DRAFT

Environmental Assessment

of the

MALPAI BORDERLANDS HABITAT CONSERVATION PLAN

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1.0 INTRODUCTION AND NEED FOR ACTION

1.1 INTRODUCTION

This draft Environmental Assessment (EA) has been prepared in accordance with the requirements of the National Environmental Policy Act (NEPA) to address the impacts on the environment of proposed issuance of an Incidental Take Permit (ITP) under section 10(a)(1)(B) of the Endangered Species Act of 1973, as amended (Act) for activities proposed by the Malpai Borderlands Group (MBG) in the Malpai Borderlands of Arizona and New Mexico.

The Act prohibits "take" of federally listed species, and defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect such species or to attempt to engage in any such conduct." Section 10(a)(1)(B) defines incidental take as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity; and provides for the issuance of ITPs to authorize such take. Under section 10(a)(2)(A), any application for an ITP must include a "conservation plan" that details, among other things, the impacts of the incidental take allowed by the ITP on affected species and how the impacts of the incidental take will be minimized and mitigated. Accordingly, MBG has applied to the U.S. Fish and Wildlife Service (USFWS) for an ITP in connection with planned and ongoing activities in the Malpai Borderlands, and has prepared the Malpai Borderlands Habitat Conservation Plan (MBHCP), dated June 27, 2007, in support of that application. MBG has also prepared an Implementing Agreement (IA), which specifies responsibilities under the MBHCP and various legal understandings among the parties to the MBHCP[1]. The action under consideration in this EA is therefore the proposed issuance of the requested ITP, considered in light of the proposed implementation of the MBHCP and IA. This is referred to throughout the document as the Preferred Alternative. The planning area under consideration in the EA, as in the MBHCP, consists of private and state trust lands in the Malpai Borderlands together with federally managed lands on the San Bernardino National Wildlife Refuge (SBNWR) and the Coronado National Forest in the Peloncillo Mountains. The covered area in the MBHCP and the associated ITP includes only the private and state trust lands (Figure 2-1 of the MBHCP).

The MBHCP encompasses two broad sets of activities: (1) those proposed by MBG and its members including, certain Grassland Improvement Activities and Ranch Management Activities (referred to hereinafter as the "covered activities"; Section 3.5 of the MBHCP); and (2) those activities proposed by MBG to protect and conserve 19 species of fish, wildlife, and plants (covered species, Table 1 below) in the course of carrying out the covered activities (Section 5.0 of the MBHCP). Of these species, nine are listed as endangered or threatened under the Act (ten are therefore not listed under the Act, but are treated by the MBHCP as if they are listed); five are listed as endangered or threatened under the New Mexico Wildlife Conservation Act, and 14 are designated as highly safeguarded under the Arizona Native Plant Law administered by the Arizona Department of Agriculture or wildlife of special concern by the Arizona Game and Fish Department (AGFD) (Table 1 below). Thus, the MBHCP, if approved, and the ITP, if issued, are designed to minimize and mitigate take of the covered species to the maximum extent practicable, but also to authorize a

[1] These consist of MBG, the USFWS (Ecological Services Division), USFWS (Refuges Division, San Bernardino NWR), Natural Resources Conservation Service (NRCS), Arizona Game and Fish Department (AGFD), New Mexico Department of Game and Fish (NMDGF), Arizona State Land Department (ASLD), and New Mexico State Land Office (NMSLO).

Table 1:
Species Covered by the proposed Malpai Borderlands HCP

Species Assemblage	Species	Act Status[1,2]	WCA Status[1]	AZ Status[3]
Aquatic Species	Yaqui chub	E		WSC
	Yaqui topminnow	E		WSC
	Yaqui catfish	T		WSC
	Yaqui sucker			WSC
	Longfin Dace			
	Mexican stoneroller			
	Beautiful shiner	T		WSC
	Chiricahua leopard frog	T		WSC
	Lowland leopard frog	SC	E	WSC
	Northern Mexican garter snake	SC	E	WSC
	Huachuca water umbel	E		HS
Grassland Species	Black-tailed prairie dog	RC/A		WSC
	Western burrowing owl	SC		
	Northern aplomado falcon	E	E	WSC
	White-sided jackrabbit	SC	T	
Riparian Species	Western yellow-billed cuckoo	CS/WBC		WSC
	Western red bat	SC		WSC
Montane Species	N.M. ridge-nosed rattlesnake	T	E	
	Mexican spotted owl	T		WSC

[1] E = Endangered; T = Threatened.
[2] SC = Species of concern, which is not a formal classification but means that the USFWS is concerned about these species and that further biological study is needed to resolve their conservation status (61 FR 7595); generally includes former category 2 candidate species. RC = Species the USFWS has removed from the candidate list because currently available information does not support a proposed listing. A = Species that are more abundant or widespread than previously believed and that are not subject to the degree of threats sufficient to warrant continuing candidate status or issuance of a proposed or final listing. CS/WBC = Candidate Species with a Warranted but Precluded finding; this classification refers to species for which the USFWS has found that sufficient data exist to support listing under the Act, but for which listing is precluded by other higher-priority actions (61 FR 7595).
[3] HS = Highly Safeguarded (meaning that collection is prohibited); WSC = Wildlife of Special Concern.

minimum amount of incidental take that is unavoidable in carrying out the covered activities. Incidental take authorized by the MBHCP and the ITP, depending on the circumstances involved, could potentially include killing, injury, harm, and harassment[2] of the covered species (Section 7.1 of the MBHCP).

[2] Federal regulation (50 CFR 17.3) defines the term "harm" in the take definition to include "significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, and sheltering"; and the term "harass" to mean "an intentional or negligent act or omission which creates the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding or sheltering."

In accordance with NEPA, the role of this EA is to analyze the potential direct, indirect, and cumulative impacts of the proposed action (issuance of the requested ITP and approval of the proposed MBHCP) on the environment, including the impacts of this action on the 19 covered species.

1.2 DESCRIPTION OF THE APPLICANT

The MBG is a private, non-profit organization composed of ranchers who live in the Malpai Borderlands. MBG was established in 1994 to represent and pursue the interests of that ranching community. It seeks to do so by maintaining and improving the area's open space values, traditional ranching economies, biodiversity, and natural habitats through cooperation and partnership among the various entities—state, Federal, and private—having an interest or role in achieving these goals. MBG thus seeks to balance sustainable ranching with sound land stewardship, and to do so by developing strategic alliances among the ranching, conservation, regulatory, and scientific communities.

