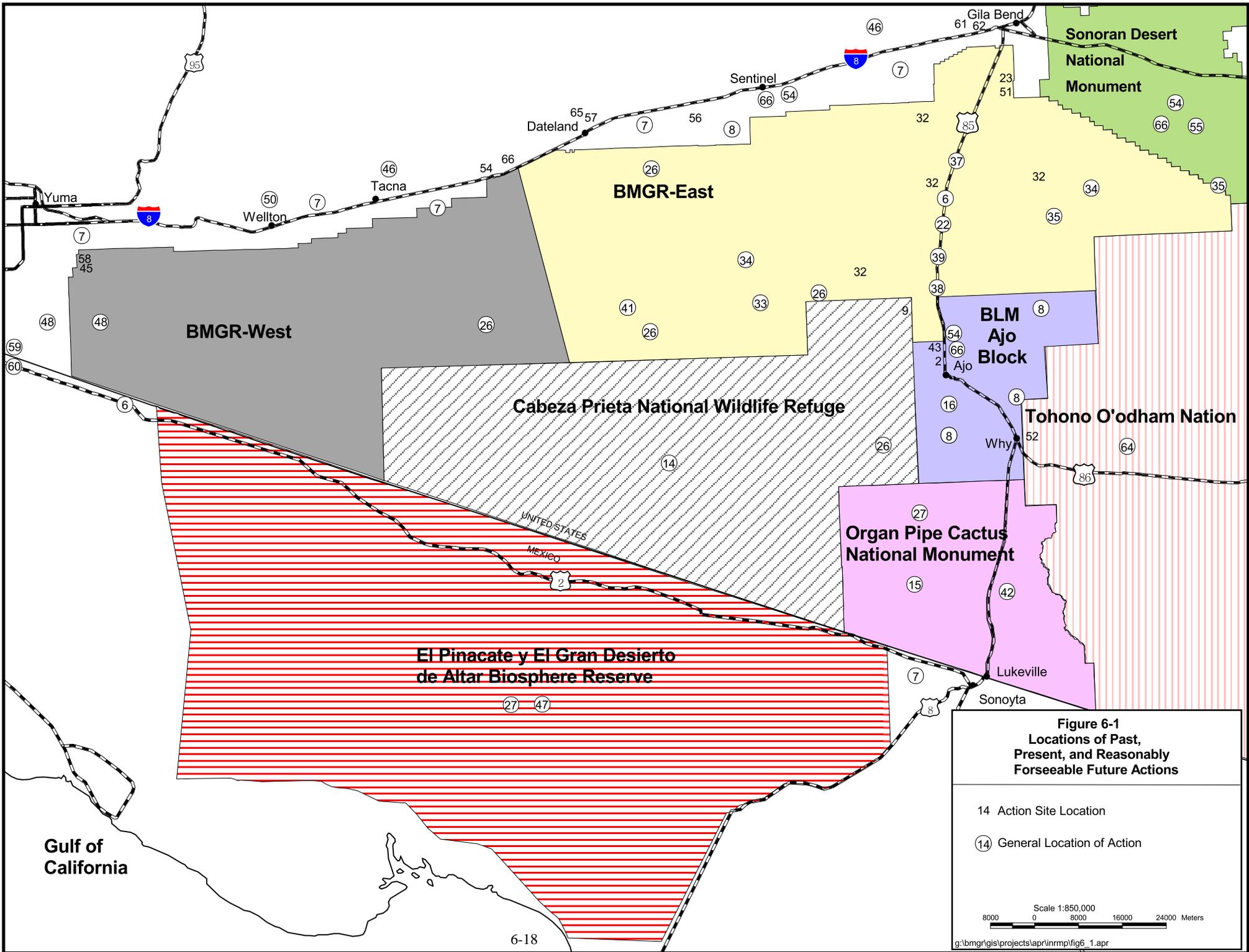
TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*										
ACTION		LOCATION OF ACTION							SUMMARY DESCRIPTION OF ACTION	
No.	Name	See Map	BMGR East	BMGR West	Organ Pipe NM	Cabeza Prieta NWR	Other Areas in Region	Mexico		
47	Reserva de la Biosfera (Biosphere Reserve) de El Pinacate Y El Gran Desierto de Altar (The Pinacate and Great Desert), Mexico	✓							✓	A designated core protection area lies within a larger protective buffer area and is contiguous with the Reserva de la Biosfera Alto Golfo de California y Delta del Rio Colorado located 40 miles to the southwest, where the Colorado River delta meets the Sea of Cortez. Ongoing extensive livestock grazing and wood cutting activities have damaged the natural flora and fauna of the region. The Biosphere Reserve was designated in 1992.
48	Flat-tailed Horned Lizard Rangewide Management Strategy	✓		✓						Management strategy established four flat-tailed horned lizard management areas in California and one in Arizona. The Arizona management area (1997), approximately 114,000 acres of which about 99,000 acres are located within BMGR—West, is by far the single largest protected management area for this species. MCAS Yuma entered into a conservation agreement with the AGFD and USFWS to implement the management strategy, which led to the temporary withdrawal of the proposed listing of this species.
49	Past urban development and current regional population growth trends							✓		Communities, many dating from the 1850s, were developed in response to mining, agricultural, military, and transportation developments. Although agriculture remains important, the Yuma economy has long been diversified and includes military bases, multiple industries, recreation, and, most recently, seasonal and permanent retirement communities. Growth and economic diversity is also affecting other communities in the BMGR locality. The three counties in which the BMGR is located experienced 40 percent growth from 1990 to 2000 and are projected to increase by about 21 percent between 2000 and 2015. Key growth areas in the immediate BMGR region are Yuma, Gila Bend, and Ajo.
50	Continued Development in Vicinity of BMGR—West Boundary (near Wellton and Yuma)	✓						✓		The Yuma and Yuma Foothills areas continue to experience rapid growth in residential, commercial, agricultural, and light industrial development. Dome, Ligurta, Roll, Tacna, Welton, and Mohawk, traditional agricultural communities, have also experienced unprecedented growth. Welton, the largest community grew by 75 percent from 1990 to 2000. Continued growth is expected.

<b>TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*</b>									
<b>ACTION</b>		<b>LOCATION OF ACTION</b>							<b>SUMMARY DESCRIPTION OF ACTION</b>
<b>No.</b>	<b>Name</b>	<b>See Map</b>	<b>BMGR East</b>	<b>BMGR West</b>	<b>Organ Pipe NM</b>	<b>Cabeza Prieta NWR</b>	<b>Other Areas in Region</b>	<b>Mexico</b>	
51	Munitions Storage Area Improvements at Gila Bend AFAF	✓	✓						The munitions storage area at Gila Bend AFAF was upgraded and expanded to meet new Air Force explosive storage safety standards and for supporting military training mission requirements (2001).
52	Hickiwan Casino, Convenience Store, and RV Park (about one mile east of Why)	✓					✓		A convenience store, gaming casino, and 92-space RV Park were constructed on the Tohono O'odham Nation about 1 mile east of Why, Arizona, from 1996 to 1998. Facilities developed to support these operations include a well, water treatment, and sewer.
53	Military Training Route Realignment		✓		✓	✓	✓		Seven Military Training Routes that lead to BMGR—East were relocated to avoid overflights of villages or other areas of activity within the Tohono O'odham Nation (1999).
54	Environmental Baseline Survey (EBS) Activities for Non-renewed Parcels	✓					✓		A Phase 1 EBS was completed by Luke AFB (2002) for the four parcels of BMGR lands that were not renewed by the MLWA of 1999. Areas with recognized environmental conditions, that indicate an existing release, a past release, or material threat of a release of hazardous substances or petroleum products within the parcels, were identified. With the exception of possible displaced munitions located within Sand Tank Mountains and Sentinel Plain parcels, no other recognized environmental conditions were classified at the EBS sites. The munitions issue is being addressed by the Air Force and the BLM.
55	Sonoran Desert NM Establishment and Management	✓					✓		Sonoran Desert NM, totaling approximately 496,337 acres, was designated in January 2001. The new national monument, which is north of and contiguous to the East TAC, includes the former 77,957-acre Sand Tank Mountains parcel of the BMGR that was not renewed by the MLWA of 1999. A management plan for the national monument is being prepared by the BLM.
56	Dairy located south of Interstate 8 at Aztec	✓					✓		A new dairy was constructed south of Interstate 8 at the Aztec exit. Operations began in 2001.
57	Agricultural development of Fallow Land in Dateland Area	✓					✓		The town of Dateland is encouraging development of fallow agricultural land north and south of Interstate 8.
58	Yuma Area Service Highway	✓		✓			✓		The highway has been proposed to connect Interstate 8 east of Yuma to U.S.-Mexico border at San Luis, with a portion within the northwesternmost edge of BMGR—West (estimated 2005).

TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*									
ACTION		LOCATION OF ACTION							SUMMARY DESCRIPTION OF ACTION
No.	Name	See Map	BMGR East	BMGR West	Organ Pipe NM	Cabeza Prieta NWR	Other Areas in Region	Mexico	
59	San Luis, Arizona, Commercial Port-of-Entry	✓					✓		Relocation of the San Luis commercial port-of-entry four miles from the existing port-of-entry, to a location west of the BMGR is planned in association with the development of the Yuma ASH (estimated 2005).
60	Parque Industrial Internacional (near San Luis)	✓						✓	A major 8,000-acre industrial park being developed in Mexico opposite the San Luis commercial port-of-entry and Yuma ASH terminus. Development began in the early 1990s. A counterpart 400-acre industrial park is anticipated in the United States just east of the proposed commercial port-of-entry (pending).
61	Paloma Ranch just west of Gila Bend and mixed-use development proposed in Gila Bend	✓					✓		Approximately 100,000 acres of fallow Paloma Ranch agricultural land west of Gila Bend is planned for future development of either residential or light and heavy industrial uses. To date, the only major development proposed within Paloma Ranch is an electrical power plant (see description below).
62	Power Plants being constructed by Panda Power and Gila Bend Power Partners, LLC at Paloma Ranch	✓					✓		Construction of a 2,000 megawatt power plant is underway. Construction of a second 750-megawatt plant is expected to begin in 2002. Mixed land use development is expected near the plants.
63	Pima County Sonoran Desert Conservation Plan		✓				✓		The Sonoran Desert Conservation Plan was prepared by Pima County land use planning and its implementation is overseen by the Pima County Board of Supervisors. The plan identifies the BMGR as a potential area for biological conservation priority.
64	Management Plan for Tohono O'odham Nation	✓					✓		A long-term goal of the Tohono O'odham Nation is to develop a Resource Management Plan that may be implemented in cooperation with federal, state, and county agencies, as well as private landholders whose lands adjoin or include portions of the Nation's traditional territory (pending).
65	El Camino del Sol Airpark in Dateland	✓					✓		A residential airpark in Dateland has been proposed but it does not appear that the airpark will be developed in the near future.
66	BLM Management Plans for BMGR Parcels not renewed by the MLWA of 1999	✓					✓		Management plans are to be prepared by the BLM for the Sentinel Plain, Sand Tank Mountains, Ajo Airport, and Interstate 8 parcels. Management of the Sand Tank Mountains parcel will be addressed by the pending Sonoran Desert National Monument management plan.

<b>TABLE 6-2 PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS*</b>									
<b>ACTION</b>		<b>LOCATION OF ACTION</b>							<b>SUMMARY DESCRIPTION OF ACTION</b>
<b>No.</b>	<b>Name</b>	<b>See Map</b>	<b>BMGR East</b>	<b>BMGR West</b>	<b>Organ Pipe NM</b>	<b>Cabeza Prieta NWR</b>	<b>Other Areas in Region</b>	<b>Mexico</b>	
67	YTRC improvements to military training facilities in BMGR—West			✓		✓			BMGR—West improvements including new ground support areas, ground support zones, TACTS Range threat emitters, modifications to the Moving Sands and Cactus West target complexes, a parachute drop zone, a runway upgrade at AUX-2, and low-level flight corridors overlying the Cabeza Prieta NWR were authorized under the YTRC EIS (1997) and YTRC Supplemental EIS (2001).
68	Beddown of Combat Search and Rescue assets at Davis -Monthan AFB		✓	✓			✓		A Combat Search and Rescue unit will be established at Davis Monthan AFB in order to meet Air Force needs to support worldwide, deployable long-range combat search and rescue of downed aircrew members. The action would add 12 HH-60 helicopters, 10 HC-130 fixed-wing aircraft, and 1,059 personnel to Davis -Monthan AFB. Training would occur in low altitude tactical navigation areas; portions of East TAC, North TAC (northeast of Crater Range), and the Yuma TACTS Range, and their associated restricted airspace. (This action is scheduled to begin in the fall of 2002, with the beddown to be completed by 2007.)

\* Adapted and updated from Yuma Training Range Complex Supplemental Environmental Impact Statement, September 2001



<b>TABLE 6-3 ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON INDIVIDUAL RESOURCES</b>		
<b>Resource Impact Assessment Category</b>	<b>Actions Causing Potential Additive or Interactive Effects (Identified from Table 6-2)</b>	<b>Description of Meaningful Additive or Interactive Effects</b>
<b>Earth Resources</b>	1-29, 31-32, 34-39, 41-44, 46-53, 55-68	<p>While almost all of the past, present, and reasonably foreseeable actions identified in Table 6-2 were identified herein as potentially causing some effect on earth resources, the net additive or interactive effects are dominated by the past development involving intense agriculture, industrial, municipal, and residential land uses encompassing large acreages. These meaningful effects have permanently altered the structure and function of earth resources. Most development has affected the basin areas of both the Sonoran Desert and Salton Trough physiographic provinces, which are shared in part by the BMGR (most of the BMGR is in the Sonoran Desert section; however, the Yuma Desert, in the southwestern BMGR, is within the Salton Trough section). The physical disturbance that has occurred within the BMGR from past and present military, agency and public use, is minor in contrast to other earth resources effects that have occurred outside of range.</p> <p>Many of the identified actions would only have the potential for minor localized effects on earth resources such as increased erosion, which would not be meaningful in context of this additive or interactive effects analysis (e.g., the unmanned threat emitter and cellular phone tower projects), while others would have localized, major impacts that would be meaningful (e.g., reopening of the Phelps Dodge mine), but would not necessarily have additive or interactive impacts with other actions analyzed. There are relatively few actions that would have the potential for synergistic impacts where the net effect of two or more actions would be greater than the individual effect of either. Meaningful synergistic impacts identified center around the large-scale effects that could negatively affect earth resources such as increased population and urban growth and various industrial and residential developments to support that growth.</p> <p>Long-term countervailing beneficial impacts have also resulted from past actions designating the Cabeza Prieta NWR, Organ Pipe Cactus NM, Sonoran Desert NM, and BLM Wildernesses and ACECs in the region and the ongoing preservation/conservation based management of these areas and the prohibition of the types of intense land uses that have negatively affected earth resources in the region. Together, with the Cabeza Prieta NWR, Organ Pipe Cactus NM, Sonoran Desert NM, and El Pinacate y el Gran Desierto de Altar, the BMGR represents an intact remaining example of the Sonoran Desert physiographic province, as detailed in Section 4.2, which is a benefit that is expected to extend into the future.</p>

**TABLE 6-3**

**ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE  
FUTURE ACTIONS ON INDIVIDUAL RESOURCES**

<b>Resource Impact Assessment Category</b>	<b>Actions Causing Potential Additive or Interactive Effects (Identified from Table 6-2)</b>	<b>Description of Meaningful Additive or Interactive Effects</b>
<b>Water Resources</b>	1-8, 10-16, 18, 20, 23-29, 31, 36-37, 41-43, 46-50, 52, 55-68	<p>The two watersheds in the BMGR region most meaningfully affected by the net additive or interactive effects of identified past, present, and future actions are the Gila River, located north of the BMGR, and the Rio Sonoyta located south of the BMGR, with some effects in the vicinity west of BMGR also potentially affecting the Colorado River watershed. The most wide-reaching effects to these water resources began with the loss of perennial and seasonally intermittent flows from disruption of perennial flows with dams and loss of groundwater for municipal, domestic, and agricultural purposes. Some of the identified actions would continue to cause similar effects to these waters, but most would be of little meaning in this watershed context.</p> <p>There are also no meaningful important individual effects or synergistic adverse effects. As with earth resources, meaningful synergistic adverse impacts identified center around the large-scale effects that could negatively affect water resources, such as increased population and urban growth and various land uses involving water use or discharge into waterways. The BMGR is downgradient of lands that are protected, with the headwaters in Organ Pipe Cactus NM, Cabeza Prieta NWR, and Sonoran Desert NM. The uses on the BMGR, which have minimally affected water resources, in this large-scale watershed context, flow northward to the Gila drainages and southward into the Sonoran drainages in the Cabeza Prieta NWR and Mexico.</p>
<b>Climate and Air Resources</b>	2-7, 10, 12, 14-15, 23-29, 31-32, 34, 36-50, 55-68	<p>The air quality of the BMGR region is generally regarded as good despite past and present actions. Most air quality effects are short-term and dissipate over time, even large-scale effects such as those that occurred when the smelter was active at the Ajo Mine. Many other effects are localized and the potential for impacts to occur, either additively or interactively, is dependent upon the season and other atmospheric conditions affecting the distribution of particulate matter and other pollutants within the airshed. Generally, activities and uses potentially affecting BMGR air resources are located within industrialized or urban settings. Large-scale air circulation patterns generally transport air into this airshed eastward from the Pacific Ocean and northward from the Gulf of California. These factors make additive or interactive impacts on air resources difficult to ascertain.</p> <p>The identified actions most likely to have additive or interactive impacts on BMGR air resources are large-scale urban, agricultural, and industrial development; transportation corridors; and military use. Individual actions such as the Yuma ASH, power plant construction, agriculture, and development of industrial parks further expand these types of development within the BMGR perimeter, where the increased emissions are more likely to be additive or interactive with those resulting from actions and uses within the BMGR. The reopening of the Ajo Phelps Dodge is not expected to involve smelting and, thus, impacts on air quality are not expected to be major. As with earth and water resources, however, perimeter lands that are managed for preservation purposes, including Cabeza Prieta NWR, Organ Pipe Cactus NM, Sonoran Desert NM, and El Pinacate y el Gran Desierto de Altar preclude types of uses that are principally associated with high levels of emissions. Likewise, development in the Tohono O'odham Nation has been at low levels, with few impacts on air quality.</p>

<b>TABLE 6-3 ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON INDIVIDUAL RESOURCES</b>		
<b>Resource Impact Assessment Category</b>	<b>Actions Causing Potential Additive or Interactive Effects (Identified from Table 6-2)</b>	<b>Description of Meaningful Additive or Interactive Effects</b>
<b>General Vegetation</b>	1-8, 10-18, 20, 23, 26, 28-29, 31, 34-36, 38- 39, 41-42, 46-52, 55-58	<p>As detailed in Section 4.5, the plant communities of the BMGR have retained relatively unaltered structure, composition, and function. Within some other areas of the greater Sonoran Desert ecoregion, however, these plant communities have been greatly affected by development that has destroyed or altered them significantly. Within the U.S. portion of the Sonoran Desert Ecoregion (Arizona and California), 87 percent of the landscape-scale land areas is managed by federal or state agencies, but less than 20 percent of this land is managed to promote the long-term persistence of conservation elements (Marshall and others 2000). The collective protection of plant communities within the contiguous BMGR-Cabeza Prieta NWR-Organ Pipe Cactus NM-Sonoran Desert NM, thus represents a large landscape-scale conservation area for the ecoregion. While large-scale development has not occurred within El Pinacate y el Gran Desierto de Altar, ongoing extensive livestock grazing and wood cutting activities have damaged the natural flora and fauna of this area to a greater extent than the other identified preservation areas.</p> <p>The past, present, and future actions within the BMGR and surrounding preservation areas are relatively minor and localized, the net additive or interactive effects on vegetation would be of little consequence in terms of these landscape-scale conservation areas.. Many of the identified past, present, and future actions that have the greatest effect on general vegetation are outside of the protected area, but could nonetheless affect vegetation within these areas by factors such as the introduction and proliferation of invasive species and the unnatural proliferation of fire as carried by these invasive species. The development in the unprotected areas of the BMGR perimeter has the greatest potential to have additive or interactive impacts with those effects on plant communities that occur within the BMGR.</p>
<b>General Wildlife and Wildlife Habitat</b>	1-8, 10-20, 23-26, 28- 29, 31-36-44, 46-52, 55-58-68	<p>The additive or interactive effects on general wildlife habitat are similar in context to those discussed for general vegetation in terms of loss and conversion of habitat. Effects to wildlife also include population declines from increased rates of death or injury and decreased recruitment rates, loss/conversion of habitat, habitat fragmentation, and disruption/disturbance from noise and human activity. Again, as with the previous resources discussed, the greatest and most extensive additive or interactive effects to general wildlife and wildlife habitat have occurred as the result of intense agriculture, industrial, municipal, and residential land uses development encompassing large acreages. Most of this use has been outside of the BMGR-Cabeza Prieta NWR-Organ Pipe Cactus NM-Sonoran Desert NM complex and, to some degree, outside of El Pinacate y el Gran Desierto de Altar.</p> <p>The additive or interactive impacts that potentially affect BMGR general wildlife and wildlife habitat most directly are those on the BMGR perimeter that would potentially cause deleterious effects which could extend to wildlife populations and habitats on the BMGR. Due to the ecological landscape scale of habitat loss, curtailment, modification, and fragmentation within the BMGR region, these issues are further discussed in Section 6.3.2</p>