In the pursuit of these goals, MBG has initiated, completed, or carries out on an ongoing basis a wide range of activities and programs. These include, but are not limited to: (1) a fire management program which seeks to return beneficial, periodic fire to the ecology of the Malpai Borderlands; (2) a conservation easement program in which MBG purchases conservation easements that prohibit development of lands from willing Malpai-area landowners; (3) a Safe Harbor Agreement which promotes recovery of the federally threatened Chiricahua leopard frog by Malpai-area ranchers; (4) a grassbanking program in which Malpai-area ranchers, under agreement with MBG and the Diamond A Ranch (formerly known as the Gray Ranch), may graze their herds on Diamond A Ranch for specified time periods in return for sale to MBG of conservation easements equal in value to the grass consumed; and (5) numerous biological and ecological monitoring and research efforts.

MBG is governed by a Board of Directors of between nine and thirteen individuals. Currently, these include local ranchers, a scientist, a Vice-president of the Nature Conservancy (TNC), and a retired U.S. Forest Service (USFS) range conservationist. MBG is funded through tax-deductible donations, grants from private foundations, and, in some cases (e.g., with respect to specific projects or activities), grants from state and Federal agencies. A more detailed description of MBG and its conservation programs is available in Section 1.2 of the MBHCP.

1.3 PURPOSE AND NEED FOR THE ACTION

The proposed action is issuance of an ITP and approval of the MBHCP pursuant to section 10(a)(1)(B) of the Act (Preferred Alternative). The MBHCP addresses six sets of covered activities that generally fall into two categories: (1) Grassland Improvement Activities designed to improve ecological conditions in the Malpai Borderlands (and carried out primarily by or under the direction of MBG); and (2) Ranch Management activities undertaken in the course of livestock ranching in the Malpai Borderlands (primarily by individual Malpai-area ranchers). Issuance of the proposed ITP is occasioned by the fact that the Malpai Borderlands supports (or potentially supports) a minimum of 15 species listed as endangered or threatened under the Act, and that nine such species could be incidentally taken in the course of carrying out the covered activities. Consequently, the MBHCP also includes a range of conservation measures and programs designed to minimize and mitigate the effects

of take of these (and other) species, to monitor the biological effectiveness of the MBHCP over time, and to allow modification of those measures and programs if necessary. These are described in Section 5.0 of the MBHCP.

The purpose of the action is therefore issuance of an incidental take permit for the covered species in the course of otherwise lawful covered activities as provided for by the Act. The need for the action is to allow these activities to be undertaken in an effective and efficient manner and in accordance with the Act. The purpose of the EA is to evaluate the effects of the action on the environment and to provide the basis under NEPA for issuance of the proposed ITP. The EA evaluates such effects for the Preferred Alternative and a No Action Alternative.

1.4 DECISION TO BE MADE BY THE RESPONSIBLE OFFICIAL

The scope of the analysis in this environmental assessment covers the direct, indirect, and cumulative environmental effects of approving the MBHCP and issuing a section 10(a)(1)(B) Incidental Take permit and anticipated future effects of implementation of the MBHCP (including the take authorization). The decisions to be made are which alternative to implement and whether the alternative to be implemented will have a significant impact on the existing environment, which would require the preparation of an Environmental Impact Statement.

2.0 ALTERNATIVES

This section describes the proposed action and alternative to the proposed action considered in the course of development of the MBHCP. These are Alternative 1: the Preferred Alternative and Alternative 2: the No Action Alternative. A discussion of other Alternatives considered, but rejected follows.

2.1 ALTERNATIVE 1: NO ACTION ALTERNATIVE

Under the No Action alternative, the MBHCP as proposed by the Preferred Alternative, described below, would not be implemented, the proposed ITP would not be issued, and the status quo with respect to planned and ongoing activities in the Malpai Borderlands would be maintained. This does not mean that no such activities would be undertaken, but that they would be undertaken at levels and under circumstances similar to the present.

2.2 ALTERNATIVE 2: PREFERRED ALTERNATIVE AND PROPOSED ACTION

As previously noted, the Preferred Alternative consists of issuance of the ITP requested by MBG and implementation of the proposed MBHCP. The MBHCP consists of two principal components: the proposed covered activities are planned to meet the conservation needs of the Malpai area as a whole and the operational needs of Malpai area ranches; and the species conservation program which are proposed to protect the covered species (Table 1) in the course of carrying out the covered activities. The proposed term of the MBHCP and the associated ITP is thirty (30) years.

2.1.1 BIOLOGICAL GOALS AND OBJECTIVES

The goals of the MBHCP are threefold: (1) To maintain and, where necessary, enhance and improve three attributes of ecological health in the Malpai Borderlands: soil stability, biotic integrity, and watershed function; (2) To ensure the covered grassland improvement activities necessary to achieve the preceding goal, and the covered ranch management activities referred to in the following goal, are undertaken in a manner consistent with protection of the covered species and their habitats; and (3) To ensure the measures necessary to protect the covered species are undertaken in a manner consistent with the effective carrying out of the covered grassland improvement activities, the covered ranch management activities, and the preservation of ranching and vigorous ranching economies in the Malpai Borderlands over the long term.

To achieve these goals the MBHCP also establishes three sets of objectives:

(1) Grassland Conservation Objectives. The MBHCP's range conservation objectives are: (a) to minimize sheet erosion and identify, abate, and repair areas exhibiting acute erosion; (b) to halt the encroachment of woody brush species into the area's historical grasslands and correct or reverse such encroachment where it has already occurred; and (c) to conserve and restore grassland habitats and grassland productivity in the Malpai Borderlands and, where appropriate, re-establish native grasses and forbs.

(2) Species Conservation Objectives. The MBHCP's species conservation objectives are: (a) to ensure that take of the covered species is minimized to the maximum extent practicable in the course of grassland improvement and ranch management activities carried out under the plan; (b) to ensure that loss or degradation of the habitats of the covered species are also minimized or reversed in the course of these activities; and (c) where possible and consistent with the MBHCP's other purposes and goals, to assist in recovery of the covered species and the conservation of other wildlife and plants native to the Malpai Borderlands.

(3) Business Objectives. The MBHCP's business objectives are to ensure: (a) a predictable regulatory environment with respect to the impacts of the plan on MBG's organizational programs and ranching activities in the Malpai Borderlands; (b) that the conservation measures required by the plan (whether at plan outset or as a result of its Adaptive Management program) are based on specific, identifiable biological needs and are cost impactive and operationally feasible; and (c) to the maximum extent possible and consistent with the species conservation objectives, that the discretion of Malpai-area ranchers to manage their lands (privately owned and state-leased) in accordance with their economic interests and cultural traditions is not significantly diminished, undermined, or eroded as a result of the plan's requirements.

2.1.2 COVERED ACTIVITIES

The covered activities fall into two categories: Grassland Improvement Activities - those needed to correct and improve ecological conditions in the Malpai Borderlands (Section 3.5.1 of the MBHCP); and Ranch Management Activities - those required by Malpai-area ranchers to manage and provide for their livestock (Section 3.5.2 of the MBHCP).

Proposed Grassland Improvement Activities consist of fire management, which includes planning and carrying out of prescribed fire and planning and managing wildland fire to restore the ecological benefits of fire to the area; erosion control, which includes design and construction of one-rock dams, rock-rubble check dams, and similar structures in eroded areas to slow water velocity, reduce ongoing erosion, and promote re-sedimentation and vegetation growth; and mechanical brush control, which includes the use of mechanical devices and means such as bulldozers, roller-choppers, and chaining to stop brush expansion in historical grasslands and allow the restoration of grasses and forbs.

Ranch Management Activities consist of construction and/or maintenance of linear-type projects, which includes fences, waterlines, roads, and utility lines; livestock management, which includes the presence and movement of livestock in areas inhabited by the covered species; and stocktank use and maintenance, which includes livestock use of stockponds and their immediate surroundings and periodic activities related to the maintenance of stockponds.

Role of Malpai-area Ranchers. MBG is the proposed permittee under the MBHCP, Malpai ranchers are neither bound nor obligated by the MBHCP or subject to its benefits or responsibilities. However, the MBHCP provides a process which allows individual Malpai-area ranchers to voluntarily enroll in and become parties to the MBHCP. This process is described in Section 5.3 of the MBHCP and consists of conditions and standards governing such enrollment, which is achieved through a Certificates of Inclusion (COI). The role of the COI under the process is to formalize a rancher's decision to participate in the MBHCP and make binding his or her commitment to implement

applicable MBHCP requirements. The COI also has the effect of extending the regulatory authorities of the MBHCP's associated ITP to the rancher. The parties to a COI are MBG and the enrolling rancher.

2.1.3 SPECIES CONSERVATION PROGRAM

The MBHCP and associated ITP would cover a total of 19 species (seven fish, five reptiles and amphibians, three mammals, three birds, and one plant). The Species Conservation Program is described in Section 5.0 of the HCP and is incorporated here by reference. In general the Species Conservation Plan consists of measures to reduce the impacts of the covered activities on the covered species and includes: Take Minimization and Mitigation Measures; Monitoring; Reporting; Adaptive Management procedures; and establishment of a Technical Advisory Committee.

Take Minimization and Mitigation Measures. The take minimization measures (Section 5.5 of the MBHCP) are a key component of the MBHCP and consist of measures designed to minimize the levels of incidental take of the covered species likely to occur in the course of the covered activities to the maximum extent practicable. Such measures are provided under the MBHCP with respect to each covered activity and each species assemblage in which the covered activity in question has the potential to result in take of a covered species. The covered species are grouped based upon general species habitat assemblages: aquatic species, grassland species, riparian species, and montane species. Incidental take minimization measures provided for in the MBHCP consist of acreage disturbance caps, limits on frequency of disturbance, avoidance of critical time periods for the covered species; burn parameters; grazing-rest requirements; and buffer zones around species habitats and known locations. Implementation of Take Minimization measures is based upon a presumption of presence in species habitats or surveys of impact areas.

Unlike incidental take minimization measures, which are designed to reduce the amount of take, mitigation measures are designed to offset or compensate for the actual effects of incidental take that occurs under the MBHCP; and mitigation for such incidental take typically includes compensating for the loss of individuals and habitat through long-term protection of intact habitats of the affected species. This mitigation should also be commensurate with the effects of the incidental take (Section 7.2 of the MBHCP). The MBHCP is unusual among HCPs in that the activities covered by the plan are themselves conservation oriented, as are the majority of activities and programs undertaken by MBG. The purpose of both types of activities are to maintain, and where necessary improve, ecological conditions in the Malpai Borderlands; to maintain the area in a natural, undeveloped condition; and to return periodic fire to the borderlands as a functioning component of the ecology of the area. Therefore, the MBHCP's long-term benefits would serve to offset or mitigate for any of the short-term adverse effects that are anticipated through implementation of the MBHCP (Section 5.6 of the MBHCP).

The MBHCP may result in four habitat-related issues connected with the plan: those involving the limited amount of species habitat that might be temporarily adversely affected by erosion control, livestock management, and stockpond use and maintenance activities; those involving the more extensive, but still temporary, adverse habitat effects of managed fire and mechanical brush control; those involving the potentially more significant, but unlikely and unplanned, adverse effects of fire on riparian and montane species habitats should managed fire inadvertently escape into such areas and

the limited, but potential permanent loss of habitat related to the construction and maintenance of some linear facilities and fire control lines. Of these effects, those resulting from the covered erosion control, livestock management, and stockpond use and maintenance activities would be so minor as to be negligible (Section 7.1 of the MBHCP); those resulting from the covered fire management and mechanical brush control activities would be transitory (Section 7.2 of the MBHCP); those resulting from inadvertent escape of fire into riparian and montane areas would be addressed if they do occur as Changed Circumstances (Section 8.3 of the MBHCP); and the potentially long-term loss of habitat from linear facilities and fire control lines would involve so small an area over the life of the plan as to be negligible (Sections 5.5.2, 5.5.3, and 7.2 of the MBHCP).

In particular, the effects of the MBHCP's proposed grassland improvement activities on the covered species and their habitats, while potentially adverse in the short term, are expected to be beneficial over the long term by correcting processes, such as erosion and brush encroachment that are detrimental to those habitats. The construction and maintenance of linear facilities include fences, water development, and the roads needed to maintain those facilities which are typically related to improvements in livestock management, specifically better distribution over a pasture and livestock rotation practices should also improve conditions on a landscape level for the habitat of covered species. In addition, the MBG conservation easement program is producing immediate and dramatic conservation benefits for the covered species by protecting large portions of the Malpai Borderlands from development, approximately 75,000 acres to date. While this program is being undertaken independently of the HCP, it nevertheless, in association with the grassland improvement activities, which are dependent on the HCP, illustrates the significant conservation orientation and potential of MBG programs overall with respect to virtually all aspects of the ecology and landscape of the Malpai Borderlands.

Therefore, it is anticipated that the landscape level benefits associated with the MBHCP over the 30-year period of the ITP should mitigate for the temporal and small-scale effects of the incidental take of the covered species from the covered activities within the MBHCP.