**TABLE 6-3**

**ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE  
FUTURE ACTIONS ON INDIVIDUAL RESOURCES**

<b>Resource Impact Assessment Category</b>	<b>Actions Causing Potential Additive or Interactive Effects (Identified from Table 6-2)</b>	<b>Description of Meaningful Additive or Interactive Effects</b>
<b>Protected Species</b>	1-8, 10-18, 20-23, 25-26, 28-29, 31-34, 36-44, 46-50, 53, 55-68	<p>Additive or interactive effects on protected species from the identified actions are readily identifiable for flat-tailed horned lizard and Sonoran pronghorn. A thorough assessment of additive or interactive effects on Sonoran pronghorn that result from past and present actions and that would result from reasonably foreseeable future actions within the historic range and current distribution of this species is presented in the YTRC Supplemental EIS (September 2001). Those actions causing Sonoran pronghorn habitat loss or curtailment, habitat modification and diminished quality of habitat, overutilization, disease or predation, management or regulatory conflicts, death or injury, harassment, diminished fawn recruitment, or exposure to toxic substances or materials have the potential for adverse additive or interactive impacts. Some actions have resulted in additive or interactive effects that have acted significantly to support the survival of this species, Most important among these countervailing actions are the long-standing prohibition on Sonoran pronghorn hunting in the U.S., habitat protection and conservation within the BMGR, Cabeza Prieta NWR, and Organ Pipe Cactus NM, and recovery efforts directed by the Sonoran Pronghorn Recovery Plan.</p> <p>For the flat-tailed horned lizard, additive or interactive impacts include urban, industrial, and agricultural development west of the BMGR within the historic and current range of this species, including development in California. The Yuma ASH may have important adverse impacts on this species in combination with other past, present, and future uses affecting this species. The Flat-tailed Horned Lizard Range-wide Management Strategy and four associated HMAs, including the one on the BMGR have countervailing effects on this species sufficient to lead to a January 2003 decision by the USFWS not to list the flat-tailed horned lizard as threatened.</p> <p>Additive or interactive effects on other protected species within the BMGR are more difficult to identify because the range is not as central to their survival and they have not been studied on the range to the extent that the Sonoran pronghorn and flat-tailed horned lizard have been. Additive or interactive impacts similar to those discussed for Sonoran pronghorn and flat-tailed horned lizard are nonetheless the cause of the decline and protected status of other species addressed in Section 4.7. Similarly, habitat protection and conservation within the BMGR, Cabeza Prieta NWR, and Organ Pipe Cactus NM has been a countervailing additive or interactive effect working in favor of protected species present within these areas.</p>
<b>Wildfire Management</b>	1-8, 10-15, 23, 28-29, 31, 40-41, 44, 46-19-50, 55-59, 61-67	<p>The identified additive or interactive impacts of wildfire management are directly related to those on general vegetation and to the extent to which plant communities have been altered by the introduction of invasive species that could carry wildfire to a greater extent than would occur naturally. Additive or interactive impacts also result from development that increases the presence of human activities within the region.</p>

<b>TABLE 6-3 ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON INDIVIDUAL RESOURCES</b>		
<b>Resource Impact Assessment Category</b>	<b>Actions Causing Potential Additive or Interactive Effects (Identified from Table 6-2)</b>	<b>Description of Meaningful Additive or Interactive Effects</b>
<b>Grounds Maintenance</b>	3, 10, 13, 24, 48, 51, 67	Additive or interactive effects on grounds maintenance are limited to those past, present, and future actions affecting operations or procedures within the maintained grounds of the BMGR—primarily at Gila Bend AFAF or Cannon Air Defense Complex. The military use of these areas is predominant, but some limited recreation use does occur. Some of the repaving projects and the Munitions Storage Area project were within the Gila Bend AFAF, although they were not related to landscape-maintenance activities. The Cannon Air Defense Complex is within flat-tailed horned lizard range. However, no meaningful additive or interactive impacts on grounds maintenance are identified.
<b>Public Utilities and Transportation Corridors</b>	2-7, 10, 12, 37-39, 43, 46, 48-50, 58-62, 64-65	The additive or interactive impact of the identified actions on public utilities and transportation corridors is a development-service relationship as the development of such services is interrelated with urban settlement and economic growth activities. The development of these services is somewhat precluded by the protected status of much of the lands in the BMGR region. Most development of public utilities and transportation corridors has occurred to the north and south of the BMGR, with network-type development centered in urban areas. The State Route 85/railroad corridor remains the only corridor within the BMGR, although the Yuma ASH is proposed for the western fringes of the range. Section 4.10 further discusses the particulars of these public utilities and transportation corridors. Meaningful additive or interactive impacts associated with public utilities and transportation corridor development are further discussed in and Section 6.3.2.
<b>Special Management Areas</b>	3-6, 10-13, 25, 48-50, 58, 67	The additive or interactive impact of the identified actions on special natural/interest areas relates to the historic recognition and management of the recently expired ACECs, SRMAs, and Backcountry Byway. This background information is covered in detail in Section 4.11. These special natural/interest areas have influenced and may continue to influence past, present, and future use of the BMGR by the military, Border Patrol, Arizona Game and Fish Department, and the public. The additive or interactive effect(s) to the flat-tailed horned lizard from the development within or near that portion of the HMA west of the BMGR, the Yuma ASH, and in the other designated management areas for this species in California and actions related to the Flat-tailed Horned Lizard Management Strategy could continue to effect the HMA. Future cleanup of inactive targets could cause some relatively low levels of disturbance within the expired Sentinel Plain SRMA
<b>Outdoor Recreation</b>	3-7, 9-18, 20, 28-30, 35, 42, 44, 46-50, 53, 55, 66-67	The identified additive or interactive impacts to outdoor recreation include the regional trends of increasing population and participation in outdoor recreation activities and the types of outdoor recreation opportunities in the BMGR region. Many of the identified past, present, and reasonably foreseeable actions involving development to accommodate population growth are correlated to the elimination of open space that was traditionally available for outdoor recreation and increasing reliance on public lands to provide outdoor recreational opportunities. Access to private and public lands is becoming increasingly difficult due to various factors including transfer of ownership, changes in land use, fee increases, and urban sprawl. In addition, some designated recreation and preservation areas have had to limit outdoor recreation access for resource protection purposes. Because of the relevance of this topic in the context of this INRMP, these issues have been previously detailed in Section 4.12 and these additive or interactive outdoor recreation effects within the BMGR region are further addressed in Section 6.3.2.

**TABLE 6-3**

**ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE  
FUTURE ACTIONS ON INDIVIDUAL RESOURCES**

<b>Resource Impact Assessment Category</b>	<b>Actions Causing Potential Additive or Interactive Effects (Identified from Table 6-2)</b>	<b>Description of Meaningful Additive or Interactive Effects</b>
<b>Public Health and Safety</b>	1-7, 9-18, 22-26, 28-29, 31, 35, 37-40, 42-47, 49-51, 53-54, 58, 65-67	The impacts of the actions identified on public health and safety are generally additive, where each identified action has some discernible potential to increase hazards or risks to public health or safety. For example, development of transportation corridors is correlated with the potential for vehicle/train accidents, risks from mining include heavy equipment use and excavation, risks associated with military operations include accidents or mishaps with aircraft, munitions, etc. Overall, however, these risks are generally managed by a combination of the responsible private parties and federal, state, and local governments so as to minimize the chances of them occurring and reduce impacts should they occur.
<b>Law Enforcement</b>	3-5, 10-16, 47, 49-50, 55, 59	The identified additive or interactive impacts to law enforcement include those enforcement requirements related to resource protection and public safety within the BMGR and other public lands as well as the actions taken to prevent the unauthorized entry of illegal aliens and drug smuggling across the U.S.-Mexico border. Agencies involved in law enforcement primarily for public safety and resource protection generally include BLM, USFWS (within the refuge and with regard to endangered species protection), AGFD (with regard to hunting laws), NPS, and the Air Force and Marine Corps with regard to law enforcement on the BMGR. Arizona Department of Public Safety and local municipal law enforcement agencies provide the primary public law enforcement outside the BMGR. Law enforcement relative to the international border is primarily the responsibilities of the United States Customs Service and Border Patrol. Several of the identified actions were detailed in the existing conditions for this resource in Section 4.14. Meaningful additive or interactive impacts potentially resulting from the actions identified are the increased population and rates of illegal border activity. Minor additive or interactive effects could result from the relocation of the San Luis Port of Entry.
<b>Transboundary and Domestic Perimeter Land Use</b>	2-7, 9-10, 12-18, 20, 27, 28-29, 35, 37-39, 42-43, 45-50, 52-56, 58-66	Nearly all of the identified actions that are outside of the BMGR are identified as potential additive or interactive effects on transboundary and domestic perimeter land use. While some of the minor individual actions would not have meaningful effects, they are additive and influence overall regional development trends..
<b>Cultural Resources</b>	1-7, 10-19, 25, 31, 44, 46-47, 49-50, 55, 58-60, 64-67	Some historic military and non-military activities within the BMGR have no doubt resulted in the loss of cultural resources and the information potential represented in these resources. The significance of these losses cannot be assessed; however, the military surface use footprint within the range that has caused notable surface disturbance has been limited to a relatively small portion of the range (< 10 percent). Consideration of potential cultural resource effects has preceded most military and other government actions within the range that had been conducted over the last several decades with the result that potential adverse effects on these resources have been avoided or mitigated. A separate ICRMP, which is mutually supportive with the INRMP, has been developed for the management of cultural resources within the BMGR. Certain non-government activities, including public recreation, have not been adequately assessed as to their potential adverse effects on cultural resources and the extent to which damage to these resources has occurred so the significance of that potential damage cannot be determined. Management programs currently in place for the range are initiating actions to assess the extent to which recreation and other non-regulated activities, such as UDA traffic, may be affecting cultural resources. Recommendations for regulating recreation and other activities to protect cultural resources will be forthcoming when the results of these assessments are available.

**TABLE 6-3**

**ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE  
FUTURE ACTIONS ON INDIVIDUAL RESOURCES**

<b>Resource Impact Assessment Category</b>	<b>Actions Causing Potential Additive or Interactive Effects (Identified from Table 6-2)</b>	<b>Description of Meaningful Additive or Interactive Effects</b>
<b>Visual Resources</b>	1-7, 9-19, 24, 25-26, 31-32, 35, 36, 37-40, 42-44, 46-47, 49-50, 55, 58-67	The additive or interactive effects of past activities on visual resources have generally not been significant in terms of the overall BMGR landscape. With the exception of some localized foreground areas, the vistas within and of the BMGR are of a natural and unmodified landscape. Military activities, such as target and electronic instrument installations, have created visual intrusions. These effects, however, were consequences of activities that are consistent with the purposes for which the BMGR was established and are not contrary to visual resources management standards for the range. Other visual foreground effects have resulted from vehicle use by non-military agencies and public visitors. Collectively, multiple roads and vehicle trails created by this use have modified the foreground character in some areas from a primitive to a semi-primitive appearance. Some developments located outside of the range, such as Interstate Highway 8, communications towers, water towers, and buildings, are also visually intrusive within the middleground or background from viewpoints within the BMGR.
<b>Hazardous Materials and Waste</b>	1-7, 9-10, 12, 25, 31-32, 34, 37-40, 42-46, 49-50, 54, 58-62, 64-67	The use, handling, transport, and storage of hazardous materials and waste, other than military munitions, is much more prevalent in the region, primarily in association with industrial and agriculture and transportation than within or adjacent to the BMGR. Most of the actions identified as having a potential effect are potential future projects that would involve the temporary use of hazardous substances and the creation of wastes from relatively minor activities that would not be meaningful. Additive or interactive impacts within the BMGR could result from military use, historic but inactive mines, fuel and other fluids from vehicles operated by civilian agencies and the public, and wildcat dumping. These effects are further discussed in Section 6.3.2.
<b>Socioeconomics</b>	1-8, 10-16, 19, 22-26, 28-34, 36-40, 42-48, 49-50, 52, 55, 58-67	Centers of economic activity within the BMGR region include Yuma, the Lower Gila River corridor, Gila Bend, Ajo, Sonoyta, and San Luis Rio Colorado. All of these areas have experienced economic growth over the last 10 years and the various ongoing and planned development projects, as indicated by the actions listed in Table 6-2, are evidence of expected continued growth. The expected additive or interactive effect of these economic activities is for continued growth in the region's population. No negative economic consequences of the area's growth are foreseen, but the expected continued increase in population will likely lead to increased competition for recreational opportunities within the BMGR and other public lands in the region.

<b>TABLE 6-3 ADDITIVE OR INTERACTIVE EFFECTS OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS ON INDIVIDUAL RESOURCES</b>		
<b>Resource Impact Assessment Category</b>	<b>Actions Causing Potential Additive or Interactive Effects (Identified from Table 6-2)</b>	<b>Description of Meaningful Additive or Interactive Effects</b>
<b>Noise</b>	2-7, 9-18, 19, 23-25, 28-29, 31-34, 36-40, 42-46, 49-50, 52-53, 55, 58-67	<p>In the absence of military or non-military human activities, the background noise that occurs within those portions of the BMGR that are away from developed areas on its perimeter is typically characterized by sounds produced by weather, wildlife, and other natural phenomenon. Natural quiet within the range under these conditions can reach levels of stillness comparable to other remote desert wilderness areas. Noise is generated within the region by many activities, but the predominant sources of noise within the BMGR are associated with military activities. Among these military activities, the most prevalent source of noise—in terms of the area, frequency, duration, and intensity of effect—is military aircraft flight operations. Other military training or support operations that generate noise within the range include live ordnance delivery training, vehicle use, portable or fixed-site generator operations, training ordnance delivery, EOD detonations, munitions and target scrap demilitarization processing, and small arms training. The additive or interactive effect of the noise generated by all military operations is non-significant for human health and safety and has generally not been found to cause harmful effects in wildlife populations. Noise from military sources can cause annoyance among recreational visitors; but given that the fundamental purpose of the range is for military training, a standard to require that military activities be managed to maintain conditions of natural quiet is inappropriate.</p> <p>Non-military sources of noise within the BMGR region include activities performed by civilian government agencies, members of the public, or persons entering the United States illegally from Mexico. Noise is also generated within the range by high-speed highway traffic on State Route 85. The U.S. Border Patrol conducts regular low-level helicopter overflights and surface vehicle patrols within the range. Other government agency activities are performed as required for natural and cultural resources management and civil law enforcement purposes. The principal noise generating activities among these management and enforcement operations involve surface vehicle use but some aircraft overflights are also conducted, usually in support of wildlife management purposes. Vehicle use is also the principal noise source generated by public visitors to the range. The most prevalent source of noise generated by non-military activity outside of the BMGR that affects the range is associated with traffic on Interstate Highway 8 and Mexico Highway 2 and Southern Pacific Railroad trains. The Yuma ASH would also contribute high-speed traffic noise to the range environment. The additive or interactive effect of noise generated by all military and non-military sources is non-significant for human health and safety within the BMGR. Noise should generally not cause harmful effects in wildlife populations, but some noise abatement procedures are in place to reduce potential noise-induced harassment impacts on Sonoran pronghorn fawns during their first three to four months of life.</p>

### 6.3.2.1 Additive or Interactive Effects of Activities Before 1937

On the broader landscape scale, early past activities that have wrought the most significant changes in natural communities and ecosystem functions as well as in the human community include:

- European settlement and the Gadsden Purchase
- rise of permanent American settlements and towns
- development of impoundments and diversions of the Colorado and Gila rivers
- construction of canal systems and the advent of broad scale irrigated agriculture
- development of transportation corridors including wagon roads, railroads, and highways
- mining
- livestock grazing

European settlement, through Mexico prior to the Gadsden Purchase and from the United States following the purchase, likely eliminated or displaced most Native American use of the BMGR region, outside of Tohono O'odham Nation (including the San Lucy District near Gila Bend) and Cocopah and Quechan Indian reservation near Yuma, by the early 1900s. After the Gadsden Purchase, the predominant land uses assumed an American character.

During the almost 90 years from the Gadsden Purchase until before World War II, economic development in the BMGR region was slow by today's standards but gave rise to the area's main communities, transportation corridors, agricultural areas, and mining and livestock industries.

The origins of the three principal U.S. communities—Yuma, Gila Bend, and Ajo—within the region can generally be traced to the 1850s when early settlements at these locations were made possible by economic development opportunities. Although Yuma was located at an advantageous crossing point on the Colorado River that was historically important to Native Americans as well as Anglo American explorers, settlers, and other travelers, it was not until Fort Yuma was constructed on the western side of the river in 1850 that there was sufficient local economic activity to give rise to the town on the eastern bank. After the closing of the fort in 1883, the town continued to prosper as a result of the new Arizona Territorial Prison, mining activity in nearby mountains, and its strategic location as an interchange point for commerce and people moving to/from the Sea of Cortez via the Colorado River and overland east-west via wagon roads and the Southern Pacific Railroad, which was constructed during the 1870s. Agricultural development became a mainstay of the Yuma and Wellton-Tacna area economies following the completion of Bureau of Reclamation projects—Laguna Dam (1909) and the Colorado River Siphon (1912)—which provided irrigation water to the Yuma Valley and Wellton-Tacna areas. Conversion to agricultural cropland, urban, and other developed uses has irreversibly eliminated hundreds of thousands of acres of natural desert communities within this area. The trade-off, of course, has been the development of an economic base that supports tens

of thousands of permanent residents and tens of thousands of winter season visitors and provides agricultural and other products throughout the nation.

The origins and prosperity of Gila Bend are also rooted in agriculture and transportation. The first reported Spanish settlement farm, which followed a long history of Native American irrigated and floodwater agriculture at this site, was established by 1700 within the Gila River flood plain. Rich soils occurred at this location as a result of the annual spring floods of the Gila River. Farming continued in the Gila Bend area but it was not until 1921, when the construction of Gillespie Dam on the Gila River north of Gila Bend provided the irrigation water diversions through the Gila Bend Canal, that such diversions were necessary to support agricultural development of extensive tracts of land north and west of the town.

Gila Bend is also located at a position where overland routes from the east and southeast converged with the historic east-west route along the Gila River. In 1858, Gila Bend became an important stop along the overland stage route that traversed southern Arizona. Construction of the Southern Pacific Railroad during 1870s, which passes through Gila Bend, signified the importance of the Gila River corridor as an overland transportation route linking south central Arizona and points east with Southern California. Wagon roads paralleled the Gila Bend to Yuma segment of the railroad and by the 1920s a graded gravel highway that was to become U.S. Highway 80, which was paved by 1932, was constructed as a conveyance for motor vehicle traffic. U.S. Highway 80 was later replaced by Interstate Highway 8, which was constructed during the late 1960s and early 1970s. Although Gila Bend remains a small community of about 2,000 residents, the Paloma Farms west and north of town grew to encompass about 100,000 acres of croplands. Agricultural and transportation industries continue to dominate the Gila Bend economy but the ongoing construction of two electrical generating stations promises to provide an impetus for residential and light industrial development as well.

The Town of Ajo had its origins in mining beginning in 1854 with the organization of the Ajo Copper Company; however, the town did not flourish until the early 1900s when technological improvements in mining methods made mining both easier and more profitable. Ore was first shipped out of Ajo by pack mule overland to Yuma and then by wagon road to the Southern Pacific Railroad at Gila Bend. Ore was shipped from Ajo to Gila Bend by railroad from 1916 onward after the single-track, Tucson, Cornelia and Gila Bend Railroad was constructed across what is now BMGR—East. The mine at Ajo closed in 1986 because of falling world copper prices and the area was hard hit economically. The town has seen some economic recovery, however, as a retirement community and regional tourism crossroads. There are some prospects that continuing advances in cost efficient mining technology may support reopening of the Ajo Mine if international copper prices rise to levels that would justify making the necessary investments in this technology.

No major mines were developed within the interior of BMGR—East, but small prospects were developed within the Mohawk and Granite mountains, Sentinel Plain, Crater Range, White Hills,

and Saucedo and Sand Tank mountains. None of these prospects covered more than a few acres or has caused extensive surface disturbance or erosion problems.

Mining development within the BMGR—West land area, prior to its multi-step inclusion in the military reservation in 1942 and 1943, also appears to have been scattered and limited but occurred on a larger scale at two sites. The two largest mining operations in the area were the Fortuna Mine (active from 1894 to about 1925) on the west side of the Gila Mountains and the Betty Lee Mine (active in the 1920s and 1930s) within an eastward opening canyon of the Copper Mountains (U.S. Air Force 1986). Numerous other historic mines and prospects are found within BMGR—West, however, these sites are small to inconsequential in size. Most of these sites are located within the mountainous terrain of Baker Peaks, Wellton Hills, Copper Mountains, and Mohawk Mountains.