Monitoring. Two types of monitoring are provided for under the MBHCP (Section 5.7 of the MBHCP): (1) compliance monitoring: to ensure the MBHCP is being properly implemented; and (2) biological monitoring: to ensure it is meeting its biological goals and objectives. Two types of biological monitoring are included in the MBHCP; ecological improvement monitoring and species conservation monitoring. Nine agencies, organizations, and groups have shared responsibilities in the monitoring program. These include MBG, Malpai-area ranchers who are parties to the MBHCP, USFWS-Ecological Services, USFWS-Refuges, AGFD, NMDGF, NRCS, ASLD, and NMSLO. Much of the monitoring specified by the MBHCP consists of agreements to continue monitoring already occurring in the Malpai Borderlands (e.g., monitoring NRCS vegetation transects and 250 monitoring plots in the area established by MBG and its cooperators). Additional monitoring measures are also provided; including water quality monitoring on San Bernardino NWR and access provisions ensuring that MBHCP parties and cooperators are granted access to privately owned and state trust (i.e., ASLD and NMSLO) lands for the purpose of carrying out monitoring activities.

Annual Reporting. Reporting requirements under the MBHCP consist primarily of an annual report to be submitted by MBG to the USFWS in February of each year in which the MBHCP is in effect (Section 5.10 of the MBHCP). Each such report will summarize pertinent information concerning

compliance with and implementation of the MBHCP in the preceding calendar year and include records and information on covered activities in the last year, monitoring results, and take of any covered species. To support and complement the report, the MBHCP also requires: (1) Malpai-area ranchers who were party to the MBHCP in a subject year to provide to MBG information in four reporting categories; and (2) USFWS-Refuges (i.e., San Bernardino NWR) to submit directly to USFWS-Ecological Services and synonymously with MBG's report, a report summarizing water quality monitoring measures conducted or carried out on the refuge under the MBHCP in the preceding year.

Adaptive Management. The MBHCP's monitoring program will be used to evaluate the MBHCP's abilities to meet its goals through an Adaptive Management process. The Adaptive Management process provides a process through which the results of MBHCP monitoring and other relevant information can be incorporated into the MBHCP. Adaptive Management under the MBHCP will consist of four basic phases or steps; these are: (1) detection of conditions or circumstances in the planning area possibly requiring correction; (2) evaluation of whether an Adaptive Management response is warranted; (3) response of the specific Adaptive Management revision or modification needed; and (4) implementation of the Adaptive Management response and notification of parties affected by it. Also included in the program are the Adaptive Management "triggers" (consisting of specified conditions, circumstances, and events which automatically initiate the Adaptive Management process; Table 5-5 of the MBHCP). Decision-making under the Adaptive Management program will be undertaken solely by the MBHCP's Technical Advisory Committee (TAC).

Technical Advisory Committee. The MBHCP will establish a TAC (Section 5.9 of the MBHCP), the primary roles of which is to advise MBG and participating Malpai ranchers in the technical aspects of MBHCP implementation, to act as the MBHCP's decision-making body, and to administer the Adaptive Management program. The TAC will be organized as a sub-committee of MBG's existing Scientific Advisory Committee and will be made up of a core membership (consisting of MBG, USFWS-Ecological Services, USFWS-Refuges, AGFD, NMDGF, NRCS, and one or two rancher representatives) and a secondary membership (consisting of species and other technical experts determined by the core membership to be needed). The TAC will meet annually, at a minimum, and will function under protocols to be developed by the core membership.

2.3 ALTERNATIVES CONSIDERED, BUT ELIMINATED

2.3.1 REDUCED COVERAGE ALTERNATIVE

Under the Reduced Coverage Alternative, the MBHCP would be implemented and an ITP would be issued, but the scope of its covered species and covered activities lists would occur at reduced levels. Several reduced coverage scenarios were considered over the course of developing the MBHCP (Lehman 2003; Malpai Borderland Technical Workgroup 2004 and 2005). However, the Reduced Coverage Alternatives did not meet the MBG goals and objectives organizationally or under the cooperative approach they have set for themselves.

Under this alternative, the relatively comprehensive MBHCP represented by the Preferred Alternative in this document would not have been prepared in favor of a more limited Focused HCP. Both types of plans were contemplated in a report entitled "Problem Assessment: Endangered Species Act

Compliance Issues and Needs in the Malpai Borderlands of Southern Arizona and New Mexico" (Lehman 2003), which was prepared to evaluate regulatory needs under the Act in the Malpai Borderlands.

As defined by the problem assessment, a Focused HCP for the Malpai Borderlands would have centered on fire management and the aquatic species, and also possibly included mechanical brush control, one or two additional activities, and the Aplomado falcon. The rationale for this was that of all activities MBG and its member-ranchers planned or proposed in the borderlands, fire management and mechanical brush control had the greatest likelihood to result in take of endangered and threatened species, and that, of these, the aquatic species were most likely to be taken. All other take potentially resulting from planned MBG and rancher activities, it was felt, could be avoided through suitable take avoidance measures, and the No-Take Agreement was to consist of a written understanding between MBG and the USFWS about the measures would be needed to avoid take in the course of the other activities.

Thus, all or most of the erosion control, livestock management, linear facility construction and maintenance, and stocktank maintenance and use activities covered by the MBHCP would not have been covered by the Focused HCP. Also, and all or most of the unlisted species covered by the MBHCP would not have been covered under the Focused HCP. As a result, few of the conservation benefits to these species occurring under the MBHCP would have occurred under the Focused HCP. The regulatory benefits to MBG for carrying out the fire management and mechanical brush control, and the conservation benefits to the aquatic species, under the Focused HCP alternative would have been roughly equivalent to such benefits under the MBHCP.

That said, some benefits of the more comprehensive MBHCP (and its associated ITP) would not have occurred under the Focused HCP alternative. These consist of the regulatory protection the ITP and associated MBHCP provides with respect to possible future listing of currently unlisted species under the Act, which, under the Focused HCP, would have to be incorporated through permit amendments at the time of such listings); the broader regulatory protection provided with respect to currently listed species (i.e., and with respect to non-fire and non-brush control activities); and the generally broader, more complete conservation benefits of the MBHCP as compared to the Focused HCP alternative. Indeed, it was because of these longer-term, more comprehensive benefits that MBG ultimately elected to develop the Multi-species/Multi-activities MBHCP and rejected the Focused HCP alternative.

2.3.2 INCLUSION OF HERBIVORY AS A COVERED ACTIVITY

As explained in Section 3.6 of the MBHCP, MBG and its member-ranches, at the outset of development of this HCP, gave serious consideration to including livestock grazing defined as herbivory as a covered activity in the plan, but, in the end, decided against this. The primary reason for this decision was MBG's belief that herbivory is not likely to result in take of any of the plan's covered species, and therefore need not be included within its permit coverage.