Ranching is the remaining early economic activity that contributed to the opening and settling of the BMGR region. Spanish settlers probably brought livestock to this region on a continuing basis at least as early as the late 1700s. American ranchers apparently arrived within the region at about the same time as the Gadsden Purchase of 1853. Not much is known about ranching activities from the 1800s, but plant community damage from over-grazing in the mid-1800s was noted as still in evidence in 1901 in what is now the Cabeza Prieta NWR (McGee 1901). Noted ranchers from the early part of the 1900s included the Childs, Cameron, and Gray families. Tom Childs, Jr. established a ranching operation 10 miles north of Ajo during this period. His operation was apparently one of the largest in the area with cattle from the Gila River to Mexico and west to the Mohawk Mountains (U.S. Air Force 1986). BLM grazing allotments under the Childs and Cameron family names continue to this day in the area around Ajo. The Gray Ranch was established in the Organ Pipe Cactus NM area in 1919 (Rutman 1997). Other ranches were also active throughout the region including the BMGR—East area. Evidence of historic ranching operations is found in many locations within BMGR—East. The remains of corrals, wells, buildings, fencelines, or other types of ranch improvements may be found south of the White Hills; in the Childs, Growler, and San Cristobal valleys; on the Sentinel Plain; between the Saucedo and Sand Tank mountains; and on the east side of the Sand Tank Mountains in the Paradise Well area. Livestock grazing occurred within what is today the Sonoran Desert NM during at least the first four decades of the 1900s prior to the BMGR during World War II. Ranching operations have also occurred in the Gila Bend area, and along the highway and Gila River corridor between Gila Bend and Yuma.

The extent to which livestock grazing occurred within BMGR—West prior to 1942 is not fully understood. In the 1870s, the Baker Ranch was located near the northern edge of what is now the BMGR near Tacna, Arizona. Evidence of possibly another ranching operation lies just inside BMGR—West at the northern end of the Sierra Pintas (U.S. Air Force 1986). All that remains at the Sierra Pintas site is a collapsed, hand-dug well and remnants of a corral made of mesquite and ironwood sticks (U.S. Air Force 1986). Another hand-dug well shaft is located near the northern boundary of BMGR—West in the valley between the Mohawk Dunes and Mohawk Mountains.

The purpose of this well is not known. No other evidence is known to indicate that livestock grazing occurred as an important industry within the BMGR—West area prior to World War II. However, the climatic and forage conditions that have prevailed during the several decades suggest that success for such an industry would have been dependent on highly ephemeral forage that appears only during the winter and early spring seasons of unusually wet years. Broyles and Hartmann (2000) shared this view as a result of their survey of the environmental setting and history of the Tinajas Altas region. Tinajas Altas, a collection of deep natural rock tanks that hold rain water throughout most years, is found in a canyon on the east side of the Tinajas Altas Mountains about four miles north of the international border. Broyles and Hartmann found no evidence of cattle camps, line camps, or ranches at Tinajas Altas, which is in the southwestern quarter of BMGR—West. They conclude that the presence of cattle within what is today BMGR—West likely occurred only in years with abundant winter rains when cattle strayed (or possibly were driven) south from settlements along the Gila River. They also point out, however, that large herds of cattle and packstock were driven by various parties along El Camino del Diablo through the Tinajas Altas area on trips to/from Sonoyta, Mexico, and Yuma and California from the 1850s to as late as perhaps 1910. The USFWS reported this driveway to be active until at least 1945 (USFWS 1945). Livestock on these drives would have made use of forage encountered along the trail. This observation suggests that ephemeral forage would likely also have been used to at least supplement the feed of packstock used at early mining operations within BMGR—West and BMGR—East, although, as already noted, most of these areas were not the scenes of extensive mining activities.

Two cities located on the Mexican side of the international border are the rough counterparts of Gila Bend and Yuma. Sonoyta, about 70 miles south of Gila Bend and immediately south of Organ Pipe Cactus NM, began as early as the late 1500s as a mission, ranching, and farming settlement positioned on the Rio Sonoyta. San Luis Rio Colorado, located on the Colorado River about 20 miles south of Yuma, also originated as a mission and farming community. Sonoyta and San Luis Rio Colorado are linked by Mexico Highway 2, which roughly parallels the international border.

When the first nearly 90 years of American sovereignty over the BMGR region drew to a close prior to the beginning of World War II, the region could be characterized as having three areas of substantial agricultural development—Yuma Valley, the Wellton-Tacna Gila River corridor area, and Gila Bend—and one heavy industrial area, Ajo, based on large-scale mining separated by vast tracts of undeveloped backcountry where scattered mining and livestock grazing were the only ongoing economic activities. Although the distances within the region were large, Yuma and Gila Bend and Gila Bend and Ajo are respectively separated by 116 and 42 highway miles, development of these communities and their associated industries did not occur in isolation from one another. Rather, these communities were linked in an often mutually supportive manner by wagon roads, railroads, and eventually highways that carried copper ore, agricultural products, fuel, and other forms of local and transcontinental commerce as well as settlers, workers, and other travelers.

Taking stock during the mid 1930s of the ecological health of that portion of the region currently occupied by the BMGR probably would have revealed that most of the interior of the area had been relatively unaffected by the development of the periphery of the region over the 85 plus previous years. This observation is based on the conditions present within the range today, the previous review of development in the region at that time, and the historical records that are available. Inventories that have been completed in recent years on surface use activities within the BMGR show that most of the area was free of heavy soil disturbing activities prior to the advent of military training in 1941 (US Air Force 1998b; U.S. Marine Corps 2001). Principal exceptions to this observation would have been limited and scattered mining operations and various dirt roads that had been pioneered through the range for mining, livestock grazing developments, community-to-community travel, early land surveys, or other purposes. As reported by a number of sources and as demonstrated by TNC's project to identify natural community conservation elements in support of the development of the proposed INRMP, some of the most substantial tracts of relatively undisturbed natural plant communities remaining in the Sonoran Desert occur within the BMGR (Wachter and others 1976, US Air Force 1986, Marshall and others 2000, Hall and others 2001). It follows from these observations, that similar plant community conditions must have been present in the 1930s and 40s over most of the range area or the conditions observed today would not be present. Still, a survey during the mid 1930s would not likely have found all aspects of the range ecosystem to be intact or the long term protection and conservation of its natural and cultural resources, including the biodiversity of the region, to be certain. The development that had occurred in the region had already brought some substantial changes to its environment including:

- The sharp decline of much of the native riparian community of the Lower Gila River, principally in response to the loss of perennial and seasonally intermittent flows in the river to upstream impoundments and diversions created by the construction of eight major dams by 1939. Accompanying the decline in riparian habitat was a complete loss of habitat within associated river flood plains and upland river valley areas to cropland conversion. As the river continued to be dewatered and habitat conversion to agriculture increased, the river corridor that had been the most productive habitat in the region and haven to many wildlife species during summer heat and drought was increasingly becoming a barrier to wildlife movement. The dewatering of the river and the rise of agriculture are cited as two of the early critical factors that led to the decline of the Sonoran pronghorn to endangered species status (Wright and deVos 1986). Additional material on this subject from the September 2001 YTRC Supplemental EIS (U.S. Marine Corps 2001) is incorporated by reference. These events also probably affected other ungulate including desert bighorn sheep and white tail and mule deer.
- The continuing rise of modern transportation corridors, including railroads and paved highways, between Yuma and Gila Bend, Gila Bend and Ajo, and Ajo and Sonoyta that

increasingly fragmented natural communities and presented barriers to the movement of some wildlife species.

- Year-round livestock grazing within the eastern portion of the region and possibly ephemeral livestock grazing within some western areas of the region. The National Park Service has found that by the mid 1930s the area that was to become Organ Pipe Cactus NM had experienced excessive livestock stocking rates and year-round grazing in excess of sustainable grazing use levels for more than half a century (U.S. DOI, National Park Service 2001). The Park Service further found that:

Short-term overuse by livestock can lead to loss of plant vigor, decrease in plant cover, and decrease in seed input to the system. Longer-term overuse can cause further decreases in plant cover, plant density, and shifts in species richness, composition and diversity. Long-term grazing pressure of the sort that occurred on the monument and adjacent areas can have long-lasting impacts, including type conversions (changing one type of plant association to a less productive type), decrease in species richness, decrease in species and community diversity, and accelerated erosion. Furthermore, desert plants, particularly long-lived species, and desert plant communities take many decades if not centuries to recover from such extensive disturbance.

As indicated in the preceding discussion of historic livestock grazing, much of the eastern portion of the BMGR region was probably subject to this activity between the 1850s and 1930s.

- An increasing cumulative number of scattered mines, prospects, livestock improvements, and access roads within the interior of the BMGR region that were not collectively substantial in area but that nevertheless further opened the interior to potential development intrusions.
- The rise of towns and small cities with a regionally increasing population that would have imposed rising pressures on the area's natural resources. One of these pressures may have been the early over hunting of Sonoran pronghorn (USFWS 1998a).

### **6.3.2.2 Additive or Interactive Effects of Activities Since 1937**

Three events occurred between 1937 and 1943 that have had a significant long-term effect on the natural and cultural sources within the interior of the BMGR region and have continued to influence development within the region through the present. The first two events, creation of Organ Pipe Cactus NM in 1937 and Cabeza Prieta NWR in 1939, placed a contiguous area of 1,865 square miles into land use designations that emphasized conservation management over most consumptive uses. Although both the NM and the NWR would be subject to continuing

legal and illegal grazing pressures until the mid 1970s, their respective designations arrested the potential for most other types of economic development and set these areas on a long-term course of management that would be increasingly protective of ecosystem functions and biodiversity.

The third event, designation of the BMGR through a series of contiguous land withdrawals in 1941, 1942, and 1943, was to have effects that both consumed and protected the range environment. Consumption came principally in the form of those parts of military training that caused direct impacts to soil surfaces and vegetative communities as a result of activities such as auxiliary airfield construction, ORV use, target construction, and air to ground ordnance deliveries. The total military surface use footprint within the BMGR over the course of 60 years is summarized in Table 4-5 which shows that less than 10 percent of the range area has been affected by activities that cause low to high levels of surface disturbance and that less than 3 percent has been subject to moderate to higher levels of disturbance. An indirect negative effect of the military range land withdrawal was that USFWS access to much of the interior of the Cabeza Prieta NWR was at many times limited by safety requirements associated with overhead air-to-air gunnery training until 1994 when the air-to-air firing range over the refuge was placed into an inactive reserve status.

The principal environmentally protective benefit of the military range was that, in exchange for surface use impacts resulting from military training, appropriative land uses, including but not limited to livestock grazing and mining, were prohibited by the legal instruments that established the range land withdrawals. This protection was also extended to about 95 percent of the Cabeza Prieta NWR, which was included within the military range. Prior to the withdrawal for the range, the NWR was subject to future mining claims and continued livestock grazing rights. Safety hazards and security requirements associated with military training also greatly limited the extent to which BMGR and Cabeza Prieta NWR lands could be subject to impacts from recreational use.

In any event, by 1943, Organ Pipe Cactus NM, Cabeza Prieta NWR, and the BMGR had placed over 4,900 square miles (reduced to about 4,750 square miles by deletions from the northern BMGR land area after World War II, many of which have been subsequently developed—see Figure 2-3) of the best remaining contiguous tracts of Sonoran Desert off limits to economic land use development through the additive and interactive actions of their respective land use designations. This was the case within the National Monument because of the National Park Service mission to preserve and protect the lands in its care for future generations. However, resource conservation objectives were not as well established for the Cabeza Prieta NWR during the first several decades of its existence. Although not by design, the safety and security requirements imposed by military use for both BMGR and NWR lands provided an enhanced level of protection to the refuge from potentially damaging levels of recreation use. The recognized high quality and expansiveness of many of the natural communities within the BMGR are also, in part, a product of long-standing limits on public use. The course had inadvertently been set by the 1941-1943 BMGR land withdrawals to conserve the environmental

qualities for which its lands are currently recognized. In the absence of the military land withdrawals, the potentials for the continued long-term protection and sustainable use of an expansive portion of the Sonoran Desert ecosystem that are under consideration in this EIS might not have been realized.

During and following World War II, all land-use within the BMGR was controlled by the requirements of the military mission. Over time, the aggregate military surface use footprint grew to reach the levels indicated in Table 4.5 as mission requirements changed, although not all portions of that footprint were active at the same time. The active military surface use footprint has actually declined by 22 percent from the peak extent of 274,000 acres that was reached about 10 years ago. The extent and density of the road network within the range also increased over time to 2,222 miles of inventoried roads with an estimated aggregate roadbed area of 8,000 acres,<sup>35</sup> but the historic timing and rate of this increase is not specifically known. Most of the road mileage increase within the long-serving tactical and manned ranges and Management Unit 1 target complex and auxiliary airfield areas that are restricted to public access is a result of the development of targets and other infrastructure needed to support military training. Military activities also contributed to new roads within areas that are currently open to the public, but much of the mileage increase in these locations, including some of the dense road network patterns, can be attributed to recreational vehicle use. The U.S. Border Patrol was responsible for the creation of some roads, such as the east-west drag roads across the Mohawk Valley and Lechuquilla Desert, which have become some of the most prominent thoroughfares on the range. Not accounted for in the preceding surface use acreage and road mileage figures are impacts caused by unauthorized off-road driving by recreationists, UDAs, and smugglers and authorized off-road driving by the Border Patrol when necessary for search and rescue or some law-enforcement purposes. Necessary off-road driving in support of military training activities is accounted for in these figures, but the figures do not take into account the aggregate surface impacts of spent aerial gunnery and air to ground munitions delivered outside of designated weapons ranges over the course of the preceding 60 years. Although these munitions impacts cannot be specifically quantified, the aggregate surface area affected by these munitions deliveries is considered to be negligible.

In addition to causing direct impacts to soils, vegetation, and wildlife, there is a concern that aggregate military and non-military surface use has also caused wildlife habitat fragmentation and that it has facilitated the introduction of invasive plant species. With the exception of State Route 85 corridor, which is a fully fenced transportation and utility corridor, habitat fragmentation has not yet been identified as a significant resource management issue within the BMGR. High-speed traffic on State Route 85 has been identified as a eastward habitat curtailment to Sonoran pronghorn within Organ Pipe Cactus NM and this highway may also impede the future recolonization of BMGR—East by these animals to the east of the highway (USFWS 1998a; U.S. Marine Corps 2001). Additional material on this subject from the

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<sup>35</sup> There is considerable overlap between the military surface use footprint and the aggregate roadbed area

September 2001 YTRC Supplemental EIS (U.S. Marine Corps 2001) is incorporated by reference. The proposed Yuma ASH has the potential to fragment habitat at the western end of BMGR—West, if the USFWS Biological and Conference Opinion of 1996 is not adhered to. This effect would separate habitat within the range from habitat outside the range. In contrast, State Route 85 separates approximately 326,000 acres, or 18 percent, of the range land area in Management Units 6 and 7 from the remainder of the range. These units, however, are contiguous with about 237,000 acres of the Sonoran Desert NM located south of Interstate Highway 8 and additional hundreds of thousands of acres within the Tohono O'odham Nation. There are no highways or other human structures between BMGR—East and the National Monument. The boundary between the military range and the Nation is separated by a cattle fence.

No other specific habitat fragmentation effects from either military or non-military surface use have been observed at this time that disrupt the movements or habitat requirements of macro fauna within the BMGR. A potential fragmentation effect on smaller wildlife species have not been investigated. This potential would presumably be greatest in association with the largest and most heavily traveled roads within the range, such as Border Patrol drag roads or roads used for daily access to manned and tactical ranges to support ongoing training missions. The potential for habitat fragmentation may also be exacerbated in the few passes that traverse some of the long trending mountain ranges, such as the Gila and Mohawk Mountains, that otherwise can pose extensive barriers to the movement of many species of terrestrial wildlife that depend on lower elevation habitats. With the exception of two air-to-ground targets located in passes through the Crater Range within North TAC Range, historic military surface use has not been positioned within these geographic areas. The creation over the years of multiple redundant roads through Cipriano and Tinajas Altas passes by public recreation has had some potential to cause habitat fragmentation effects within these constricted areas but the level of impact has not yet been known to affect wildlife movements including those of bighorn sheep.

The extent to which surface disturbance has served as a vector for the introduction of invasive plant species within the BMGR is not yet well understood. Some potential for these effects has been documented by Malusa and others (2001) in the Mohawk Sand Dunes in association with drag roads used routinely for law-enforcement surveillance by the U.S. Border Patrol. Determining the extent to which invasive species are a threat to the native ecosystem of the BMGR is a management problem that will require additional monitoring as well as interagency cooperation to determine and, if necessary, control.

Other potential additive or interactive effects from military use on the ecosystem of the BMGR include impacts from hazardous materials or wastes, munitions delivery, and noise. As described in Section 4.18, both the Marine Corps and Air Force have maintained long-standing and aggressive hazardous materials and waste containment and clean-up programs. The use of potentially hazardous materials or wastes, such as paints, solvents, lubricants, or other petroleum products, is closely regulated. Materials dispensed for use on the range are inventoried and

carefully tracked in terms of their use and, if necessary, proper disposal. Special provisions are taken to contain materials, such as vehicle fuels and lubricants, that may be subject to spillage or leakage while they are in use on the range. Certified spill response plans are in place with both the Marine Corps and Air Force, which include full coordination with other agencies with applicable resource management or regulatory jurisdictions, to provide for timely and appropriate containment and remediation actions should a release of a hazardous material or waste occur. Releases of hazardous materials are likely to occur in the event of an aircraft crash. Plans are also in place to direct and coordinate responses to these events including steps to contain and remediate spills associated with crashes.

Procedures for the handling of hazardous materials and wastes as a result of military use have long been in use on the BMGR. Handling procedures for hazardous materials and wastes within the BMGR have not always been up to contemporary standards and releases of such substances in the past may not have been handled in accordance with today's standards. The 1992 IRP for the range, however, was designed to identify, investigate, and remediate past release sites. As a result of the range of the IRP, 12 sites were identified within the BMGR and all sites have been adequately addressed, including no further declarations on site ST-108, AUX-2; site DP-109, Napalm Burn Area; and site SS-123, Fortuna Mine.

The most likely apparent sources of hazardous materials and wastes within the BMGR from non-military origins would include historic but inactive mines, fuel and other fluids from vehicles operated by civilian agencies and the public, and wildcat dumping. Nevertheless, none of these sources are known to contribute notable quantities of hazardous materials or wastes. Wildcat dumping, however, is an increasing source of solid waste in the form of trash and debris that is principally discarded around the periphery of the range. Another problem source of solid waste is items discarded by UDAs as they attempt to cross the range while entering United States illegally.

Collectively, hazardous materials and wastes have not been a prominent source of environmental concern within the BMGR. Inadvertent releases that do occur are promptly contained and remediated as appropriate and there are no apparent residual contamination problems associated with historic uses. There is no evidence to indicate that hazardous materials or wastes pose a threat to the overall health or functions of the ecosystem within the range.

As already discussed, munitions deliveries can cause a high degree of physical impact to core target areas but these areas are tightly concentrated and do not constitute a significant portion of the range land area. Target impact areas are accounted for within the data representing the military surface use footprint. From an ecological perspective, the pulverized soils within core target impact areas are areas of greatly simplified function and structure compare to surrounding undisturbed natural communities. The disturbed soils of these impact areas are known to support an abnormally high abundance of annual forbs following winter or spring rains that are

particularly attractive forage to Sonoran pronghorn. These impacts areas may also be fertile grounds for colonization by invasive species.

The best available evidence indicates that noise generated by military activities, including aircraft overflights, is not a significant problem for wildlife in general. Some specific activities that generate noise in certain circumstances, such as low-level helicopter overflights of Sonoran pronghorn females and fawns during the early months of the fawn's life, may be problematic. There are no indications, however, that noise plays a larger and more pervasive role within the BMGR that effects the structure, functions, or distributions of natural communities or individual species. Additional material on this subject from the September 2001 YTRC Supplemental EIS (U.S. Marine Corps 2001) is incorporated by reference.

Land use development in the region surrounding the BMGR during and after the second World War continued in the pattern establish before the war. Three additional dams were constructed on the Gila River system, including Painted Rock Dam in 1959, which all but eliminated natural flows within the lower Gila River corridor. The dewatering of this corridor was accompanied by continued agricultural development along the river and in the Yuma Valley area until at the present time there are nearly 94,000 acres of inventoried cropland within 5 miles of the northern and western boundaries of the BMGR.