In evaluating this likelihood, two types of take must be considered: (1) direct mortality or injury to the covered species as a result of herbivory; and (2) take as a result of the indirect effects of herbivory on the habitats of the covered species under the Act's "harm" definition (Section 1.4 of the MBHCP).

Direct Mortality or Injury. The central question here is whether any of the MBHCP's covered species might periodically be killed or injured as a direct consequence of herbivory—which could happen only if livestock actually ate a covered species, and, therefore, could happen only with respect to plants. The MBHCP addresses only one plant, the Huachuca water umbel. However, the distribution of this species in the planning area is confined to the San Bernardino NWR, where livestock are not present and herbivory by livestock does not occur. Hence, herbivory is not likely to result in take of the covered species as a result of direct mortality or injury. In addition, the prohibitions against take on non-Federal lands do not apply to plants.

It should be mentioned that grazing defined as livestock management could result in direct killing or injury of certain covered species, e.g., through trampling effects (Section 7.1 of the MBHCP), and it was because of this dichotomy in the effects of these two livestock ranching components that grazing was segregated in this manner in the plan. For this reason as well, livestock management, but not herbivory, is included as a covered activity in the MBHCP (Section 3.5.2.1 of the MBHCP), as is use of stocktanks by livestock (Section 3.5.2.3 of the MBHCP).

Take as a Result of Harm. Under the Act's harm definition, habitat modification or degradation constitutes take if it results in significant impairment of essential behavioral patterns (breeding, feeding, or sheltering) to the extent that individual animals are actually injured or killed. The question here is whether or not grazing defined as herbivory (and as practiced in the Malpai Borderlands), would be expected to have these results.

Theoretically, take of the HCP's covered species through harm could occur as a result of: (a) the impacts of herbivory on the vegetative characteristics in an area (in terms of its amount, type, or structure) to the extent that the particular characteristics needed by the covered grassland and riparian species to meet their various life history components would be significantly compromised; or (b) the impacts of herbivory on the vegetative cover of an area to the extent that inadequate vegetation would trigger erosion that, in turn, would degrade downstream aquatic habitats and, thereby, kill or injure their constituent covered species.

The first of these effects has already been seen in the Malpai Borderlands, in the form of brush encroachment into grasslands, which evidently was caused in part by overgrazing in the late 1800s and early 1900s (Section 2.2.2 of the MBHCP) and evidently has adversely affected the numbers and distribution of white-sided jackrabbits in the Animas Valley (Section 4.2.4 of the MBHCP). Other such possible effects would be degradation, as a result of over-utilization, of vegetative cover and structure in riparian areas to the extent that such areas would not support nesting by yellow-billed cuckoos or roosting by western red bats; and in grassland areas to the extent that Aplomado falcon nest structures or foraging habitat would be significantly adversely affected, or western burrowing owl or black-tailed prairie dog nesting, sheltering, or foraging habitat would be so affected (e.g., in both cases through insufficient nesting sites, vegetative food, or vegetative cover supporting prey bases being available); or in grassland areas to the extent that degradation of vegetative cover would be so intense as to trigger erosion over and above existing levels and to the extent that downstream aquatic species habitats would suffer significant sedimentation effects. With respect to the latter, furthermore, such effects on fish could occur for the most part in San Bernardino NWR only (since that is their

primary location), and sedimentation would have to cross the refuge itself to make it into the aquatic species habitats on the refuge (since grazing does not occur on the refuge itself).

These effects of overgrazing are well documented, summarized in USFWS 2002, and significant overgrazing clearly could have all of the effects described above, particularly when it is combined with drought. However, the effects of moderate grazing is another matter, and MBG is aware of no documentary evidence suggesting that moderate, well-managed herbivory (of the type that occurs in the Malpai Borderlands; Section 3.6 of the MBHCP) is likely to have such effects to the extent that they would rise to the level of take (i.e., would result in death or injury to the covered species by impairing essential behavioral patterns). MBG is also unaware of any conditions or circumstances in the Malpai Borderlands attributable to the current effects of grazing suggesting that well-managed herbivory at present is having any such effects in the area. Consequently, MBG does not believe that herbivory as practiced in the Malpai Borderlands is likely to result in take of the HCP's covered species through harm and therefore, has not included it in their request for an ITP.

3.0 AFFECTED ENVIRONMENT

The Malpai Borderlands consists of approximately 828,000 acres (1,290 square miles) of desert landscape straddling the southeastern corner of Arizona (in Cochise County) and the southwestern corner of New Mexico (in Hidalgo County). Topographically, the area is characteristic of the Basin-and-Range geologic region, with rugged, forested north-south trending mountain ranges and broad intervening valleys. In the Malpai Borderlands, these geological features consist, respectively (from west to east), of the San Bernardino/Upper San Simon valleys, the Southern Peloncillo Mountains, Animas/San Luis valleys, the Animas Mountains, and Playas Valley. Elevations range from about 3,700 feet to 8,500 feet, with the Continental Divide running along the crest of the Animas Mountains. The area also occurs at the convergence of several major topographic and biotic regions, lying at the southern end of the Rocky Mountain biotic region (with a temperate climate), the northern end of the Mexican Highlands biotic region (with a subtropical climate), and the juncture of the Sonoran and Chihuahuan deserts and the American high plains.

3.1 VEGETATION

The Malpai Borderlands occurs in the Apache Highlands eco-region and, following Brown (1994), supports at least eight vegetation associations. The most widespread vegetation associations in the Malpai Borderlands are Semidesert Grassland, a grass-and-scrub dominated community that occurs across much of the San Bernardino, southern Animas, and Playas valleys and the lower slopes of the Peloncillo and Animas mountains; and the Chihuahuan Desert Scrub association, which occurs in ephemeral drainages and on bajadas and outwash plains at intermediate elevations (i.e., above the grassland and below the woodland associations). As discussed in the MBHCP, The Chihuahuan Desert Scrub association is an expanding association with the encroachment of woody shrubs into the Semidesert Grassland association (Sections 2.2.2.1 and 2.2.2.3 of the MBHCP). In addition, locally common in the area are the Plains Grassland vegetation association, which is limited to the San Luis and northern Animas valleys on Diamond A Ranch, and represents the southwestern-most extent of the short-grass prairie biome of the American Plains. The two high-elevation forest associations, Petran Montane Conifer Forest and Madrean Evergreen Woodland, occur at and near the tops of the Peloncillo and Animas mountains; with the two mid-elevation associations, Great Basin Conifer Woodland and Interior Chaparral, occurring in the mid-elevations. The Interior Southwestern Riparian Deciduous Forest and Wetland associations are locally rare in this area, composed of seeps, springs, playas (i.e., closed basins into which runoff collects seasonally), and the relatively few perennial and near-perennial stream drainages in the area (Section 3.5 below). Table 2 below, provides a brief description of these vegetation associations together with a summary of plant species characteristic of (or common to) each association.