Urban population growth and mixed economic development has continued in the Yuma area and, as previously indicated, unprecedented residential growth has occurred in many of the rural communities bordering the BMGR. Increased population in the region has in turn increased the numbers of people that have turned to the BMGR as an outdoor site over the last two decades. In addition, the increase in the popularity and availability of sport utility vehicles and other types four-wheel-drive vehicles has made remote locations, such as the BMGR, accessible for recreation by a higher proportion of the general population. In some respects, an increase in the number of federally restricted or protected land areas within the BMGR region has led some to increasingly favor the range for vehicle based recreation. Yuma Proving Ground was established in 1943; much of the Kofa and Cabeza Prieta NWRs were designated as wilderness in 1990; six wilderness areas—Muggins Mountains, Eagletail Mountains, Woolsey Peak, North Maricopa Mountains, South Maricopa Mountains, and Table Top—to the north and east of the BMGR were designated in 1990, and Sonoran Desert NM, which incorporated North Maricopa Mountains, South Maricopa Mountains, and Table Top wildernesses within its boundaries, was established in 2001.

Interstate Highway 8 was constructed during the late 1960s and early 1970s forming an imposing four-lane, high-speed, fenced barrier lying between the BMGR and the diminished Gila River riparian corridor. Increases in highway speeds on State Route 85 through Organ Pipe Cactus NM from about 35 miles per hour during the World War II era to the current 65 miles per hour has been credited with curtailing Sonoran pronghorn movement to the east of this highway since the mid 1970s (U.S.DOI, National Park Service 2001). Mexico Highway 2 between Sonoyta and San

Luis Rio Colorado was constructed as a paved highway at some point since World War II, thus, completing the encirclement of the contiguous land area generally composed by about 82 percent of the BMGR, all of the Cabeza Prieta NWR, and most of the Organ Pipe Cactus NM by joining the combination of Interstate Highway 8, State Route 85, and U.S. Highway 95 and paved Yuma County roads. The use of Mexico Highway 2 by heavy trucks has reportedly increased markedly since the passage of NAFTA in 1995 (U.S.DOI, National Park Service 2001). Additional material on this subject from the September 2001 YTRC Supplemental EIS (U.S. Marine Corps 2001) is incorporated by reference.

Another economically related phenomenon is the unprecedented surge of UDA traffic that has streamed across the interior of the BMGR region in recent years. Driven principally by the quest for work and better pay, this traffic and the US law enforcement response is nonetheless causing some of the most significant environmental damage to occur in some of the most remote locations of the region's interior.

### **6.3.3 Additive or Interactive Effects of Reasonably Foreseeable Future Actions on the Ecological Landscape and Human Community**

Reasonably foreseeable future actions within the BMGR include the cleanup of inactive targets, development of gravel extraction sites for targets and maintenance, potential development of an electronically scored simulated urban target area, and increased aircrew training operations at night within the BMGR—East and the possible relocation of a Marine squadron to MCAS Yuma that would operate UAVs within BMGR—West (see actions 25, 31, 40, 41, and 45 in Table 6-2). Next-generation aircraft and weapon systems will also likely be introduced to the BMGR within future years (see action 44 in Table 6-2). The individual and cumulative effects of these actions will be assessed in separate NEPA documentation. At this time, it is reasonable to project that these actions would not cause appreciable increases in the military surface use footprint within the range but these actions may affect public access as a result of modified safety and security requirements. Continuing Sonoran pronghorn recovery actions, including the forage enhancement and semi-captive breeding projects (see action 26 in Table 6-2), may also prompt changes to public access privileges within portions of the BMGR, Cabeza Prieta NWR, Organ Pipe Cactus NM, or adjacent BLM lands.

Many of the future actions that are pending within the BMGR region outside of the military range involve economic development activities that are less reasonably foreseeable as specific projects but that appear to be collectively inevitable (see actions 43, 49, 50, 57-59, 60-63, and 65 in Table 6-2). Most of the economic growth in the region is expected in the Yuma area but unprecedented residential growth has occurred in the greater Wellton-Tacna area over the last 10 years and is expected to continue. Population growth and urban development are also anticipated to accelerate in Gila Bend in response to two new electric power generating stations that are currently under construction adjacent to this town. The potential reopening of the Phelps Dodge

Mine in Ajo is dependent on international copper prices and is therefore less certain. Reopening this mine would create job opportunities for 350 to 400 people in Ajo, but may have negative effects on the attractiveness of this community as a retirement area. Economic development in Sonoyta and San Luis Rio Colorado, Mexico, is also expected to continue at a rapid pace as a result of cross border trade advantages imparted by the NAFTA. Collectively, these projections for economic development will likely result in some additional irretrievable loss of wildlife habitat and conversions of native Sonoran Desert to urban activities. Much of the anticipated or planned development in the vicinities of Yuma, Gila Bend, Wellton and Tacna, and Dateland, however, is expected to involve the conversion of existing agricultural lands to urban land uses with no direct loss in undisturbed desert. Still, the increases in population that will occur in these communities and elsewhere in the region as a result of the accelerated economic activity will place more pressures on the wildlands, including the BMGR, that remain in the region. These pressures may be expected to come in the forms of degraded air quality, curtailed wildlife movement corridors, increased traffic, and increased demand for outdoor recreation.

The reasonably foreseeable future also includes the ongoing or pending development of four management plans for various wildland areas outside of the BMGR (see actions 14, 55, 64, and 66 in Table 6-2). These areas include the Cabeza Prieta NWR, Sonoran Desert NM, Tohono O'odham Nation, and the Sentinel Plain, Interstate 8, and Ajo Airport parcels that were not renewed as a part of the BMGR. These areas are contiguous with the BMGR and, collectively, the pending management plans should enhance and coordinate conservation of natural and cultural resources throughout this greater region.

#### **6.3.4 Additive or Interactive Effects of All Past, Present, and Reasonably Foreseeable Actions on the Ecological Landscape and Human Community**

The additive or interactive effects of all past, present, and reasonably foreseeable actions on the ecological landscape and human community of the BMGR region are best summarized in terms that characterize how the current status of the region was shaped, its present ecological and human community conditions, and future activities that will likely influence its fate. These effects include:

- Native American cultures and land uses in the region were displaced or eliminated first by Spanish settlement and economic development (1500s-1853) and then by American settlement and development following the Gadsden Purchase of 1853. Spanish economic and development activities were focused on farming, livestock grazing, and trade. These activities were expanded and accelerated in the region following the American acquisition of sovereignty. Since 1853, the principal centers of economic activity in the BMGR region have been Yuma, the Lower Gila River corridor in the vicinity of Wellton and Tacna, Gila Bend, Ajo, Sonoyta, and San Luis Rio Colorado. These communities and development areas were linked by transportation corridors that originated as overland trails and wagon roads, were

expanded to include railroads, and eventually further developed to include modern two-lane and four-lane highways. The additive or interactive ecological effects of economic development are principally the collective result of (1) dewatering of the Gila River through impoundments and diversions; (2) conversion of Rio Sonoyta streamflows from perennial to intermittent due to groundwater pumping; (3) the loss of riverine and riparian habitat along these formally perennial streams; (4) irreversible conversion of native Sonoran desert to agricultural, urban, and industrial purposes within the Yuma Valley, lower Gila River corridor, Gila Bend, Ajo, Sonoyta, and San Luis Rio Colorado areas; (5) development of transportation corridors linking the principal centers of economic activity; (6) livestock grazing within the interior of the region; and (7) opening of the interior of the BMGR region as a result of unimproved road development to support livestock grazing, prospecting and mining, and land survey. As a result of these actions, structural and functional components of the region's ecosystem have been diminished. Accordingly, its resiliency to resist, recover from, or adapt to impacts has also been reduced. The most critical effects of these actions have been the loss of riverine and riparian habitat, the loss of other habitats to agriculture and urban oriented activities, and the fragmentation of habitat from the development of major transportation corridors and irrigation canals. These outcomes have, in turn, impacted natural communities and selected wildlife species within the interior of the region, in part by retarding or curtailing wildlife movements and migrations. Further, these outcomes have limited or eliminated biologically productive and protective floodplain and bottomland habitats that were at least seasonally important to many upland wildlife species and reducing the availability of riverine and riparian habitat impacted upland wildlife that utilize these very limited corridor areas directly or indirectly for support during certain phases in their life cycles. The ecological effects of perimeter development on the interior of the BMGR region have been further exacerbated by the stresses induced by historic livestock grazing and the opening of the area to vehicle access through the development of backcountry roads.

- Three long-standing, land use designations—Organ Pipe Cactus NM, Cabeza Prieta NWR, and the BMGR—have provided resource conservation protection to much of the interior of the BMGR region. These designations, from the 1937 to 1943 timeframe, have collectively eliminated or prohibited appropriate land uses, such as livestock grazing, mining, and farming, from the region's 4,750 square mile interior and have somewhat offset the adverse ecological effects of the economic development and population growth that has occurred on its perimeter. The NM and NWR designations have also placed resource protection and conservation at the core of land management priorities for about 40 percent of the region's interior. Military use of the BMGR has resulted in the impairment of some of natural and cultural resource qualities but, with a surface use footprint that has affected less than 10 percent of the range area at low to high levels of surface disturbance and less than 3 percent of the area at moderate to high levels of disturbance, designation of the military range has also had the countervailing effect of protecting over 90 percent of the area from the deleterious effects of long-term economic land use development. The interior land area of the BMGR region also has an advantage associated with its surface hydrology that helps to

insulate this area from potential impacts originating outside of its perimeter. The topography of the BMGR region, including Organ Pipe Cactus NM, Cabeza Prieta NWR, and the BMGR, is such that the headwaters of almost all surface water drainage from the region originates from within the region and drains to locations outside of the region. Most of the region drains to the north or northwest into the Gila River. The exceptions include the area along the southern portions of Organ Pipe Cactus NM and Cabeza Prieta NWR in the area west of the Gila and Tinajas Altas Mountains. These locations drain into either the Rio Sonoyta or Colorado River in Sonora, Mexico. The only notable location that drains into rather than out of the region is the Growler Wash that flows into Organ Pipe Cactus NM from BLM lands located in the vicinity of Ajo. As a result of these drainage patterns, Organ Pipe Cactus NM, Cabeza Prieta NWR, and the BMGR are generally not vulnerable to surface waterborne sources of hazardous materials or wastes or other contaminant that originated outside their collective boundaries.

- The current relationship between the ecological conditions of the BMGR region and its human community is best characterized as one of growing tension. The tension is that between a fairly well protected and expansive core land area that continues to harbor a representative cross section of indigenous Sonoran Desert natural communities and biodiversity that is nonetheless ringed by transportation corridors, centers of population, and economic development activity that in a number of ways threaten the long-term ecological health of the core. The past, present, and reasonably foreseeable future actions that collectively affect and to some degree diminish the ecological health of the region's interior have been defined under the two preceding bullets.
- The additive or interactive effects of past, present, and reasonably foreseeable future actions on the human community are also divergent. On one hand, the economic development activities that have occurred within the region have provided humans livelihoods and support for diverse cultural amenities. Prosperity over recent years has made, and will likely continue to make, these benefits increasingly available to a growing number of people. The extraction of these economic and other types of benefits from among the region's natural resources has, of course, not come without trade-offs. Development of the selected resource uses have come at the loss of other natural and cultural resource values with the consequence that those values are either no longer available or are available only in diminished quantity and quality for the enjoyment and benefit of the human community. A case-in-point within the BMGR region is that of the Sonoran pronghorn. This endangered species continues to survive within the United States but marginally so and almost exclusively within habitat currently found in Organ Pipe Cactus NM, Cabeza Prieta NWR, and the BMGR. The relatively infrequent opportunity to observe these animals is welcomed by most visitors to these areas. In the late 1900s, the Sonoran pronghorn was much more widely distributed within the Sonoran Desert in both the United States and Mexico. Many factors have contributed to the decline of this species but among the critical additive or interactive impacts that affect the prospects for its continued survival are the loss of the habitats adjacent to and within the former Gila River

riparian corridor. The availability of these habitats have been irreversibly lost to this species as a result of the development of the railroad and interstate highway that block its north-south movements, conversion of river corridor habitats to agriculture and other economic uses, and dewatering of the river itself. As a result of these and other additive or interactive effects, the Sonoran pronghorn population has lost much of its capacity to tolerate the effects of severe drought during its spring and early summer fawning season. In one of a number of management efforts to compensate for the aggregate losses incurred by this species, substantial portions of Organ Pipe Cactus NM, Cabeza Prieta NWR, and the BMGR are now closed to visitor use each year from March 15th through July 15th to increase the potential for pronghorn fawn survival by decreasing the potential for harmful levels of harassment of fawns during a vulnerable point in their lives. The trade-offs to the human community have been the reaping of economic benefits gained from the modifications to the Gila River corridor and transportation developments at the cost of seasonal visitation privileges to the interior of the BMGR region and the threat of the additional loss of the Sonoran pronghorn species.

#### **6.4 THE INCREMENTAL EFFECTS OF THE PROPOSED ACTION AND ALTERNATIVES WHEN TAKEN TOGETHER WITH ALL PAST, PRESENT, AND REASONABLY FORESEEABLE ACTIONS ON THE ECOLOGICAL LANDSCAPE AND HUMAN COMMUNITY**

A fundamental purpose of the proposed INRMP is to provide for the protection and conservation of natural and cultural resources of the BMGR and sustainable multipurpose public use, to the extent activities are consistent with the military purposes of the range. This fact is directly relevant to the overall determination of the cumulative effects of preparing an INRMP considered together with other past, present, and reasonably foreseeable future actions. As the preceding review and analysis presented in Sections 6.2 and 6.3 demonstrate, the BMGR represents a fairly well protected and expansive environment that harbors some of the largest and least disturbed remaining tracts of indigenous Sonoran Desert. Some of the natural communities present on the range are the best surviving representatives of these community types in the entire Sonoran Desert ecoregion. This is not to say that the additive or interactive effects of past and present actions, including non-military activities, have not adversely affected the range environment. These adverse effects have been thoroughly reviewed and documented in this EIS. The additive or interactive impact of past and present actions have been limited, however, and the overall BMGR ecosystem remains relatively healthy and intact. Therefore, the fundamental ecosystem management task for the proposed INRMP is to protect and conserve components, structure, and functions of this ecosystem. On overall balance, the management actions adopted through this plan must not harm these basic ecological components and processes. The vision of the proposed INRMP is to achieve more than the basic management expectations and ultimately set management on a course that will also help to restore damage to BMGR environments and enhance the overall resiliency of its ecosystem and biodiversity. Towards these ends, the

proposed action and all of the alternatives have been designed to, at a minimum, meet the overall requirement of protecting and conserving the basic ecological components and processes of the range environment while balancing opportunities for public use. The proposed action, however, is aimed at also fulfilling the long-term plan vision of guiding management such that overall improvements in the vitality and resilience of the range environment are achieved.

The aggregate effects of the proposed action and alternatives on individual resources within the BMGR are presented in Table 6-1. On overall balance, the proposed action and Alternative Management Strategies C and D are beneficial for the natural and cultural resources of the range and provide mixed effects for outdoor recreation. All three of these alternatives provide for public access but each strikes a balance between access and resource protection and conservation goals that favors the protection and conservation side of this management equation. The effects of these three alternatives on recreation are mixed because of the widely varying expectations that different groups of people have regarding desirable recreational experiences. The overall balances of Alternative Management Strategies A and B are shifted more in the direction of providing for public access and, as a result, these strategies would be less beneficial for the long-term protection and conservation of natural and cultural resources than the proposed action or Strategies C or D. In fact, the aggregate effects of the no-action alternative (Strategy A) were found to be slightly adverse for vegetation, wildlife, wildlife habitat, and protected species not because the provisions of this strategy would cause direct harm to these resources but because this strategy would fall somewhat short of the long-term goal of facilitating restoration and improvements in the range ecosystem and biodiversity. Although Strategies A and B provide for more public access than the proposed action or Strategies C or D, the aggregate effect of Strategies A and B on outdoor recreation were also found to be mixed because of the continuing variances in the perspectives of different segments of the population regarding the appropriateness of various recreation activities and the desirable characteristics of environments in which to pursue activities of their choice.

The additive or interactive effects of past, present, and reasonably foreseeable future actions on the individual resources within the BMGR are identified in Table 6-3. For most resource categories, including those for vegetation, wildlife, wildlife habitat, and protected species, the additive or interactive effects of past, present, and reasonably foreseeable future actions have been adverse and in some cases, such as protected species, these effects have also been significant. The cumulative impact of combining the proposed action, Alternative Management Strategy C, or Alternative Management Strategy D with the additive or interactive effects of past, present, and reasonably foreseeable future actions would be beneficial for most individual resources in that these alternatives would encourage or facilitate improvements in the existing conditions of these resources. In contrast, the cumulative impact of combining Strategies A or B with the additive or interactive effects of past, present, and reasonably foreseeable future actions would benefit the existing conditions of fewer individual resources.

The aggregate effect of the proposed action and all alternatives when considered on the broader scales of the BMGR ecosystem and the human community are overall countervailing influences for the restoration of the effects of past damage, the management and regulation of ongoing use, and adjustments and adaptations in management for responding to emerging issues. In aggregate, each of these strategies provides for sustainable multi-purpose use without compromising resources. Strategies A and B, however, in comparison to the proposed action, Strategy C, and Strategy D, promise less effective management tools toward this end.

The aggregate effect of Strategy D is overall most beneficial on both the human community and ecological landscape (see Table 6-1). This strategy offers the most ecosystem benefits at the scale of species-specific, natural community, range-wide ecosystem, and the greater ecosystem of which the BMGR is a part. While most effects on the human community are mixed, this strategy also offers the greatest benefits in terms of socioeconomics and public health and safety. One notable adverse individual effect on the human community, however, would result from the public utilities and transportation corridors management objectives in this strategy, which would preclude the development of new corridors, including the Yuma ASH for which extensive efforts are currently underway. Also, regardless of management strategy, there is an outstanding potential for BMGR recreation to be having adverse effects on cultural resources. Without having surveyed all areas of the range, recreation use could be causing damage to cultural resources that is yet unknown. As Strategy D is the most restrictive in terms of limiting the extent and types of recreation use, this strategy is the most advantageous in terms of minimizing the potential for such effects to unknowingly occur.

Next to Strategy D, the proposed action offers the most aggregate benefits. The proposed action includes some tradeoffs, which are less beneficial to resources as compared to Strategy D, but is less adverse in terms of the human community. A key example is that the proposed action would allow for the development of the Yuma ASH. Another tradeoff is that less extensive road closures are proposed within Management Unit 2, which is a popular area for recreation, including recreational driving and camping. There is little distinction in potential aggregate impacts of Strategy C and the proposed action.

Similarly, Strategies A and B would be less beneficial than the proposed action or Strategies C and D. The distinction between the two is that Strategy A is the continuation of management in accordance with the Goldwater Amendment and the habitat management plans, which are less comprehensive in comparison to the other strategies in terms of biodiversity management and are outdated; thus, this strategy has the potential for adverse effects above all other strategies in terms of general vegetation, wildlife and wildlife habitats, protected species, and cultural resources. Strategy B is less beneficial as compared to the other actions as it allows for the careful consideration of some consumptive uses (e.g., ORV use areas, wood cutting, and public entry to mines) that previously have not been sanctioned on the range. This strategy is potentially adverse above all other strategies on both ecological and human community scales in terms of

special natural/interest areas, public health and safety, cultural resources, and hazardous materials and waste.

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## CHAPTER 8

### DRAFT EIS DISTRIBUTION

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The draft EIS for the proposed INRMP for the BMGR was sent to the agencies and organizations listed in this chapter. The draft EIS was also sent to the following libraries to provide opportunities for the general public to review the document.

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Scottsdale Public Library  
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Tohono O'odham Education Department Library  
Tucson/Pima Library  
Wellton Branch Library  
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Dated: July 14, 2000.

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## DEPARTMENT OF DEFENSE

### Department of the Air Force

#### Notice of Intent to Prepare an Environmental Impact Statement (EIS) for the Barry M. Goldwater Range Integrated Natural Resources Management Plan

**AGENCY:** Department of the Air Force, DoD.

**SUMMARY:** Pursuant to Section 102(2)(c) of the National Environmental Policy Act of 1969 (NEPA), as implemented by the Council on Environmental Quality regulations (40 CFR 1500 to 1508), the Departments of the Air Force and Navy, in partnership with the Department of the Interior and the State of Arizona (Arizona Game and Fish Department), intend to prepare an EIS to evaluate the environmental effects of the implementation of the Integrated Natural Resources Management Plan being prepared for the Barry M. Goldwater Range.

**DATES:** Comments must be received no later than August 28, 2000 to ensure full consideration in the EIS.

**ADDRESSES:** See **SUPPLEMENTARY INFORMATION** section for meeting addresses.

**FOR FURTHER INFORMATION CONTACT:**

Luke Air Force Base, 56 FW/RMO, 6605 North 140th Drive, Luke AFB, AZ 85309-1934 (Attn: Mr. Bob Barry, telephone 623-856-3823, extension 242); Marine Corps Air Station Yuma at Range Management Department, Box 99160, Yuma, AZ 85369-9160 (Attn: Mr. Ron Pearce, telephone 520-341-3401); Bureau of Land Management at Phoenix Field Office, 2015 West Deer Valley Road, Phoenix, AZ 85027 (Attn: Mr. Gene Dahlem, telephone 623-580-5525); or Arizona Game and Fish Department, 2221 W. Greenway Road WM-HB, Phoenix, AZ 85023-4312 (Attn: Mr. John Kennedy, telephone 602-789-3602).