3.2 WILDLIFE

The Malpai Borderlands is an area of exceptional biological diversity, a function of elevation and the fact that it lies at the convergence of several bio-geographic regions and two climatic regimes (temperate and subtropical). In addition, because it lies at the northern tip of the Mexican Highlands biotic region of Mexico, the Borderlands area supports or is occasional habitat for numerous plant and animal species which are unique to the U.S./Mexico border area (including the jaguar, many bird species, the white-sided jackrabbit, and Gould's turkey); the southwestern corner of

Table 2:
Primary Vegetation Associations of the Malpai Borderlands[1]

Vegetation Association	Description	Characteristic Species
Petran Montane Conifer Forest	*A mild winter/wet summer association, occupies mountaintops of Peloncillo/ Animas Mtns. approx. 7,500-8,500 feet.*	*Ponderosa pine, Gambel oak, Douglas fir.*
Madrean Evergreen Woodland	*Also a mild winter/wet summer association,, occupies upper slopes and drainages of the Peloncillo/Animas Mtns. above app. 5,000 feet.*	*Oak-pine associations include silverleaf oak, Chihuahua pine; also extensions of leaf succulents/cacti, etc. from lower associations.*
Great Basin Conifer Woodland	*Occupies mid-elevation mountain slopes and upper bajadas of Peloncillo/Animas Mtns.*	*Colorado pinyon, one-seed juniper,; also extensions of leaf succulents/ cacti from lower associations.*
Interior Chaparral	*Occupies lower slopes/upper bajadas of Peloncillo/Animas Mtns., above grasslands, below Madrean woodland.*	*Mountain mahogany, pointleaf manzanita, wavyleaf oak.*
Chihuahuan Desert Scrub	*Occurs throughout area on intermontane alluvia and arid outwash plains and rocky bajadas.*	*Low scrub 0.5- 2.0 m. tall, ranging from creosote on sloping plains to mixed scrub on upland bajadas; spp. incl. yuccas, agaves, mesquite.*
Semidesert Grassland	*Most widespread assn. in the area, occupying basin floors, lower mountain slopes 3,700-5,600 feet. Transitional between P&B Grassland and CD Scrub.*	*Ranges from pure perennial grasses (e.g., black grama) to combinations of grasses, shrubs, leaf succulents, cacti, etc.; forbs present seasonally.*
Plains and Basin Grassland	*A prairie short-grass association, occurs in San Luis & n. Animas valleys and lower mountain slopes above 4,950 feet.*	*Principal species are perennial sod-forming grasses (e.g., blue grama, Buffalo grass) and forbs; cacti, cholla, saltbush, etc. locally present.*
Interior Southwestern Riparian Deciduous Forest and Wetland	*Consists of perennial streams, closed basins, springs, seeps, and associated mesic vegetation; potentially crosses or occurs in all other associations.*	*Species incl. Fremont cottonwood, Arizona sycamore along streams; alkali-sacaton, saltbush on playas; sedges, etc. next to springs, seeps.*

[1] Based on Brown (1994).

the Borderlands also encompasses a portion of the northern extent of the Rio Yaqui River basin, which supports a suite of fish species, also found nowhere else in the U.S. (Table 1 above). As a result of these and other factors, the Malpai Borderlands region supports a diverse array of approximately 400 species of vertebrates, including about 260 birds (many of which breed in the area), 80 mammals and 55 reptiles and amphibians, as well as a long list of invertebrates. Among these species, excluding endangered and threatened species (Section 3.3 below), and the MBHCP covered species are the following.

Birds Common to the Malpai Borderlands

Abert's towhee *(Pipilo aberti)*
White-winged dove *(Zenaida asiatica)*
Verdin *(Auriparus flaviceps)*
Black-throated sparrow*(Amphispiza bilineata)*
Bronzed cowbird *(Molothrus aeneus)*
Mountain plover *(Charadrius montanus)*
House finch *(Carpodacus mexicanus)*
American goldfinch *(Carduelis tristis)*
Mourning dove *(Zenaida macroura)*
Black-chinned sparrow *(Spizella atrogularis)*
Botteri's sparrow *(Aimophila botterii)*
Black-tailed gnatcatcher *(Polioptila melanura)*
Curve-billed thrasher *(Toxostoma curvirostre)*
Cactus wren *(Campylorhynchus brunneicapillus)*

Birds Common to the Malpai Borderlands (Cont.)

House wren *(Troglodytes aedon)*
Phainopepla *(Phainopepla nitens)*
Horned lark *(Eremophila alpestris)*
Northern (Gilded) flicker *(Coloptes auratus)*
Gambel's quail *(Callipepla gambelii)*
Road runner *(Geococcyx californianus)*
Golden eagle (*Aquila chrysaetos*)
Red-tailed hawk *(Buteo jamaicensis)*
Turkey vulture *(Cathartes aura)*
Great-horned owl *(Bubo virginianus)*
Pyrrhuloxia *(Cardinalis sinuatus)*
Northern mockingbird *(Mimus polyglottos)*
Ash-throated flycatcher *(Myiarchus cinerascens)*
Scaled quail (*Callipepla squamata*)
Lesser nighthawk *(Chordeiles acutipennis)*
Common raven *(Corvus corax)*
Northern harrier *(Circus cyaneus)*
Short-eared owl *(Asio flammeus)*
Coopers hawk *(Accipiter cooperii)*

Mammals Common to the Malpai Borderlands

Desert cactus mouse *(Peromyscus eremicus*)
Woodrat *(Neotoma spp.)*
Black tailed jackrabbit *(Lepus californicus)*
M. long-tongued bat *(Choeronycteris mexicana)*
Western spotted skunk *(Spilogale gracilis)*
Pronghorn (*Antilocarpa americana mexicana)*
Ringtail *(Bassariscus astutus)*
Desert cottontail *(Sylvilagus audubonii)*
Pocket gopher *(Thomomys spp.)*
Yellow-nosed cotton rat *(Sigmodon ochrognathus)*
Fringed myotis *(Myotis thysanodes)*
Mule deer *(Odocoileus hemionus)*
Javelina *(Tayassu tajacu)*
Coyote *(Canis latrans)*

Reptiles & Amphibians Common to the Malpai Borderlands

Diamondback rattlesnake *(Crotalus atrox*)
Yaqui blackhead snake *(Tantilla yaquia)*
Texas horned lizard *(Phrynosoma cornutum)*
Red-spotted toad *(Bufo punctatus*)
Gophersnake *(Pituophis catenifer*)
Desert massasauga *(Sistrurus catenatus)*
Couch's spadefoot toad *(Scaphiopus couchii*)
Desert box turtle (*Terrapene ornate luteola*)

3.3 LISTED, PROPOSED, AND CANDIDATE SPECIES

In addition to the above, the Malpai Borderlands also supports numerous endangered, threatened, and candidate species of fish, wildlife, and plants (special status species) listed under two statutes—the Act and the New Mexico's WCA. Complete lists of species listed under both statutes and actually or potentially present in the Malpai Borderlands follows.