**SUPPLEMENTARY INFORMATION:** The Barry M. Goldwater Range, located in southwestern Arizona, was rewithdrawn from the public domain for military

training purposes under the Military Lands Withdrawal Act of 1999 (Public Law 106-65). In compliance with this Act, the Air Force and Marine Corps, in partnership with the Department of the Interior and the State of Arizona (Arizona Game and Fish Department), will manage the natural resources present on the Range in accordance with the Sikes Act (16 U.S.C. 670).

Accordingly, the Air Force and Marine Corps, in partnership with the Department of Interior and the State of Arizona (Arizona Game and Fish Department), are preparing and will implement an Integrated Natural Resources Management Plan for the Goldwater Range. Pursuant to the requirements of Public Law 106-65 and the Sikes Act, this Plan will provide for: (1) Management of natural and cultural resources present on the Range in support of the requirements of the military mission, (2) sustainable public use to the extent that use is compatible with military activities and natural and cultural resource compliance requirements, (3) compliance with laws protecting sensitive biological and cultural resources, including endangered species management, and (4) participation in local initiatives to advance regional biodiversity goals. The EIS, which is being prepared concurrently with the Integrated Natural Resources Management Plan, will evaluate the environmental effects of the management alternatives proposed in the Plan. Given the military purposes of the Range and the safety and security requirements associated with those purposes, the alternatives to be studied will focus on the protection, conservation, and management of resources and public use opportunities to the extent possible while not jeopardizing the military purposes of the Range.

Environmental issues to be addressed in the EIS include but are not limited to earth, biological, cultural, water, and visual resources; regional biological diversity management; wildlife management; threatened and endangered species; air quality; noise; land use compatibility; socioeconomic; recreation; environmental justice; and public health and safety.

The Air Force and Marine Corps, in partnership with the Department of the Interior and the State of Arizona (Arizona Game and Fish Department), are initiating a scoping process to determine the extent of issues to be addressed and identify the significant issues related to this action. Scoping meetings will be held in six southern Arizona communities, as indicated in

the Meetings section below. Each meeting will begin with an open house at which the public may review maps and other displays. At each meeting location, the open house will be followed by a formal presentation beginning at 7:00 p.m. These meetings also will be advertised in area newspapers. A Tohono O'odham translator will be available at the meeting in Sells, AZ.

Air Force, Marine Corps, Department of the Interior, and State of Arizona representatives will be available at these meetings to receive comments from the public regarding issues of concern to the public. Federal, state and local agencies, any affected Native American tribes, and interested individuals are encouraged to take this opportunity to identify environmental concerns that should be addressed during the preparation of the EIS. Agencies and the public are also invited and encouraged to provide written comment on issues that are important to them in addition to, or in lieu of, oral comments at the public meeting. To be most helpful, comments should clearly describe specific issues or topics, which the commentor believes the EIS should address. Written statements and or questions regarding the Integrated Natural Resources Management Plan and associated EIS should be mailed to BMGR INRMP, P.O. Box 67132, Phoenix, AZ 85082-7132.

#### Meetings

Public scoping meetings will be held:

1. Monday, August 7, 2000, 5:30 to 8:30 p.m., Glendale Adult Center Palo Verde Building, 7121 North 57th Avenue, Glendale, AZ.
2. Tuesday, August 8, 2000, 5:30 to 8:30 p.m., Ajo Community Center, 290 East 5th Street, Ajo, AZ.
3. Wednesday, August 9, 2000, 5:30 to 8:30 p.m., El Rio Center, 1390 West Speedway Boulevard, Tucson, AZ.
4. Thursday, August 10, 2000, 5:30 to 8:30 p.m., Kofa High School, 3100 Avenue A, Yuma, AZ.
5. Friday, August 11, 2000, 5:30 to 8:30 p.m., Gila Bend Union High School, 308 North Martin, Gila Bend, AZ.
6. Tuesday, August 15, 2000, 5:30 to 8:30 p.m., Tribal Council Chambers, Sells, AZ.

**Janet A. Long,**

*Air Force Federal Register Liaison Officer.*

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**BILLING CODE 5001-05-U**

## **APPENDIX B CURRENT EXPLOSIVE ORDNANCE DISPOSAL (EOD) PRACTICES WITHIN THE BMGR**

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The Defense Department mandates that a programmatic strategy be used to maintain bombing and gunnery ranges in the best interests of safety and the environment commensurate with the use of the land as a weapons range. The source of these mandates may be found in P.L. 106-65, Section 3031(c), DoD Directive 4715.11. Within BMGR—East, Air Force clearance standards established in AFI 13-212, Volume 1 drive the Air Force EOD clearance operation. Marine Corps EOD clearance practices applied within BMGR—West are controlled by policies established by MCAS Yuma.

EOD activity is an important facet of the service's strategies to keep the range safe for continued operation and well maintained by managing ground hazards resulting from military training activity. Within BMGR—East, EOD range clearances are performed by the 56th CES EOD Flight under direction of the 56th RMO. Within BMGR—West, EOD personnel from the Range Management Department at MCAS Yuma clear munitions<sup>B-1</sup> from the Marine's operating areas. Basic EOD functions are common to both services, namely that they locate, identify, and subsequently destroy dangerous unexploded ordnance remaining from training operations of their respective services.

The ongoing EOD program on the BMGR has five objectives:

1. Remove unexploded ordnance (UXO) from the ground surface of the EOD clearance zones of in-service target impact areas
2. Remove built up scrap metal contamination from the cleared zones
3. Secure expended munitions, spent targets, and munitions scrap until it may be safely processed and recycled
4. Demilitarize and decontaminate all munitions and target scrap to make it safe for recycling in commercial metal processing plants
5. Recycle all metals removed from the range safely and ensure that trash sent to landfills is free of hazardous material

Aircrew training requires the use of aircraft to deliver a wide variety of military munitions against ground or aerial targets. These munitions include many types of bombs, rockets, missiles, cannon, or machine gun ammunition, and a variety of flares intended for specialized tasks

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<sup>B-1</sup> The terms ordnance and munitions are synonymous and are used interchangeably

ranging from target illumination to diversion of enemy heat-seeking missiles away from friendly aircraft. In addition, ground forces incorporated into large-force aviation training exercises, such as the Marine Corps WTI Course, may employ artillery or mortar ammunition, small arms, and crew-served machine guns.

Among the variants of these weapons that may be used for warfighting are those that destroy targets (through conventional high-yield explosives (also called high explosives or HE), incendiaries, or kinetic energy), provide illumination, or smoke. The weapons ranges on the BMGR are designed to support aircrew training in the use of most types of aircraft-delivered munitions, although most of this training is effectively accomplished through the use of training practice munitions rather than live warfighting ordnance. More than 99 percent of the munitions currently used in training activity within BMGR—East are training munitions, sometimes referred to as “target practice” or “training practice” variants. All of the munitions utilized in regularly scheduled training activities within BMGR—West are training practice munitions.

Training practice munitions are designed to replicate the delivery trajectories of their warfighting counterparts, but they do not contain live HE warheads. Aircraft cannon ammunition fired against range targets is restricted to target practice ammunition only. No explosive aircraft cannon rounds or the armor piercing warfighting rounds used by the A-10 aircraft 30 mm cannon, which use depleted uranium penetrators, are permitted anywhere on the BMGR. Training practice munitions may be the same size and weight as their live warfighting counterparts or they may be a sub-scale/caliber version designed to simulate the delivery trajectory of the live round without the mass normally associated with a full-scale weapon. Training munitions may be completely inert or may contain limited quantities of explosives or pyrotechnics, known as a signal cartridge or spotting charge, that are used to mark their impact point for scoring purposes. Any munition—live or target practice—that EOD personnel encounter that retains or potentially retains explosives is managed as UXO regardless of its explosive charge weight. UXO is defined as:

... military munitions that have been primed, fused, armed, or otherwise prepared for action, and have been fired, dropped, launched, projected, or placed in such a manner as to constitute a hazard or potential hazard, to operations, installation, personnel, or material, and remain unexploded either by malfunction, design, or other cause (DoD Directive 4715.11, 1999).

Live air-to-ground munitions may be used on the BMGR, but currently only within BMGR—East and only on the three designated HE Hill or two live Maverick missile targets within North, South, and East TAC ranges. Air-to-ground ordnance deliveries on all other targets within both BMGR—East and BMGR—West are restricted to training practice munitions.

The ground impact effects of training and live munitions can be sharply different. While these smaller spotting charges are capable of causing severe injury or death to the personnel handling

them, they do not cause significant environmental damage through blast, fire, or fragmentation. The principal damaging effect of training practice ordnance is physical disturbance of the ground surface or to vegetation from the effect of high velocity impact. Depending on the angle of impact and the composition of the ground surface—rock or soil—the inert mass of a 500-pound training practice bomb may create a surface crater roughly the size and shape of the bomb in cross section and 18 inches or more in depth. Live weapons that explode after contact with the Earth's surface or that malfunction and are subsequently detonated in place by EOD personnel have a much more dramatic impact on the local area from their explosive effects than do training practice ordnance. An impact crater from a live bomb can be as much as 8 to 10 feet in depth and 20 to 30 feet in diameter depending on the depth of penetration before detonation and the composition of the ground surface. Owing to the accuracy of the air-to-ground weapons delivery systems on board modern military aircraft, live and training ordnance impact areas on the BMGR are tightly concentrated around the developed targets. In soft soils and at high angles of incidence, training practice munitions or live munitions that failed to detonate on delivery may be partially or completely buried by their impact momentum.

Although more benign from an immediate danger standpoint than munitions containing live high-explosives, training ordnance on the ground surface must be found, assessed, and recovered by EOD work crews using heavy equipment and off-highway vehicles to keep the targets safe for continued use while maintaining the tactical integrity of the target. EOD personnel normally destroy unexploded live weapons by countercharging them in place (commonly known as a “blow-in-place” procedure in EOD vernacular). Heavy equipment is required to support training ordnance recovery operations because of the large size and volume of munitions that must be removed each year. Recovery operations can cause considerable localized damage to the soils and plant communities within established clearance zones. One of the critical benefits of EOD clearance work is that a relatively small area of range land can be maintained to support safe operational training use on an ongoing basis. The EOD clearances limit the amount of range land that must be committed to use as target impact areas.

AFI 13-212 VI specifies that the surfaces of Air Force manned range targets are to be cleared of collectable munitions and munitions scrap to a radius of 500 feet once every 50-use days (bimonthly) and to a radius of 1,000 feet once annually. These same targets must also be cleared to a radius of one kilometer (3,281 feet), or until the density of munitions is reduced to less than five items per acre, whichever is the lesser distance, at least once every five years. Tactical range targets must be cleared annually to a distance of 1,000 feet from the target and to a distance of one kilometer until the density of munitions is reduced to less than five items per acre, whichever is the lesser distance, at least once every five years.

Standard EOD clearances, as practiced within BMGR—East, require off-road travel by several heavy vehicles (typically 5-ton M929 or similar dump trucks) that are used to drive parallel search lines across the clearance area in a line abreast formation to find and then haul inert munitions to consolidation points. Each truck carries a driver and a crewman who watch for

munitions on their respective sides of the vehicle. When a clearance vehicle crew encounters munitions, the entire line stops. The munitions are inspected and evaluated for action. If the munitions are dangerous and require disposal in place, the crew records their position with a GPS unit and physically marks them with a temporary flag. If the munition has hazardous components, but can be safely handled (i.e. a practice bomb with a live spotting charge or a live flare) the team loads it into a truck designated to haul hazardous material to an on-range disposal site. If the munition is hazard-free it is simply loaded in the nearest truck for transport to the RMCP as scrap. Not all inert munitions are man-portable. Large inert bombs are chained to the clearance truck hitch and pulled along to a central point where explosive bomb case-opening procedures will be performed to prepare the bombs for salvage. After the bomb cases are explosively opened to confirm that each munition has an inert concrete core rather than a HE filler or a spotting charge, heavy lift equipment is used to load the scrap on trucks for transport to one of the four RMCPs within BMGR—East.

The parallel search lines are spaced appropriately in response to the density of the munitions and vegetative cover present. The vegetative cover is sparse enough in most of the five-year clearance areas that the search lines can be spaced by 150 to 250 feet without sacrificing the visibility needed to effectively locate munitions. This spacing is an average range, as the vehicles must maneuver to recover heavy munitions, avoid dense (e.g. mesquite bosques) or significant vegetation (e.g., saguaro or other large cactus and trees), and pick a safe path through terrain. Spacing of 50 feet or less between vehicles is typically required for the annual-clearance area of a well-used target because of the higher density of expended munitions.

EOD teams also have a role within BMGR—East in the removal and disposal of spent target material. At the start of each clearance, maintenance personnel determine which targets must be replaced during the clearance. EOD personnel perform an initial evaluation of each replaced target to ascertain that it is free of imbedded unexploded ordnance. Safe targets are banded and transported to the RMCPs. Targets with UXO hazards are held on the range until blow-in-place procedures to destroy the dangerous munitions are completed.

Munitions and target scrap and other debris removed from BMGR—East weapons ranges undergo demilitarization processing, also known as range residue removal (R3) processing, at the RMCPs to prepare this material for recycling or disposal. With the exception of crushing and flashing procedures used to demilitarize some types of training practice ordnance, all R3 processes share four common steps. The first step is a radiological survey that ensures no Low Level Radiological Waste (LLRW) is being processed for recycling. Second, the prime contractor's UXO specialist completes an inspection of the munitions and targets. Third, a third party UXO specialist confirms that the munitions and targets are safe to process. The metals are then cut up or crushed. Fourth, the recoverable metal gleaned from the R3 process is sealed in a transport container, certified free of explosives and LLRW, and trucked directly to a processing mill without passing through an intermediate level scrap yard. Even trash harvested from the weapons ranges must be inspected and certified explosive-free before it is hauled to local

landfills. The R3 services provide clean, safe, metal products that are ready to recycle and re-use for industrial applications.

Large inert training bombs and salvaged trucks and light vehicles formerly used as targets are cut apart by a specially built hydraulic powered shear that is mounted on a tracked excavator. LLRW, found occasionally in the irradiated instruments of old military vehicles and some aircraft, is removed and set aside for disposal by the government according to rules established by the Nuclear Regulatory Commission. Concrete filler material from the large processed training bombs is left on site and used as a soil stabilizer within the confines of the RMCPs. Some bombs are equipped with parachutes that are used to retard their velocity and control their trajectory for some types of low-level bomb deliveries. These parachutes are cut away from large bomb fins and are processed as non-recyclable, and otherwise worthless trash that ultimately ends up in a landfill. All vehicle residues are either recycled or, if unacceptable for this process, culled and sent to an appropriate landfill. Tires are sorted by size and taken to the Maricopa County tire disposal facility. Exceptionally durable vehicles, such as armored personnel carriers and tanks require torch cutting to reduce them into pieces small enough to transport and process at a steel mill.

The sheer quantity of sub-scaled practice bombs (such as the BDU-33 25-pound practice bomb) consolidated each year from range clearance activity makes a complete re-inspection of these bombs impractical. Instead, they are fed into a mobile rotary crusher unit that is capable of breaking them into small chunks that are acceptable for recycling. Light metal components are magnetically separated from the cast steel bomb bodies after the bombs are crushed. UXO technicians visually scan the material exiting the crusher to ensure that it meets size criteria and contains no intact pyrotechnic spotting charges. They remove all spent spotting charges and contaminated steel fines during this step and set these items aside for introduction to a flashing unit that heats them to 1,000° F. This step burns off any ignitable phosphorous that remains on the metal after crushing.

The flashing step is an ideal addition to the mechanical harvesting process used to extract BDU-33 bombs from the totally disturbed centers of manned range targets. In these operations, a specially equipped wheeled loader is used by EOD personnel to extract large quantities of practice bombs from the soil at the center of the conventional bull's-eye bombing targets. The loader places these bombs in a dump truck that transports them to the RMCP where they are segregated from other BDU-33s until they can be crushed and flashed. This marriage of mechanical harvesting and machine-based disposal for practice bombs can be accomplished without the need for a hand inspection for UXO or ignitable residues.

Flashing also destroys ignitable residue on aluminum alloy rocket motors and flare containers and burns off other dangerous residue on other metals, such as case fragments from live high-explosive bombs. A fully contained process, the flashing unit selected by the R3 contractor has tested to *de minimus* emissions levels.

Transporting thousands of tons of metal residue from the range each year requires the use of heavy trucks and perhaps hundreds of trips to and from the RMCPs. Contractor support trucks use roll-on-roll-off containers that are loaded and sealed jointly by the prime contract and contracted third party UXO technicians. Both sign certification documents and a logbook indicating that the containers were appropriately sealed. The containers are then transferred under a chain of custody to the mill where they are received and processed, completing the recycling loop.

The Moving Sands and Cactus West target complexes are the only locations requiring regularly scheduled EOD surface clearances within BMGR—West to support ongoing training activities. EOD clearance operations are conducted at these complexes on a once per year basis. Munition deliveries on the Moving Sands and Cactus West targets are limited to inert training practice ordnance of up to 1000 pounds in weight. The clearances at these complexes are limited to the 1,500-foot radius area of the conventional targets and the 500-foot by 5,000-foot area of the Mobile Land Target. Marine Corps EOD teams perform these clearances using procedures similar to those described for the Air Force weapons ranges. Missions and target residue moved from these ranges are consolidated at AUX-2 until a sufficient volume of material is present to justify hiring a R3 type of contractor to demilitarize and remove the munitions and target scrap for recycling or disposal.

## APPENDIX C

# EVALUATION GUIDELINES FOR INCLUDING OR EXCLUDING ROADS AND OTHER TRADITIONAL TRAVEL ROUTES (WHICH MAY INCLUDE WASHES) IN THE BMGR ROAD INVENTORY FOLLOWING IMPLEMENTATION OF THE PROPOSED INRMP

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### Background Information

An inventory of the existing roads within the BMGR was completed prior to the preparation of this EIS for the proposed range INRMP. This inventory identified about 2,222 miles of existing roads of all types within the range including almost 35 miles of State Route 85 and 66 miles of single-lane, paved roads that provide access to locations in the range interior. There are approximately 23 miles of single-lane, paved roads within BMGR—West that provide access to the rifle range, AUX-2, the Moving Sands and Cactus West target complexes, ordnance jettison area, and the Cannon Air Defense Complex. Approximately 43 miles of single-lane pavement in five separate segments provide access within BMGR—East to Manned Ranges 1, 2, 3, and 4 and to communication facilities on Childs Mountain. Paved roads and parking areas within Gila Bend AFAF and the Cannon Air Defense Complex are excluded from the inventory. The rest of the 2,121 miles of roads inventoried within the range include a variety of improved (i.e., bladed) and unimproved routes with roadbeds composed of sand, gravel, cobbles, rock, or other natural soil materials. Many, if not most, of these roads are unimproved and are less than 12 feet wide. Large proportions of the unimproved roads are little more than primitive cross-country vehicle routes or trails that have been established by repeated vehicle traffic.

### Purpose of the Evaluation Guidelines

The roads within the BMGR road inventory have been classified<sup>C-1</sup> within a database that identifies their future management status based on the determinations made through the EIS and proposed INRMP planning process. However, additional previously existing roads or other traditional travel routes (which may include washes or wash segments) or new roads that are not presently identified within the classified road inventory for the range will likely need to be assessed in the future for inclusion in or exclusion from the range transportation system. In addition, some roads that are included in the classified transportation system may be found in the future to: be in excess of military or civilian agency requirements; have fallen into disuse; have excessively deteriorated from overuse or flooding; or be in conflict with resource protection

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<sup>C-1</sup> Classified roads are those roads that have been identified, surveyed, and included in the inventory of BMGR roads and that are classified for government only or government and public use. Other use classifications or limitations applicable to each road may also be identified. Unclassified roads are not intended to be part of, and not managed as part of, the BMGR road transportation system; examples include temporary roads, unplanned roads, off-road vehicle tracks, and abandoned travelways (adapted from U.S. Forest Service).

requirements. The purpose of the following guidelines is to provide a systematic method for evaluating the eligibility of roads and traditional travel routes for either inclusion or exclusion in the classified road transportation system for the BMGR. Roads or traditional travel routes excluded from the classified transportation system would be slated for active or passive revegetation and recovery. The use of these guidelines as an evaluation tool by itself would not supplant other requirements that may be applicable pursuant to the NEPA and other relevant laws. Future decision making procedures for including or excluding roads and other traditional travel routes from the classified transportation system for the BMGR will be in accordance with the NEPA and other applicable laws.

### **Policy for Unclassified Roads and Traditional Travel Routes**

The policy for addressing unclassified roads and traditional travel routes would apply to previously existing roads or traditional travel routes or to roads created after the INRMP road inventory maps were displayed at the public workshop in January 2001. Examples of roads or traditional travel routes that would and would not be evaluated for potential inclusion in the classified road transportation system include:

- *Pre-existing roads or traditional travel routes.* Roads or traditional travel routes that have been used in the past as vehicle routes but were inadvertently omitted from the road inventory prepared for the INRMP. The guidelines would be used to evaluate the eligibility of pre-existing roads and traditional travel routes for either inclusion or exclusion in the classified road transportation system when they are identified.
- *Development of a new road to support an identified management purpose.* In this circumstance, the proponent government agency would take the necessary planning and compliance steps in accordance with the NEPA and other applicable laws before implementing development of a proposed road or other associated actions. The guidelines outlined in this appendix would not be directly applicable to this situation, but may be useful for evaluating the need for proposed roads. The assumption is that roads developed through the deliberative NEPA planning process would be eligible for inclusion in the classified road transportation system.
- *Unanticipated and unplanned creation of a new road or activation of an officially closed road by a government agency to provide temporary support for a time-critical law-enforcement/security action, aircraft crash response, government personnel/public safety emergency, or other urgent management situation.* Plans for any needed restoration and remediation of roads created/activated under this scenario would be developed following the conclusion of the time-critical response period. In some cases, this may require agreement on the part of other involved agencies to participate in the development and implementation of restoration/remediation plans. Should the government identify a need

for permanent access to an unclassified, new or closed road created or reactivated in response to a time-critical situation, then the appropriate planning and compliance steps would be taken in accordance with the NEPA and other applicable laws to classify the road as a permanent part of the BMGR road transportation system. Under these circumstances, the guidelines outlined in this appendix may be useful for evaluating the proposed continuing need for new or closed roads.

- *Creation of an unanticipated and unplanned road by members of the public or by persons entering the United States illegally from Mexico.* Roads created under these circumstances would not be evaluated for inclusion in the classified BMGR road transportation system. Management actions would be taken to prevent the further use and development of these unclassified, wildcat roads. This policy is intended to preclude any potential for the continued establishment/proliferation of roads on the BMGR, which can occur when vehicle tracks from off-road travel are driven on repeatedly until an unmaintained road is established. Management steps may also be taken to obliterate and remediate such roads in order to prevent the further use and to promote recovery of the affected natural communities that sustained damage as a result of the road development.

### **Guidelines for Evaluating Roads and Traditional Travel Routes for Inclusion in or Exclusion from the Classified Road Transportation System of the BMGR**

The following evaluation guidelines consist of a series of questions that address the various characteristics, purposes, and conditions of roads or traditional travel routes being considered for inclusion or exclusion from the classified transportation system of the BMGR. Question 1 addresses whether an unclassified road or traditional travel route has a historical context that is relevant to its inclusion in the system. Questions 2 and 3 are designed to determine whether there is a legitimate ongoing or specific demonstrated future requirement for a road (classified or unclassified) or unclassified traditional travel route. Questions 4 through 8 examine the condition of the road or traditional travel route and how continued use or reuse of the road may cause environmental damage.

An underlying premise behind the evaluation guidelines is that all decisions following from these guidelines would be consistent with the INRMP for the BMGR and in accordance with the NEPA and other applicable laws. The evaluation guidelines do not provide a quantified basis upon which to make a decision for or against including or excluding an unclassified or classified road or unclassified traditional travel route in the BMGR road transportation system. Rather, the criteria provided are intended to provide a framework for evaluating:

- the status of a specific road or traditional travel route as a pre-existing/established or newly created motor vehicle route
- the identified continuing need for a road or traditional travel route

- the extent to which the road or traditional travel route alignment can be recognized and driven without the need for detours out of the roadbed or travel route to avoid areas overgrown with vegetation, washouts, or other obstacles
- the extent to which continued or renewed driving use of the road would cause unacceptable environmental damage, including, but not limited to, whether such damage results in a direct loss of habitat or reduction in habitat value or in an impact to adjoining habitat by adversely impacting ecological processes

Well-considered management judgement would be necessary to balance the trade-offs between the perceived need for continuing to use or reuse a road or traditional travel route and the environmental implications of such use. The management policies and goals established by the INRMP must be kept at the forefront of thinking when considering these potential trade-offs.

**1. Road History.** On what basis has the road or traditional travel route been distinguished from wildcat roads or routes created since the January 2001 public workshop for the INRMP? Among the factors to be considered in determining the historical origin of a road or traditional travel route are the following:

- 1.1 depiction of the road or traditional travel route on a published map
- 1.2 the date of the published map on which the road or traditional travel route is depicted and whether the same road or traditional travel route appears on later editions of the same map
- 1.3 record of the road or traditional travel route in the INRMP road database
- 1.4 record(s) of the road or traditional travel route in other agency database(s)
- 1.5 field evidence of the road or traditional travel route condition that demonstrates its historic status
- 1.6 other evidence of the historical context of the road or traditional travel route

**2. Demonstrated Need.** What is the need for the road or traditional travel route to be included or excluded from the classified BMGR road transportation system? In identifying the answer to this question, consider whether the road or traditional travel route is currently or is known to be needed to support access for:

- 2.1 military ground troops involved in training activities
- 2.2 range EOD clearances
- 2.3 target construction or maintenance
- 2.4 electronic training instrument construction or maintenance
- 2.5 other training or training support activities
- 2.6 routine or periodic law enforcement or security patrols
- 2.7 other routine or periodic law enforcement or security purposes
- 2.8 routine or periodic wildlife population surveys
- 2.9 routine or periodic wildlife habitat evaluations

- 2.10 routine or periodic wildlife habitat improvement projects (such as the development or maintenance of wildlife waters or forage enhancement plots)
  - 2.11 other routine or periodic natural resource monitoring activities
  - 2.12 routine or periodic natural resource survey activities
  - 2.13 routine or periodic cultural resource monitoring activities
  - 2.14 routine or periodic cultural resource survey activities
  - 2.15 routine or periodic natural or cultural resource research projects
  - 2.16 other routine or periodic natural or culture resource management projects
  - 2.17 management access to the Cabeza Prieta NWR
  - 2.18 public access (including hunting, other wildlife-related recreation, other appropriate recreation, education, or traditional Native American purposes)
  - 2.19 other requirements consistent with the INRMP
- 3. Consistency of Public Use with BMGR Safety and Security Requirements and the INRMP.** Would public use of the road or traditional travel route be consistent with current BMGR safety and security requirements, the INRMP, or identified resource protection requirements (such as Sonoran pronghorn management)? If public use of the road or traditional travel route is inconsistent with these requirements, then the road or traditional travel route cannot be incorporated or retained in the BMGR transportation system for the purpose of providing public access.
- 4. Condition of the Road or Traditional Travel Route.** Can most of the length of the original road or traditional travel route alignment be readily recognized and driven without damaging reestablished perennial vegetation and without needing to detour from the original roadbed or traditional travel route to avoid such vegetation, impassible driving conditions, or other obstacles? In answering this question, the following factors should be considered:
- 4.1 the presence of stands of well-established shrubs, trees, or cacti growing within substantial segments of the original roadbed or traditional travel route
  - 4.2 the presence of roadbed or traditional travel route segments that are characterized by deep pulverized soils that would no longer support the passage of a vehicle without the risk that the vehicle would be stranded because of high centering or without generating excessive quantities of fugitive dust
  - 4.3 the presence of wash crossings that have been rendered impassable by the effects of floods or bank erosion
  - 4.4 the presence of deeply eroded roadbed or traditional travel route segments that would retard or prevent the passage of a vehicle within the original roadbed or traditional travel route
  - 4.5 deep down cutting of the original roadbed that has led to its conversion into an active wash

- 5. Biological Resources.** Is the road or traditional travel route located within the habitat of a protected or other sensitive species, does its presence or condition adversely impact ecological processes that maintain natural community conservation elements, or does it otherwise adversely impact the connectivity requirements for species and natural community conservation elements?
- 6. Soil Stability.** Is the road or traditional travel route located on soils or a slope that are prone to accelerated erosion and has recent disuse of the road or traditional travel route allowed a previously eroded roadbed to restabilize?
- 7. Cultural Resources** Would continued or renewed use of the road or traditional travel route impact a known cultural resource site?

## APPENDIX D

### REPRESENTATIVE ANIMAL AND PLANT SPECIES THAT MAY OCCUR ON THE BMGR AND CABEZA PRIETA NWR

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**Relative abundance** ratings in the following list are as follows:

**C = COMMON OR ABUNDANT:** nearly always found in the appropriate habitat at the right time of year, occasionally in large numbers.

**LC = LOCALLY COMMON:** nearly always found in the appropriate habitat, occasionally in large numbers, at the right time of year. This category includes species whose habitat requirements tend to be restricted to localized areas on the BMGR

**U = UNCOMMON:** Seldom or infrequently found in the appropriate habitat at the right season, although not unusual.

**R = RARE:** Very low probability of finding the species, but not out of its normal range.

**H = HYPOTHETICAL:** May be found in the appropriate habitat and season, although unlikely; not enough information is known regarding the extent of the species' range at this time. It has not been found on the BMGR, but may occur there infrequently, or the species may be very difficult to find.

#### **Seasonal Distribution**

P= permanent resident

S= summer resident

W= winter resident

T= transient

I = irregular or erratic

CAS=casual

A= accidental

?= status uncertain

**Habitat Types** listed below are those in which a given species is most likely to be found. Some species are restricted to one or two habitat types, whereas other species are found over a wider range of conditions. Habitat types are defined below as:

**OPEN WATER (OW):** This habitat type is restricted to managed and natural tanks (tinajšs), charcos, playas, ephemeral washes, and road beds that may flood during heavy rains.

**DESERT RIPARIAN (DR):** Vegetation in or adjacent to ephemeral playas, stream courses, and managed or natural tanks resulting from an increased availability of water. This habitat type consists largely of denser associations of mesquite, blue paloverde, acacia, and ironwood along major washes.

**CREOSOTE BUSH DESERTSCRUB (CD):** environments dominated by the creosote bush, usually with bursage. Typical of the Lower Colorado River division of the Sonoran Desert Biome, this habitat type is found primarily on level terrain with deeper soil in plains and valleys throughout the BMGR.

**MIXED SONORAN DESERTSCRUB (MSD):** Characteristic of bajadas, lower mountain slopes, and rocky, rolling hills, these habitats are dominated by a varying combination of paloverde, bursage, ocotillo, brittlebush, saguaro, and other species of cacti. This is the Arizona Upland Division of the Sonoran Desert, and is particularly characteristic of the eastern half of the BMGR.

**TABLE D-1  
REPRESENTATIVE PLANT SPECIES  
THAT MAY OCCUR ON THE BMGR AND CABEZA PRIETA NWR**

SCIENTIFIC NAME	COMMON NAME
<b>TREES</b>	
<i>Bursera microphylla</i>	Elephant Tree
<i>Canotia holacantha</i>	Canotia
<i>Cercidium</i> sp.	Paloverde
<i>Cercidium floridum</i>	Blue Paloverde
<i>C. microphyllum</i>	Foothill Paloverde
<i>Chilopsis linearis</i>	Desert Willow
<i>Dalea spinosa</i>	Smoke Tree
<i>Olneya tesota</i>	Ironwood
<i>Prosopis</i> spp	Mesquite Tree
<i>Prosopis glandulosa</i>	Honey Mesquite
<i>P. velutina</i>	Velvet Mesquite
<b>SHRUBS AND SEMI-SHRUBS</b>	
<i>Acacia constricta</i>	White Thorn Acacia
<i>A. greggii</i>	Catclaw
<i>Acampptopappus sphaerocephalus</i>	Golden Head
<i>Achyronychia cooperi</i>	Frost Mat
<i>Aloysia wrightii</i>	Oreganillo
<i>Ambrosia ambrosioides</i>	Canyon Ragweed
<i>A. deltoidea</i>	Triangle Leaf Bursage
<i>A. dumosa</i>	White Bursage
<i>A. ilicifolia</i>	Holly-leaved Bursage
<i>Agave deserti</i>	Desert Agave
<i>Asclepias albicans</i>	White-stemmed Milkweed
<i>Atriplex</i> sp.	Saltbush
<i>Atriplex canescens</i>	Four-wing Saltbush
<i>Baccharis brachyphylla</i>	Short-leaved Baccharis
<i>Baccharis sarothroides</i>	Desert Broom
<i>Bebbia juncea</i>	Chuckwalla's Delight, Rush Bebbia
<i>Beloperone californica</i>	Chuperosa
<i>Brandegea bigelovii</i>	Brandegea
<i>Brickellia atractyloides</i>	Brickell-bush
<i>Brickellia incana</i>	Wooly Brickellia
<i>Calliandra eriophylla</i>	Fairy Duster
<i>Cassia armata</i>	Desert Cassia
<i>C. covesii</i>	Desert Senna
<i>Celtis pallida</i>	Desert Hackberry
<i>Condalia globosa</i>	Bitter Condalia
<i>Dalea emoryi</i>	Emory Dalea
<i>D. schottii</i>	Indigo Bush
<i>Ditaxis lanceolata</i>	Narrowleaf Silverbush
<i>Dyssodia porophylloides</i>	San Felipe Dyssodia
<i>Encelia farinosa</i>	Brittlebush
<i>E. frutescens</i>	Rayless Encelia
<i>Ephedra aspera</i>	Popotillo
<i>E. nevadensis</i>	Nevada Joint-fir

**TABLE D-1  
REPRESENTATIVE PLANT SPECIES  
THAT MAY OCCUR ON THE BMGR AND CABEZA PRIETA NWR**

SCIENTIFIC NAME	COMMON NAME
<i>E. trifurca</i>	Mormon Tea, Long-leaved Joint-fir
<i>Eriogonum fasciculatum</i>	California Buckwheat
<i>E. wrightii</i>	Wright Buckwheat
<i>Fouquieria splendens</i>	Ocotillo
<i>Gallium stellatum</i>	Desert Bedstraw
<i>Haplopappus laricifolius</i>	Turpentine Bush
<i>Hibiscus denudatus</i>	Rock Hibiscus
<i>Hymenoclea monogyra</i>	Burro Brush
<i>H. salsola</i>	Cheese Bush
<i>Hyptis emoryi</i>	Desert Lavender
<i>Jatropha cardiophylla</i>	Limber Bush
<i>J. cuneata</i>	Sangre-de-Cristo
<i>Justica californica</i>	Desert hummingbird-bush, chuparosa
<i>Koeberlinia spinosa</i>	Crucifixion Thorn
<i>Krameria grayi</i>	White Ratany
<i>K. parvifolia</i>	Little-leaved Ratany
<i>Larrea tridentata</i>	Creosote Bush
<i>Lycium andersoni</i>	Anderson Thornbush
<i>L. fremontii</i>	Fremont Thornbush
<i>Menodora scabra</i>	Twinberry
<i>Nolina bigelovii</i>	Bigelow Nolina
<i>Peucephyllum schottii</i>	Desert Fir
<i>Pleurocoronis pluriseta</i>	Arrow Leaf
<i>Porophyllum gracile</i>	Odora
<i>Psilostrophe cooperi</i>	Paper Flower
<i>Rhus kearneyi</i>	Kearney Sumac
<i>Salazaria mexicana</i>	Paper Bag Bush
<i>Simmondsia chinensis</i>	Jojoba
<i>Stephanomeria pauciflora</i>	Desert Straw
<i>S. schottii</i>	Schott's Wire Lettuce
<i>Stillingia linearifolia</i>	Stillingia
<i>Tamarix ramosissima</i>	Tamarisk, Salt Cedar
<i>Tetracoccus fasciculatus</i> var. <i>halli</i>	Tetracoccus
<i>Thamnosma montana</i>	Turpentine Broom
<i>Tiquilia canescens</i>	Shrubby Coldenia
<i>T. palmeri</i>	Palmer Coldenia
<i>T. plicata</i>	Plicate Coldenia
<i>Trixis californica</i>	California Trixis
<i>Trichoptilium incisum</i>	Yellow Head
<i>Vaquelinia californica sonorensis</i>	Arizona Rosewood
<i>Viquiera deltoidea</i>	Parish Viquiera, Goldeneye
<i>Yucca schidigera</i>	Spanish Dagger, Mojave Yucca
<i>Zizyphus obtusifolia</i>	Gray-leaved Abrojo
<b>CACTI</b>	
<i>Cereus giganteus</i>	Saguaro
<i>Chaenactis carphoclinia</i>	Pebble Pincushion

**TABLE D-1  
REPRESENTATIVE PLANT SPECIES  
THAT MAY OCCUR ON THE BMGR AND CABEZA PRIETA NWR**

<b>SCIENTIFIC NAME</b>	<b>COMMON NAME</b>
<i>C. fremontii</i>	Fremont Pincushion
<i>C. stevioides</i>	Esteve Pincushion
<i>Chorizanthe brevicornu</i>	Brittle Spine Flower
<i>C. rigida</i>	Rigid Spiny Herb
<i>Crossosoma bigelovii</i>	Ragged Rock-Flower
<i>Cryptantha angustifolia</i>	Narrow-leaved Cryptantha
<i>C. barbiger</i>	Bearded Cryptantha
<i>C. costata</i>	Ashen Cryptantha
<i>C. maritima</i>	White-haired Cryptantha
<i>C. micrantha</i>	Purple-rooted Cryptantha
<i>C. pterocarya</i>	Wing Nut Cryptantha
<i>C. racemosa</i>	Woody Cryptantha
<i>Echinocactus polycephalus</i>	Cottontop Cactus or Many-headed Barrel Cactus
<i>Echinocereus engelmannii</i>	Hedgehog Cactus
<i>Echinomastus erectocentrus acunensis</i>	Acuna Cactus
<i>Ferocactus acanthodes</i>	Barrel Cactus
<i>F. covillei</i>	Barrel Cactus
<i>F. wislizenii</i>	Barrel Cactus
<i>Mammaillaria tetrancistra</i>	Pincushion Cactus
<i>M. microcarpa</i>	Pincushion Cactus
<i>Opuntia acanthocarpa</i>	Buckhorn Cholla
<i>O. arbuscula</i>	Pencil Cholla
<i>O. basilaris</i>	Beavertail Cactus
<i>O. bigelovii</i>	Teddy Bear Cactus
<i>O. fulgida</i>	Jumping Cholla
<i>O. echinocarpa</i>	Silver Cholla
<i>O. engelmannii</i>	Desert Prickly Pear
<i>O. leptocaulis</i>	Desert Christmas Cholla
<i>Opuntia</i> spp	Cholla
<i>Opuntia</i> spp	Prickly Pear Cactus
<i>O. ramosissima</i>	Diamond Cholla
<i>O. stanlyi</i>	Devil's Cholla
<i>Stenocereus thurberi</i>	Organ Pipe
<b>FORBS AND VINES</b>	
<i>Abronia villosa</i>	Hairy Sand Verbena
<i>Abutilon incanum</i>	Indian Mallow
<i>Acourtig wrightii</i>	Brownfoot
<i>Adenophyllum porophylloides</i>	Dogweed
<i>Allionia incarnata</i>	Trailing Four-O'Clock
<i>Asclepias subulata</i>	Desert Milkweed
<i>Amaranthus</i> sp	Pigweed
<i>Ambrosia confertifolia</i>	Slimleaf Bursage
<i>Amsinckia tessellata</i>	Fiddleneck
<i>Argythamnia neomexicana</i>	Ditaxis
<i>A. serrata</i>	Saw-toothed Ditaxis
<i>A. lanceolata</i>	Lance-leaved Ditaxis

**TABLE D-1  
REPRESENTATIVE PLANT SPECIES  
THAT MAY OCCUR ON THE BMGR AND CABEZA PRIETA NWR**

SCIENTIFIC NAME	COMMON NAME
<i>Astragalus</i> spp.	Locoweed
<i>A. crotalariae</i>	Salton Milkvetch
<i>A. lentiginosus</i>	Locoweed
<i>Atricoseris platyphylla</i>	Parachute Plant
<i>Baileya multiradiata</i>	Many-Flowered Desert Marigold
<i>Baileya pauciradiata</i>	Lax Flowers
<i>Boerhavia</i> spp.	Spiderling
<i>Bowlesia incana</i>	Hairy Bowlesia
<i>Brassica nigra</i>	Black Mustard
<i>B. tournefortii</i>	Mustard
<i>Brickellia</i> sp	Brickellia
<i>Calycoseris parryi</i>	Yellow Jack Stem
<i>C. wrightii</i>	White Tack Stem
<i>Camissonia</i> spp.	Camissonia
<i>C. chamaeneroides</i>	Log-capsuled Primrose
<i>Caulanthus cooperi</i>	Cooper's Cabbage
<i>Cucurbita digitata</i>	Coyote Gourd
<i>Cucurbita palmata</i>	Coyote Melon
<i>Cuscuta umbellata</i>	Dodder
<i>Dalea mollis</i>	Silk Dalea
<i>D. mollissima</i>	Dalea
<i>D. parryi</i>	Parry Dalea or Dune Indigo
<i>Datura discolor</i>	Desert Thorn Apple
<i>Daucus incana</i>	Wild Carrot
<i>Delphinium scaposum</i>	Barestem Larkspur
<i>Descurainia pinnata</i>	Yellow Tansy Mustard
<i>Dichelostemma pulchellum</i>	Bluedicks
<i>Dicoria canescens</i>	Desert Dicoria
<i>Dithyrea californica</i>	Spectacle Pod
<i>D. wislizeni</i>	Spectacle Pod
<i>Draba cuneifolia</i>	Whitlow Grass
<i>Eremalche exilis</i>	Eremalche
<i>E. rotundifolia</i>	Desert Five Spot
<i>Erigeron</i> sp	Fleabane
<i>Eriastrum</i> sp.	Eriastrum
<i>Eriogonum</i> spp.	Wild Buckwheat
<i>E. inflatum</i>	Desert Trumpet
<i>Eriophyllum lanosum</i>	Wooly Eriophyllum
<i>E. wallacei</i>	Wallace Eriophyllum
<i>Erodium cicutarium</i>	Filaree
<i>E. texanum</i>	Large-flowered Heron's Bill
<i>Eschscholtzia mexicana</i>	Mexican Poppy
<i>E. minutiflora</i>	Little Gold Poppy
<i>Eucrypta micrantha</i>	Small Flowered Eucrypta
<i>Euphorbia albomarginata</i>	Rattlesnake Weed
<i>E. eriantha</i>	Desert Poinsettia