Act-listed Species Occurring or Potentially Occurring in the Malpai Borderlands[3]

Yaqui chub (Gila purpurea)*
Beautiful shiner *(Cyprinella formosa)**
Cochise pincushion cactus (*C. robbinsorum*)**
Aplomado falcon *(Falco femoralis)**
Mexican gray wolf *(Canis lupis baileyi)**
Yaqui catfish *(Ictalurus pricei)***
Yaqui topminnow *(P. occidentalis sonoriensis)**
Huachuca water-umbel *(L. schaffneriana recurva)**
Mexican spotted owl *(Strix occidentalis lucida)***
Jaguar *(Panthera onca)**

[3] One asterisk indicates endangered species, two asterisks threatened species under Act.

Act-listed Species Occurring or Potentially Occurring in the Malpai Borderlands[4] (cont.)

Mexican long-nosed bat *(Leptonycteris nivalis)** Lesser long-nosed bat (*L. curasoae yerbabuenae*)*
Ch. leopard frog *(Rana chiricahuensis)*** N.M. r-n. rattlesnake *(Crotalus willardi obscurus)***

For purposes of this EA, special status species are considered to include the list of 15 species listed under the Act listed above, and the 10 unlisted species that are proposed for coverage by the ITP through the MBHCP shown in Table 1 above. Therefore, this EA considers effects to 25 special status species. The 10 unlisted in the MBHCP-covered species list are included in their entirety because for purposes of the MBHCP unlisted covered species are treated as if they are listed under the Act. They are therefore also treated as if listed for purposes of the EA. This includes five WCA-listed species proposed for coverage by the MBHCP (Table 1 above). All other WCA-listed species are considered to be included in the wildlife species discussed above.

WCA-listed Species Occurring or Potentially Occurring in the Malpai Borderlands[5]

Lucifer hummingbird (*Calothorax lucifer*)** White-eared hummingbird (*Hylocharis leucotis*)**
Thick-billed kingbird (*Tyrannus crassirostris*)* N. beardless-tyrannulet (*Camptostoma imberbe*)*
Elegant trogon (*Trogon elegans*)* Gray vireo (*Vireo vicinior*)**
Bells' vireo (*Vireo bellii*)** Gila woodpecker (*Melanerpes uropygialis*)**
Baird's sparrow (*Ammodramus bairdii*)** Yellow-eyed junco (*Junco phaeonotus*)**
Varied bunting (*Passerina versicolor*)** Gould's turkey (*Meleagris gallopavo mexicana*)**
Common ground dove (*Columbina passerina*)* Buff-collared nightjar (*Caprimulgus ridgwayi*)*
Violet-cr'd hummingbird (*Amazilia violiceps*)** Broad-billed hummingbird (*Cynanthus latirostris*)**
Costa's hummingbird (*Calypte costae*)** AZ Grasshopper sparrow (*A. s. ammolegus*)*
Aplomado falcon (*Falco femoralis*)* Whiskered screech owl (*Megascops trichopsis*)**
Peregrine falcon *(Falco peregrinus*)** Common black hawk (*Buteogallus anthracinus)***
S. pocket gopher (*Thomomys umbrinus)*** White-sided jackrabbit (*Lepus callotis*)**
Arizona shrew (*Sorex arizonae*)* Desert bighorn (*Ovis canadensis mexicana*)*
Mexican gray wolf (*Canis lupis baileyi*)* S. long-nosed bat (*Leptonycteris curasoae*)**
Mexican long-nosed bat (*Leptonycteris nivalis*)* Western yellow bat (*Lasiurus xanthinus*)**
Green ratsnake (*Senticolis triaspis*)** Mountain skink (*Eumeces callicephalus*)**
Gila monster (*Heloderma suspectum*)* Slevin's bunchgrass lizard (*Sceloporus slevini*)**
Sonoran desert toad (*Bufo alvarius*)** Canyon spotted whiptail (*Aspidoscelis burti*)**
Lowland leopard frog (*Rana yavapaiensis*)* N.M. r-n. rattlesnake (*Crotalus willardi obscurus*)*
Shortneck snaggletooth (*G. dalliana dalliana*)**

Appendix A of the MBHCP contains a summary of the WCA and brief discussion of each WCA species potentially found in the covered area of the MBHCP.

[4] One asterisk indicates endangered species, two asterisks threatened species under Act.
[5] One asterisk indicates endangered species, two asterisks threatened species under WCA. A complete list of WCA listed species, including Species of Concern are in Appendix A of the MBHCP.

3.4 WATER RESOURCES/WATER QUALITY

As is typical of the desert southwest generally, natural water resources in the Malpai Borderlands are limited and confined to seeps and springs (found in valley basins and along mountain flanks); cienegas (mid-elevation wetlands of valleys and basins) and playas (closed basins where runoff collects seasonally); and a few perennial or intermittent streams (with surface or groundwater sufficient to support riparian vegetation). These consist of, but are not necessarily limited to: (1) Black Draw (in San Bernardino NWR); (2) Astin Spring (on the Malpai Ranch); (3) Guadalupe Canyon (on the Hadley Ranch); (4) Cottonwood Creek (on the McDonald Ranch); (5) Baker Canyon (a tributary of Guadalupe Canyon); (6) Clanton Draw; (7) the cienega at Diamond A Ranch headquarters; and (8) San Luis Lake (a playa in San Luis Valley). In addition, artificial water resources in the area include numerous wells, which access groundwater, and stocktanks and stockponds, constructed and used to water livestock.

Because of their relatively natural character and distance from significant municipal, industrial, and commercial influences, water quality in these water bodies is generally excellent. The primary water quality factor under normal circumstances in the Malpai Borderlands is sedimentation in the above-referenced streams resulting from occasional high-flow or flood-flow events.