**TABLE D-1  
REPRESENTATIVE PLANT SPECIES  
THAT MAY OCCUR ON THE BMGR AND CABEZA PRIETA NWR**

SCIENTIFIC NAME	COMMON NAME
<i>E. micromeria</i>	Sonoran Sand Mat
<i>E. polycarpa</i>	Spurge
<i>E. setiloba</i>	Bristle-lobed Sand Mat
<i>Fagonia laevis</i>	Fagonia
<i>Filago arizonica</i>	Arizona Filago
<i>F. depressa</i>	Dwarf Filago
<i>Galium stellatum</i>	Starry Bedstraw
<i>Geraea canescens</i>	Hairy-headed Sunflower
<i>Gilia latifolia</i>	Broad-leaved Gilia
<i>G. stellata</i>	Gilia
<i>Gutierrezia sarothrae</i>	Broom Snakeweed
<i>Helianthus petiolaris</i>	Sunflower
<i>Hesperocallis undulata</i>	Desert (Ajo) Lily
<i>Hibiscus denudatus</i>	Rock Hibiscus
<i>Horsfordia alata</i>	Pink Felt Plant
<i>H. newberryi</i>	Orange Velvet-Mallow
<i>Janusia gracilis</i>	Fermina
<i>Langlosia schottii</i>	Langlosia
<i>Lappula redowskii</i>	Stickseed
<i>L. setosissima</i>	Langlosia
<i>Layia glandulosa</i>	Tidy-tips
<i>Lepidium lasiocarpum</i>	Sand Pepper Grass
<i>Lesquerella gordonii</i>	Gordon Bladderpod
<i>L. tenella</i>	Bladderpod
<i>Linanthus bigelovii</i>	Bigelow Linanthus
<i>L. jonesii</i>	Jones Linanthus
<i>Lotus salsuginosus</i>	Lotus
<i>L. tomentellus</i>	Hairy Lotus
<i>Lupinus sp</i>	Lupine
<i>L. concinnus</i>	Elegant Lupine
<i>L. sparsiflorus</i>	Lupine
<i>Machaeranthera tortifolia</i>	Desert Aster
<i>Malacothrix glabrata</i>	Desert Dandelion
<i>Malva parviflora</i>	Little Mallow
<i>Melilotus indicus</i>	Yellow Sweet Clover
<i>Mentzelia albicans</i>	Blazing Star
<i>M. involucrata</i>	Blazing Star
<i>Mimulus bigelovii</i>	Bigelow Mimulus
<i>Mirabilis bigelovii</i>	Bigelow Four O'Clock
<i>Mohavea confertiflora</i>	Ghost Flower
<i>Monoptilon bellioides</i>	Mohave Desert Star
<i>Nama demissum</i>	Purple Mat
<i>N. hispidum</i>	Sand Bells
<i>Nemacladus glanduliferus</i>	Thread Plant
<i>N. rubescens</i>	Thread Plant
<i>N. sigmoideus</i>	Thread Plant

**TABLE D-1  
REPRESENTATIVE PLANT SPECIES  
THAT MAY OCCUR ON THE BMGR AND CABEZA PRIETA NWR**

SCIENTIFIC NAME	COMMON NAME
<i>Nicotiana trigonophylla</i>	Desert Tobacco
<i>Oenothera</i> spp	Evening Primrose
<i>O. primaveris</i>	Evening Primrose
<i>Oligomeris linifolia</i>	Linear-leaved Cambess
<i>Orthocarpus purpurascens</i>	Mohave Owl Clover
<i>Palafoxia arida</i>	Spanish Needles
<i>Parietaria hespera</i>	Pellitory
<i>Pectocarya heterocarpa</i>	Hairy-leaved Comb Bur
<i>P. platycarpa</i>	Broad-nutted Comb Bur
<i>P. recurvata</i>	Arch-nutted Comb Bur
<i>Penstemon pseudospectabilis</i>	Mohave Beardtongue
<i>Perityle emoryi</i>	Desert Rock Daisy
<i>Petalonyx thurberi</i>	Thurber Sandpaper Plant
<i>Phacelia</i> spp	Phacelia
<i>Pholisma sonorae</i>	Sand Food
<i>Phoradendron californicum</i>	Desert Mistletoe
<i>Physalis crassifolia</i>	Thick-leaved Ground Cherry
<i>Plagiobothrys jonesii</i>	Jones Popcorn Flower
<i>Plantago insularis</i>	Wooly Plantain
<i>Proboscidea althaeifolia</i>	Desert Unicorn Plant
<i>Psathyrotes ramosisissima</i>	Velvet Rosette
<i>Psilostrophe cooperi</i>	Paper Daisy
<i>Rafinesquia californica</i>	California Chickory
<i>Rafinesquia neomexicana</i>	Desert Chickory
<i>Sarcostemma cynanchoides</i>	Climbing Milkweed
<i>S. hirtellum</i>	Rambling Milkweed
<i>Salvia columbariae</i>	Chia
<i>Senecio mohavensis</i>	Mohave Groundsel
<i>Sisymbrium irio</i>	London Rocket
<i>Sphaeralcea ambigua</i>	Globe Mallow
<i>Stephanomeria paniciflora</i>	Desert Straw
<i>Streptanthella longirostris</i>	Long-beaked Twist Flower
<i>Stylocline gnaphalioides</i>	Nest Straw
<i>S. micropoides</i>	Desert Nest-Straw
<i>Teucrium glandulosum</i>	Germander
<i>Tidestromia oblongifolia</i>	Tidestromia
<i>T. lanuginosa</i>	Honey Sweet
<i>Thelypodium lasiophyllum</i>	Thelypodium
<i>Triteleiosis palmeri</i>	Blue Sand Lily
<i>Verbesina enceloides</i>	Cowpen Daisy
<b>GRASSES</b>	
<i>Aristida</i> spp.	Three-awn
<i>Avena fatua</i>	Wild Oat
<i>Bouteloua</i> spp.	Grama Grass
<i>Bromus rubens</i>	Red Brome
<i>Eragrostis lehmanniana</i>	Lehmann's Lovegrass

**TABLE D-1  
REPRESENTATIVE PLANT SPECIES  
THAT MAY OCCUR ON THE BMGR AND CABEZA PRIETA NWR**

SCIENTIFIC NAME	COMMON NAME
<i>Erioneuron pulchellum</i>	Desert Fluff Grass
<i>Festuca arizonica</i>	Arizona Fescue
<i>Heteropogon contortus</i>	Tanglehead
<i>Hilaria rigida</i>	Big Galleta
<i>Hordeum jubatum</i>	Fox-tail Barley
<i>Muhlenbergia microsperma</i>	Littleseed Muhly
<i>M. porteri</i>	Bush Muhly
<i>Nolina begelovii</i>	Bigelow beargrass
<i>Pennisetum ciliare</i> [= <i>Censhrus siliaris</i> ] (Non-Native)	Buffelgrass
<i>Schismus arabicus</i>	Arabian Grass
<i>Schismus barbatus</i>	Mediterranean Grass
<i>Sporobolus airoides</i>	Alkali Sacaton
<i>Stipa comata</i>	Needle and Thread
<i>Tridens muticus</i>	Slim Tridens
<i>Vulpia octaflora</i>	Six-weeks fescue
Sources: Felger, R. S., D. Turner, and M.F. Wilson. 1998. Survey of plants on the Mohawk Dunes on the Barry M. Goldwater Range. Final Report from Drylands Institute to Natural Resources Program, Luke Air Force Base, Arizona, Contract No. 97MS130. 48 pp. + appendices. Felger, R.S. 1998. Checklist of Plants of the Cabeza Prieta National Wildlife Refuge, Arizona. Drylands Institute, Tucson, Arizona. Kearney, T.H. and R. H. Peebles. 1960. Arizona Flora. Berkeley and Los Angeles: University of California Press. 1085 pp. Lehr. J.H. 1978. <i>A Catalogue of the Flora of Arizona</i> . Desert Botanical Garden, Phoenix, Arizona. 203 pp. Munz. P.A. 1974. <i>A Flora of Southern California</i> . Berkley: University of California Press. University of Arizona. 1986. Natural Resources Management Plan for Luke Air Force Range.	

**TABLE D-2  
REPRESENTATIVE MAMMALS  
THAT MAY OCCUR ON THE BMGR AND CABEZA PRIETA NWR**

Relative Abundance (RA); C=Common or Abundant; LC=Locally Common; U=Uncommon; R=Rare; H=Hypothetical  
Seasonal Distribution: P= permanent resident; S= summer resident; W= winter resident; T= transient; I = irregular or erratic; CAS=casual, A= accidental; ?= status uncertain.  
Habitat Types: OW=Open Water; DR=Desert Riparian; CD=Creosote Bush Desertscrub; MSD=Mixed Sonoran Desertscrub

	HABITAT TYPE				
	RA	OW	DR	CD	MSD
<b>Order Insectivora</b>					
Desert Shrew <i>Notiosorex crawfordi</i>	H	X	X		
<b>Order Chiroptera</b>					
California Leaf-nosed Bat <i>Macrotus californicus</i>	C	X	X	X	X
Long-tongued Bat <i>Choeronycteris mexicana</i>	H	X	X		X
Lesser Long-nosed Bat <i>Leptonycteris curasoae</i>	UT				X
Yuma Myotis <i>Myotis yumanensis</i>	H	X			X
Cave Myotis <i>Myotis velifer</i>	LC	X	X		X
Little Brown Myotis <i>Myotis lucifugus</i>	H		X		
California Myotis <i>Myotis californicus</i>	C	X	X		X
Western Pipistrelle <i>Pipistrellus hesperus</i>	C	X	X		X
Big Brown Bat <i>Eptesicus fuscus</i>	LC	X			X
Southern Yellow Bat <i>Lasiurus ega</i>	H		X		X
Hoary Bat <i>Lasiurus cinereus</i>	H	X	X		X
Spotted Bat <i>Euderma maculata</i>	H		X		X
Townsend's Big-eared Bat <i>Plecotus townsendii</i>	H	X	X		X
Pallid Bat <i>Antrozous pallidus</i>	LC	X	X		X
Mexican Free-tailed Bat <i>Tadarida brasiliensis</i>	LC	X			X
Pocketed Free-tailed Bat <i>Tadarida femorosacca</i>	H	X			X
Big Free-tailed Bat <i>Tadarida macrotis</i>	H	X			X
Western Mastiff Bat <i>Eumops perotis</i>	R	X			X
Underwood's Mastiff Bat <i>Eumops underwoodi</i>	H	X			X
<b>Order Lagomorpha</b>					
Desert Cottontail <i>Sylvilagus audubonii</i>	C	X	X	X	
Antelope Jack Rabbit <i>Lepus alleni</i>	R		X	X	X
Black-tailed Jack Rabbit <i>Lepus californicus</i>	C		X	X	X
<b>Order Rodentia</b>					
Rock Squirrel <i>Spermophilus variegatus</i>	U				X
Round-tailed Ground Squirrel <i>Spermophilus tereticaudus</i>	C			X	
Harris' Antelope Squirrel <i>Ammospermophilus harrisi</i>	LC				X
Botta's Pocket Gopher <i>Thomomys bottae</i>	LC	X	X	X	
Little Pocket Mouse <i>Perognathus longimembris</i>	H			X	X
Arizona (Yavapai) Pocket Mouse <i>Perognathus amplus</i>	LC			X	X
Desert Pocket Mouse <i>Chaetodipus penicillatus</i>	C			X	X
Rock Pocket Mouse <i>Chaetodipus intermedius</i>	C				X
Bailey's Pocket Mouse <i>Chaetodipus baileyi</i>	LC			X	X
Banner-tailed Kangaroo Rat <i>Dipodomys spectabilis</i>	LC			X	X
Desert Kangaroo Rat <i>Dipodomys deserti</i>	LC			X	

**TABLE D-2  
REPRESENTATIVE MAMMALS  
THAT MAY OCCUR ON THE BMGR AND CABEZA PRIETA NWR**

Relative Abundance (RA); C=Common or Abundant; LC=Locally Common; U=Uncommon; R=Rare; H=Hypothetical					
Seasonal Distribution: P= permanent resident; S= summer resident; W= winter resident; T= transient; I = irregular or erratic; CAS=casual, A= accidental; ?= status uncertain.					
Habitat Types: OW=Open Water; DR=Desert Riparian; CD=Creosote Bush Desertscrub; MSD=Mixed Sonoran Desertscrub					
	HABITAT TYPE				
	RA	OW	DR	CD	MSD
Merriam's Kangaroo Rat <i>Dipodomys merriami</i>	C			X	X
Western Harvest Mouse <i>Reithrodontomys megalotis</i>	H	X	X	X	
Cactus Mouse <i>Peromyscus eremicus</i>	C	X	X	X	X
Canyon Mouse <i>Peromyscus crinitus</i>	LC				X
Deer Mouse <i>Peromyscus maniculatus</i>	R	X	X	X	X
Southern Grasshopper Mouse <i>Onychomys torridus</i>	U			X	X
White-throated Woodrat <i>Neotoma albigula</i>	C	X	X		X
Arizona Woodrat <i>Neotoma devia</i>	C			X	X
<b>Order Carnivora</b>					
Raccoon <i>Procyon lotor</i>	H		X		X
Coati <i>Nasua nasua</i>	I		X		X
Coyote <i>Canis latrans</i>	C	X	X	X	X
Kit Fox <i>Vulpes macrotis</i>	C		X	X	X
Gray Fox <i>Urocyon cinereoargenteus</i>	LC	X	X	X	X
Ringtail <i>Bassariscus astutus</i>	LC	X	X		X
Badger <i>Taxidea taxus</i>	U		X	X	X
Western Spotted Skunk <i>Spilogale gracilis</i>	U	X	X		X
Striped Skunk <i>Mephitis mephitis</i>	H	X	X		
Hognose Skunk <i>Conepatus mesoleucus</i>	H	X	X		X
Mountain Lion <i>Felis concolor</i>	R	X	X		X
Bobcat <i>Felis rufus</i>	C	X	X	X	X
<b>Order Perissodactyla</b>					
Burro <i>Equus asinus</i> (introduced species)	U		X		X
<b>Order Artiodactyla</b>					
Collared Peccary (Javelina) <i>Tayassu tajacu</i>	U	X	X	X	X
Mule Deer <i>Odocoileus hemionus</i>	C	X	X	X	X
White-tailed Deer <i>Odocoileus virginianus</i>	U	X	X	X	X
Sonoran Pronghorn <i>Antilocapra americana sonoriensis</i>	R		X	X	X
Desert Bighorn <i>Ovis canadensis mexicana</i>	U	X	X		X
Sources: Barry, Robert X. 2001a. Various personal conversations and informal e-mail exchanges between Robert X. Barry, Wildlife Biologist, Luke Air Force Base Range Management Office and URS personnel. Hoffmeister, D.F. 1986. Mammals of Arizona. Tucson: University of Arizona Press. 602 pp. University of Arizona. 1986. Natural Resources Management Plan for Luke Air Force Range.					

**TABLE D-3  
REPRESENTATIVE REPTILES AND AMPHIBIANS  
THAT MAY OCCUR ON THE BMGR AND CABEZA PRIETA NWR**

Relative Abundance (RA); C=Common or Abundant; LC=Locally Common; U=Uncommon; R=Rare; H=Hypothetical Seasonal Distribution: P= permanent resident; S= summer resident; W= winter resident; T= transient; I = irregular or erratic; CAS=casual, A= accidental; ?= status uncertain. Habitat Types: OW=Open Water; DR=Desert Riparian; CD=Creosote Bush Desertscrub; MSD=Mixed Sonoran Desertscrub					
	HABITAT TYPE				
	RA	OW	DR	CD	MSD
<b>Amphibians</b>					
Couch Spadefoot <i>Scaphiopus couchi</i>	LC	X	X		
Sonoran Desert Toad <i>Bufo alvarius</i>	C	X	X		
Great Plains Toad <i>Bufo cognatus</i>	LC	X	X		
Red-spotted Toad <i>Bufo punctatus</i>	C	X	X		
Sonoran Green Toad <i>Bufo retiformis</i>	H	X	X		
Canyon Treefrog <i>Hyla arenicolor</i>	H	X	X		
Northern Casque-headed Frog <i>Pternohyla fodiens</i>	H	X	X		
Great Plains Narrow-mouthed Toad <i>Gastrophryne olivacea</i>	H	X	X		
<b>Reptiles</b>					
Desert Tortoise <i>Gopherus agassizii</i>	U		X	X	X
Western Banded Gecko <i>Coleonyx variegatus</i>	C		X	X	X
Desert Iguana <i>Dipsosaurus dorsalis</i>	C		X	X	X
Common Chuckwalla <i>Sauromalus obesus</i>	LC			X	X
Zebra-tailed Lizard <i>Callisaurus draconoides</i>	C		X	X	X
Colorado Desert Fringe-toed Lizard <i>Uma notata</i>	LC	SAND DUNES			
Common Collared Lizard <i>Crotaphytus collaris</i>	C		X		X
Large-spotted Leopard Lizard <i>Gambelia wislizenii</i>	LC		X	X	X
Desert Spiny Lizard <i>Sceloporus magister</i>	C		X	X	X
Clark Spiny Lizard <i>Sceloporus clarki</i>	U		X		X
Side-blotched Lizard <i>Uta stansburiana</i>	C		X	X	X
Long-tailed Brush Lizard <i>Urosaurus graciosus</i>	C		X	X	
Tree Lizard <i>Urosaurus ornatus</i>	C		X		X
Desert Horned Lizard <i>Phrynosoma platyrhinos</i>	C		X	X	
Flat-tailed Horned Lizard <i>Phrynosoma mcalli</i>	R	YUMA DUNES, SANDY SOIL			
Regal Horned Lizard <i>Phrynosoma solare</i>	LC		X		X
Desert Night Lizard <i>Xantusia vigilis</i>	R		X		X
Cowle's Fringe-toed Lizard <i>Uma notata rufopunctata</i>	LC	AEOLIAN SANDS			
Fringe-toed Lizard <i>Uma notata</i>	LC	AEOLIAN SANDS			
Canyon Spotted Whiptail <i>Cnemidophorus burti</i>	R		X		X
Western Whiptail <i>Cnemidophorus tigris</i>	C		X	X	X
Gila Monster <i>Heloderma suspectum</i>	U		X	X	X
Western Blind Snake <i>Leptotyphlops humilis</i>	H	X	X	X	
Rosy Boa <i>Lichanura trivirgata</i>	U	X	X	X	X
Spotted Leaf-nosed Snake <i>Phyllorhynchus decurtatus</i>	LC		X	X	
Saddled Leaf-nosed Snake <i>Phyllorhynchus browni</i>	H			X	X
Coachwhip <i>Masticophis flagellum</i>	C		X	X	X

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	HABITAT TYPE				
	RA	OW	DR	CD	MSD
Sonoran Whipsnake <i>Masticophis bilineatus</i>	U	X	X	X	X
Western Patch-nosed Snake <i>Salvadora hexalepis</i>	C			X	X
Glossy Snake <i>Arizona elegans</i>	C		X	X	X
Gopher Snake <i>Pituophis melanoleucus</i>	C	X	X	X	X
Common Kingsnake <i>Lampropeltis getulus</i>	U	X	X	X	X
Long-nosed Snake <i>Rhinocheilus lecontei</i>	C		X	X	X
Black-necked Garter Snake <i>Thamnophis cyrtopsis</i>	H	X	X	X	X
Checkered Garter Snake <i>Thamnophis marcianus</i>	H	X	X	X	X
Ground Snake <i>Sonora semiannulata</i>	H		X	X	
Western Shovel-nosed Snake <i>Chionactis occipitalis</i>	LC		X	X	X
Sonoran Shovel-nosed Snake <i>Chionactis palarostris</i>	H		X	X	X
Banded Sand Snake <i>Chilomeniscus cinctus</i>	U		X	X	X
Southwestern Black-headed Snake <i>Tantilla hobartsmithii</i>	H		X	X	X
Lyre Snake <i>Trimorphodon biscutatus</i>	U		X	X	X
Night Snake <i>Hypsiglena torquata</i>	C		X	X	X
Western Coral Snake <i>Micruroides euryxanthus</i>	R		X	X	X
Western Diamondback Rattlesnake <i>Crotalus atrox</i>	C		X	X	X
Speckled Rattlesnake <i>Crotalus mitchelli</i>	C				X
Sidewinder <i>Crotalus cerastes</i>	C		X	X	X
Black-tailed Rattlesnake <i>Crotalus molossus</i>	U		X		X
Tiger Rattlesnake <i>Crotalus tigris</i>	U		X	X	X
Mojave Rattlesnake <i>Crotalus scutulatus</i>	C		X	X	X
Western spotted leaf-nosed snake <i>Phyllorhynchus decurtatus perkinsi</i>	LC		X	X	
Sources: Barry, Robert X. 2001a. Various personal conversations and informal e-mail exchanges between Robert X. Barry, Wildlife Biologist, Luke Air Force Base Range Management Office and URS personnel. Stebbins, R.C. 1985. A Field Guide to Western Reptiles and Amphibians. Boston, Houghton Mifflin Co. 336 pp. U.S. Fish and Wildlife Service 1995. Amphibians and Reptiles of the Cabeza Prieta National Wildlife Refuge, Ajo, Arizona. University of Arizona. 1986. Natural Resources Management Plan for Luke Air Force Range.					

**TABLE D-4  
REPRESENTATIVE BIRDS  
THAT MAY OCCUR ON THE BMGR AND CABEZA PRIETA NWR**

Relative Abundance (RA); C=Common or Abundant; LC=Locally Common; U=Uncommon; R=Rare; H=Hypothetical					
Seasonal Distribution: P= permanent resident; S= summer resident; W= winter resident; T= transient; I = irregular or erratic; CAS=casual, A= accidental; ?= status uncertain.					
Habitat Types: OW=Open Water; DR=Desert Riparian; CD=Creosote Bush Desertscrub; MSD=Mixed Sonoran Desertscrub					
Breeding Status: *= breeding is known to occur; [*]= breeding suspected, but no recorded observations					
	HABITAT TYPE				
	RA	OW	DR	CD	MSD
*Killdeer	UT, RW	X	X		
Black Vulture	RS		X	X	X
*Turkey Vulture	CP		X	X	X
Osprey	UT	Big X			
Northern Harrier	CW		X	X	X
Sharp-shinned Hawk	LCT, UW		X		X
Cooper's Hawk	LCT, UW		X	X	X
*Harris' Hawk	UP		X		X
Swainson's Hawk	RT		X	X	X
*Red-tailed Hawk	CP		X	X	X
Ferruginous Hawk	UW		X	X	X
[*] Golden Eagle	RP		X	X	X
Crested Caracara	H			X	X
*American Kestrel	CP		X	X	X
Merlin	RT, RW		X	X	X
[*] Peregrine Falcon	RT		X		X
*Prairie Falcon	UP		X	X	X
*Gambel's Quail	CP		X	X	X
*Rock Dove (introduced species)	CP	Urban developed areas			
Band-tailed Pigeon	UW	Montane pine forests			
*White-winged Dove	CS		X	X	X
*Mourning Dove	CP		X	X	X
Inca Dove	RT?	Human settlements			
Common Ground-Dove	RS		X	X	X
*Greater Roadrunner	UP		X	X	X
*Common Barn-Owl	UP		X	X	X
*Western Screech-Owl	LCP		X		X
*Great Horned Owl	CP		X	X	X
Ferruginous Pygmy-Owl	H		X		X
*Elf Owl	CS, RW		X		X
*Burrowing Owl	LCS			X	
Long-eared Owl	RW		X		X
Short-eared Owl	RW		X	X	X
*Lesser Nighthawk	US, RW	X	X	X	X
*Common Poorwill	CS, RW	X	X	X	X
Vaux's Swift	UT		X	X	X
Black Swift	RT				X
*White-throated Swift	US, SW	X	X	X	X
[*] Black-chinned Hummingbird	UT		X	X	X

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	HABITAT TYPE				
	RA	OW	DR	CD	MSD
[*] Anna's Hummingbird	RT, RW		X		X
*Costa's Hummingbird	CS, UW		X	X	X
Calliope Hummingbird	RT		X		X
Rufous Hummingbird	UT		X		X
Allen's Hummingbird	CAS		X	X	X
Broad-tailed Hummingbird	RT				X
Belted Kingfisher	RT	X	X		
*Gila Woodpecker	CP		X		X
Red-naped Sapsucker	RT		X		X
*Ladder-backed Woodpecker	CP		X	X	X
Northern Flicker (Red-shafted)	CW		X	X	X
*Northern Flicker (Gilded)	CP		X	X	X
Olive-sided Flycatcher	RT		X		X
Western Wood-Pewee	UT		X		X
Willow Flycatcher	UT		X		
Hammond's Flycatcher	RT		X		
Dusky Flycatcher	RT		X		X
Gray Flycatcher	CT, RW		X	X	X
Western (Pacific Slope) Flycatcher	UT		X		
Black Phoebe	RT, RW	X	X		
*Say's Phoebe	RS, CW		X	X	X
*Vermilion Flycatcher	US	X	X		
*Ash-throated Flycatcher	CS, UW		X	X	X
*Brown-crested Flycatcher	LCS				X
Tropical Kingbird	CAS		X		
[*]Western Kingbird	LCS		X	X	X
Cassin's Kingbird	UT		X	X	X
*Horned Lark	UP			X	
*Purple Martin	RS				X
Tree Swallow	RT	X	X	X	X
Violet-green Swallow	UT	X	X	X	X
[*]Northern Rough-winged Swallow	UT, RS	X	X	X	X
Bank Swallow	RT	X	X	X	X
Cliff Swallow	UT	X	X	X	X
Barn Swallow	UT	X	X	X	X
*Common Raven	CP	X	X	X	X
Mountain Chickadee	RT		X	X	X
*Verdin	CP		X	X	X
Red-breasted Nuthatch	CAS		X		

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	HABITAT TYPE				
	RA	OW	DR	CD	MSD
*Cactus Wren	CP		X	X	X
*Rock Wren	CP		X	X	X
*Canyon Wren	CP		X		X
Bewick's Wren	UW		X		X
House Wren	UT, UW		X		X
Ruby-crowned Kinglet	CW, CT		X		X
Blue-gray Gnatcatcher	RW		X		
*Black-tailed Gnatcatcher	CP		X	X	X
Western Bluebird	RI		X	X	X
Mountain Bluebird	UW		X	X	X
Townsend's Solitaire	UW		X	X	X
Swainson's Thrush	UT		X		
Hermit Thrush	UT, RW		X		
American Robin	UW		X	X	X
*Northern Mockingbird	LCP		X	X	X
Sage Thrasher	UT, RW		X	X	X
*Bendire's Thrasher	RP		X	X	
*Curve-billed Thrasher	CP		X	X	X
*Crissal Thrasher	UP		X		
*Le Conte's Thrasher	LCP			X	X
Water Pipit	RT	X			
*Phainopepla	CP		X	X	X
*Loggerhead Shrike	LCP, LCW		X	X	X
*European Starling (introduced species)	UP	Urban developed areas			
*Bell's Vireo	CS		X		
Gray Vireo	UW, LCT		X		X
Solitary Vireo	CT		X		X
Warbling Vireo	CT		X		X
Tennessee Warbler	UT		X	X	X
Orange-crowned Warbler	RW, CT		X	X	X
Nashville Warbler	CT		X	X	X
*Lucy's Warbler	US		X		X
Virginia's Warbler	RT		X	X	X
[*]Yellow Warbler	CT		X	X	X
Yellow-rumped Warbler	CT, CW		X	X	X
Black-throated Gray Warbler	CT, RW		X	X	X
Townsend's Warbler	UT		X		
Hermit Warbler	UT		X		X
MacGillivray's Warbler	CT		X		

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	HABITAT TYPE				
	RA	OW	DR	CD	MSD
Common Yellowthroat	RT	X	X		X
Wilson's Warbler	CT	X	X	X	X
Yellow-breasted Chat	RT	X	X		
Summer Tanager	CAS		X		
Western Tanager	CT		X		X
*Northern Cardinal	UP		X		X
*Pyrrhuloxia	UP		X		
Black-headed Grosbeak	CT		X		X
[*]Blue Grosbeak	RT, RS		X		
Lazuli Bunting	UT		X		X
[*]Varied Bunting	RS				X
Green-tailed Towhee	CT, UW		X		X
Rufous-sided (Spotted) Towhee	UW		X		
*Canyon Towhee	UP		X		X
Brown Towhee	UP		X		X
Cassin's Sparrow	RS, RW		X		X
Rufous-crowned Sparrow	UP		X	X	X
Rufous-winged Sparrow	UP		X	X	X
Chipping Sparrow	UT, RW		X	X	X
Brewer's Sparrow	CW		X	X	X
Black-chinned Sparrow	RT		X		X
Vesper Sparrow	UW		X	X	
Lark Sparrow	UT, RW		X		X
*Black-throated Sparrow	CP		X	X	X
Sage Sparrow	UW			X	X
Lark Bunting	OW		X	X	X
Savannah Sparrow	UW		X	X	X
Grasshopper Sparrow	RW		X	X	
Fox Sparrow	RW		X		
Song Sparrow	CAS		X		
Lincoln's Sparrow	UT, RW		X		X
White-crowned Sparrow	CW		X	X	X
Dark-eyed Junco (Oregon/Gray-headed)	UW		X	X	X
Red-winged Blackbird	RT	X	X		
*Western Meadowlark	CW			X	X
Yellow-headed Blackbird	LCT	X	X		
Brewer's Blackbird	UT	X	X		
*Bronzed Cowbird	US		X		
*Brown-headed Cowbird	CT, LCS		X		X

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Seasonal Distribution: P= permanent resident; S= summer resident; W= winter resident; T= transient; I = irregular or erratic; CAS=casual, A= accidental; ?= status uncertain.					
Habitat Types: OW=Open Water; DR=Desert Riparian; CD=Creosote Bush Desertscrub; MSD=Mixed Sonoran Desertscrub					
Breeding Status: *= breeding is known to occur; [*]= breeding suspected, but no recorded observations					
	HABITAT TYPE				
	RA	OW	DR	CD	MSD
*Hooded Oriole	US		X		
[*]Northern Oriole	CT		X		
*Scott's Oriole	LCS				X
Cassin's Finch	CAS	Montane pine forests			
*House Finch	CP		X	X	X
Pine Siskin	RT		X		X
American Goldfinch	RT		X		X
[*]Lesser Goldfinch	RS, UW		X		X
Lawrence's Goldfinch	RI		X		X
Evening Grosbeak	CAS		X		
House Sparrow (introduced species)	UP	Urban developed areas			
Sources: Arizona Game and Fish Department. 2001. Arizona Breeding Bird Atlas Data for the BMGR. 1993-2000. American Ornithologists' Union. 1983. Checklist of North American Birds, sixth edition. Baltimore, American Ornithologist Union and supplement in Auk 1993. Barry, Robert X. 2001a. Various personal conversations and informal e-mail exchanges between Robert X. Barry, Wildlife Biologist, Luke Air Force Base Range Management Office and URS personnel. Deamaree, S.R., E.L. Radke and J.L. Witzeman. 1972. Annotated Field List, Birds of Maricopa County, Arizona. Maricopa Audubon Society. 70 pp. Monson, G. and A.R. Phillips. 1981. Annotated Checklist of the Birds of Arizona. Tucson: University of Arizona Press. 240 pp. Rosenberg., K.V., R.D. Ohmart, W.C. Hunter, and B.W. Anderson. 1991. Birds of the Lower Colorado River Valley. Tucson: The University of Arizona Press. 416 pp. University of Arizona. 1986. Natural Resources Management Plan for Luke Air Force Range.					

**TABLE D-5  
BIRD SPECIES THAT MAY HYPOTHETICALLY OCCUR<sup>1</sup> ON THE BMGR AND CABEZA  
PRIETA NWR**

<sup>1</sup> The bird species listed on this table are those that are only expected to occur on the BMGR and Cabeza Prieta NWR on a hypothetical basis or as the result of some anomaly. While two hypothetical bird species were also included in Table D-4, the presence of those species has been studied and the hypothetical basis for their potential presence more adequately documented; the presence of the bird species listed on this table has not been studied.

Relative Abundance (RA); C=Common or Abundant; LC=Locally Common; U=Uncommon; R=Rare;  
H=Hypothetical

Seasonal Distribution: P= permanent resident; S= summer resident; W= winter resident; T= transient;  
I = irregular or erratic; CAS=casual, A= accidental; ?= status uncertain.

Habitat Types: OW=Open Water; DR=Desert Riparian; CD=Creosote Bush Desertscrub;  
MSD=Mixed Sonoran Desertscrub

Breeding Status: \*= breeding is known to occur; [\*]= breeding suspected, but no recorded observations

	HABITAT TYPE				
	RA	OW	DR	CD	MSD
Pied-billed Grebe	RT	X			
Eared Grebe	RT	X			
Great Blue Heron	RT	X			
Snowy Egret	RT	X			
Cattle Egret	UT	X		X	
Green Heron	RT	X			
Black-crowned Night Heron	RT	X			
Canada Goose	CAS	X	X		
Green-winged Teal	UW	X			
Mallard	RW	X			
Northern Pintail	RT	X			
Cinnamon Teal	UT	X			
Northern Shoveler	RW	X			
Gadwall	RW	X			
American Wigeon	RT	X			
Ring-necked Duck	RW	X			
Lesser Scaup	RT	X			
Common Goldeneye	CAS	X			
Bufflehead	RT	X			
Common Merganser	CAS	X			
Ruddy Duck	RT	X			
Virginia Rail	CAS	X	X		
Sora	RT	X	X		
Black-necked Stilt	UT	X			
American Avocet	RT	X			
Greater Yellowlegs	RT	X			
Solitary Sandpiper	RT	X			
Willet	CAS	X			
Spotted Sandpiper	UT, RW	X			
Long-billed Curlew	CAS	X			
Western Sandpiper	UT	X			
Least Sandpiper	UT	X			
Baird's Sandpiper	RT	X			
Common Snipe	RT	X			

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BIRD SPECIES THAT MAY HYPOTHETICALLY OCCUR<sup>1</sup> ON THE BMGR AND CABEZA  
PRIETA NWR**

<sup>1</sup> The bird species listed on this table are those that are only expected to occur on the BMGR and Cabeza Prieta NWR on a hypothetical basis or as the result of some anomaly. While two hypothetical bird species were also included in Table D-4, the presence of those species has been studied and the hypothetical basis for their potential presence more adequately documented; the presence of the bird species listed on this table has not been studied.

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Habitat Types: OW=Open Water; DR=Desert Riparian; CD=Creosote Bush Desertscrub; MSD=Mixed Sonoran Desertscrub

Breeding Status: \*= breeding is known to occur; [\*]= breeding suspected, but no recorded observations

	HABITAT TYPE				
	RA	OW	DR	CD	MSD
Long-billed Dowitcher	CAS	X			
Wilson's Phalarope	UT	X			
Red-necked Phalarope	CAS	X			
Red Phalarope	CAS	X			
Ring-billed Gull	CAS	X			
Black Tern	CAS	X			
Steller's Jay	RI		X	X	X
Scrub Jay	RI		X	X	X
Sprague's Pipit	CAS	Short grass with open patches			
Cedar Waxwing	CAS		X		X
Chestnut-collared Longspur	CAS	Dense grass			

Sources:

- American Ornithologists' Union. 1983. Checklist of North American Birds, sixth edition. Baltimore, Am. Ornithologist Union and supplement in Auk 1993.
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- Monson, G. and A.R. Phillips. 1981. Annotated Checklist of the Birds of Arizona. Tucson: University of Arizona Press. 240 pp.
- Rosenberg., K.V., R.D. Ohmart, W.C. Hunter, and B.W. Anderson. 1991. Birds of the Lower Colorado River Valley. Tucson: The University of Arizona Press. 416 pp.
- University of Arizona. 1986. Natural Resources Management Plan for Luke Air Force Range.

## APPENDIX E

### ARIZONA BREEDING BIRD ATLAS BREEDING CODES<sup>E-1</sup>

CODE	INTERPRETATION
<b>Observed (OB)</b>	Non-breeder or migrant <b>observed</b> in block during breeding season, but not believed to be breeding. Used to address species in unlikely breeding habitat, flying over the block or out of their normal breeding range and with no indication of breeding; for example, could apply to ducks summering on a pond with no breeding habitat or a great blue heron foraging when no heronry exists on the block.
<b>Possible (PO)</b>	Based on one of the following:  Species <b>observed</b> in suitable nesting habitat during its breeding season. Used to address birds seen in likely breeding habitat, such as a western tanager in a ponderosa pine forest; however, caution is necessary during the migration period of birds that may be passing through or for birds that may linger on wintering areas before concluding possible breeding. Additionally, some wintering species may be present in late winter and early spring in the desert, while some resident species have commenced breeding.  <i>or</i> <b>Singing male</b> present in suitable nesting habitat during its breeding season.
<b>Probable (PR)</b>	Based on one of the following:  <b>Pair</b> observed in suitable habitat during its breeding season. Applies to situations when a male and female of the same species are seen in the right habitat, though some birds (for example, ducks) are often paired during migration.  <i>or</i> Permanent territory presumed through <b>song</b> at same location on at least 2 occasions 7 days or more apart.  <i>or</i> Permanent <b>territory</b> presumed through defense of territory (chasing individuals of the same species).  <i>or</i> <b>Courtship</b> behavior or <b>copulation</b> between a male and female. Includes courtship displays or food exchange.  <i>or</i> Visiting probable <b>nest-site</b> , but no further evidence obtained. Applies to a bird that consistently flies into the same likely nest site, but which provides insufficient behavior for upgrading to confirmed. Applies especially to hole-nesters.  <i>or</i> <b>Agitated</b> behavior or anxiety calls of adult, indicating nest site or young in the vicinity. Two birds circling above or a goshawk distress call falls into this category. Does not include agitation that is induced by "pishing" or using taped calls.  <i>or</i> Nest <b>building</b> by wrens or excavation of cavities by woodpeckers, chickadees and nuthatches. Woodpeckers and other cavity excavators usually make only one nest hole, but use other holes for roosting; wrens will build several nests before a female selects one, and unmated males do this too.

<sup>E-1</sup> Modified from Corman (1994).

**ARIZONA BREEDING BIRD ATLAS BREEDING CODES<sup>E1</sup> (continued)**

CODE	INTERPRETATION
<b>Confirmed (CO)</b>	<p>Based on one of the following:</p> <p>Bird seen <b>carrying nesting</b> material (that is, sticks, grass, mud, and cobwebs). Applies for all species except wrens.</p> <p style="text-align: center;"><i>or</i></p> <p><b>Nest building</b> seen at the actual nest site, excluding wrens, woodpeckers, chickadees and nuthatches.</p> <p style="text-align: center;"><i>or</i></p> <p><b>Distraction displays</b>, defense of unknown nest or young or injury feigning. Used if adult bird is seen trying to lead people away from nest or young. Commonly seen in most ground nesters, this is the typical killdeer broken-wing act. This also includes active defense such as a Cooper's hawk diving at an intruder. Does not include agitated behavior.</p> <p style="text-align: center;"><i>or</i></p> <p><b>Used nest</b> or eggshells found. Unless carefully identified, used only for unmistakable egg shells and nests that were used during the atlas period. Magpie nests, for example, are characteristic.</p> <p style="text-align: center;"><i>or</i></p> <p>Recently <b>fledged</b> young of altricial species incapable of sustained flight or downy young of precocial species restricted to the natal area by dependence on adults or limited mobility. A duck brood on an isolated pond merits this code, but barely fledged blackbirds and swallows may fly considerable distances. The presence of young cowbirds confirms both the cowbird and the host.</p> <p style="text-align: center;"><i>or</i></p> <p><b>Occupied nest</b> indicated by adult entering or leaving nest site in circumstances indicating an occupied nest, including those in high trees, cliffs, cavities, and burrows in which the contents of the nest and incubating or brooding adult cannot be seen.</p> <p style="text-align: center;"><i>or</i></p> <p>Adults seen <b>carrying food</b> for the young. Some birds, especially corvids and raptors, may carry food some distance before eating it themselves.</p> <p style="text-align: center;"><i>or</i></p> <p>Adults feeding recently <b>fledged young</b>. Young cowbirds begging food confirm both the cowbird and the host.</p> <p style="text-align: center;"><i>or</i></p> <p>Adult carrying <b>fecal sac</b>. Many passerines keep their nests clean by carrying fecal sacs away from the nest.</p> <p style="text-align: center;"><i>or</i></p> <p><b>Nest with eggs</b> found. Same cautions as under <b>used nest</b> apply here. Cowbird eggs confirm both the cowbird and the host.</p> <p style="text-align: center;"><i>or</i></p> <p><b>Nest with young</b> seen or heard. Used when young actually seen or, as with most cavity nesters, when young only are heard. A cowbird chick in the nest confirms both the cowbird and the host.</p>