3.5 WETLANDS

Natural wetlands within the covered area of the MBHCP are much reduced from historical accounts of the area. Most wetlands are small and centered around small isolated springs or along the margins of small streams (Section 3.4 above). The U.S. Army Corps of Engineers (Corps) has permitting authority over activities affecting waters of the United States[6] under two Federal statutes: (1) section 10 of the Rivers and Harbors Act of 1899 (RHA); which prohibits the obstruction or alteration of any navigable water of the U.S. without a Corps permit; and (2) section 404 of the Clean Water Act (CWA); which prohibits the discharge of dredged or fill material into waters of the U.S. without a Corps permit. Two types of determinations are often performed in connection with these authorities: (1) jurisdictional determinations (to determine whether a given water body is a water of the U.S. and therefore subject to Corps jurisdiction); and (2) wetland delineations (to determine whether a given water body meets the Corps definition of a wetland[7]).

Based on a check of Corps records, no jurisdictional determinations or wetland delineations have been performed in the Malpai Borderlands either by the Corps or other individuals in the last several years. However, in 2004, MBG approached the Corps about CWA permit requirements in connection with carrying out its erosion control program (Section 3.5.1.2 of the MBHCP), to which the Corps recommended that MBG obtain CWA permit authorization for such work conducted in perennial and ephemeral streambeds and similar areas. This was accomplished under Nationwide Permit #27 (a generic Corps permit for stream and wetland restoration activities), the authorities of which were

[6] Waters of the United States include all navigable waters and their tributaries and adjacent wetlands, all interstate waters and their tributaries and interstate wetlands, all impoundments of such waters, and other waters such as intrastate lakes, rivers, streams (including intermittent streams), prairie potholes, and arroyos the degradation or destruction of which could affect interstate commerce (33 CFR 328.3).

[7] Wetlands are areas inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and which under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. The Corps uses three characteristics to determine whether a water body is a wetland—type of vegetation present, the presence of hydric soils, and hydrology.

extended to MBG via notification from the Corps dated January 8, 2004. Thus, while no regulatory determinations have been undertaken concerning Corps jurisdiction over particular waters in the Malpai Borderlands, this action represented a *de facto* assumption that jurisdictional waters of the United States occur in the area.

3.6 AIR QUALITY

Because of its rural character and distance from major metropolitan areas (the closest is Tucson, Arizona about 120 miles to the northwest), air quality in the Malpai Borderlands is excellent. The chief impact to air quality in the area in the past were two copper smelters—one near Douglas, Arizona, the other in Playas, New Mexico near Diamond A Ranch; however, both have been closed for some time (the Douglas facility since the 1970's, the Playas facility since the 1990's) (P. Warren, TNC, pers. comm.). A third smelter is still in operation in Nacozari, Mexico about 50 miles southwest of Douglas; it has good emissions controls and does not appear to be a significant air quality factor in the Borderlands area.

In Arizona, the Arizona Department of Environmental Quality (ADEQ) monitors two general categories of air quality across the state: (1) criteria pollutants (including carbon monoxide, nitrogen dioxide, ozone, sulfur dioxide, lead, and particulate matter); and (2) visibility (which is measured in connection with the state's scenic values). Of the criteria pollutants, ozone and particulate matter (both 10 microns (µm) and 2.5 µm in size) are monitored in Cochise County and the only exceedance of National Ambient Air Quality Standards (NAAQS) for this area were recorded in 2003 for particulate matter 10 µm in size within this area (ADEQ 2006). In addition, visibility is measured at two locations in the vicinity of the Malpai Borderlands, one in Chiricahua National Monument and the other in Chiricahua Mountains, Coronado National Forest. Visibility measured at both these stations in 2004 and 2005 met expected standards (ADEQ 2006). Air quality in the even more remote New Mexico side of the Borderlands area (lying approximately 150 miles from Tucson and 225 miles from Albuquerque, New Mexico) at a minimum can be expected to be similar.

3.7 CULTURAL RESOURCES

The Malpai Borderlands encompasses an area that has supported many cultures, historic and prehistoric, and is rich in archeological resources. Archeological investigation, however, while not insignificant, has been spotty, often poorly documented, and involved many small-scale studies by professionals and amateurs, but relatively few large-scale, systematic efforts. The former include a long history of reconnaissance-level surveys, small-scale excavations, and anecdotal observations from the 1920s to the present which, at a minimum, yielded many archeological discoveries. Examples of the latter include systematic, but limited, archeological surveys of the San Bernardino, Animas, and Playas valleys in the 1970s and 1980s; an intensive excavation of the Pendleton ruin in the late 1940s; more limited excavations at six additional pueblos from the 1960s to 1990s (Table 3 below); and a comprehensive, well-documented archeological survey undertaken in the 1990s for the purpose of preparing nominations to the National Register of Historic Places (Fish et al. 2006).

As a result of these and other studies, over 300 known archeological sites exist in the Malpai Borderlands, which generally include habitation and village sites, agricultural sites, surface

Table 3:
Summary of Archeological Resources in the Malpai Borderlands[1]
(Including a Cultural Chronology and Sample List of Sites**)**

Prehistoric Cultures of the Borderlands[2]			Sample List of Sites[3]		
Name	Period	Evidence Found	Name	Date/Ref.#	Type/Location
Paleo-Indian Hunters	10,000 to 7,000 B.C.	Projectile points, other lithic artifacts	Boss Ranch Site	1150-1450 AZ:FF:7:10	S. Bernardino Valley 10 mi. n.w. of Malpai Ranch (AZ).
Archaic Foragers	7,000 to 1500 B.C.	Projectile points and lithic scatters	San Bernardino Site	AZ:FF:7:13	S. Bernardino Valley 10 mi. north of Malpai Ranch (AZ).
Pre-ceramic Farmers	1500 B.C. to A.D. 200	Tools/corn found at pre-pottery sites	Slaughter Ranch Site	1300-1500 AZ:FF:11:21	S. Bernardino Vly in SBNWR and Slaughter Ranch (AZ).
Pit House Villages	A.D. 200 to A.D. 1000	Diagnostic ceramics	Clanton Draw Site	1350-1375 LA54038	Lower Clanton Draw, east side of Peloncillo Mtns (NM).
Mimbres Horizon Villages	A.D. 1000 to A.D. 1200	Mimbres black-on-white pottery	Double Adobe Creek Site	LA54038	Animas Vly, east side near base of Animas Mtns (NM).
Late Prehistoric Pueblos	A.D. 1200 to A.D. 1450	Ruins/pottery of the Salado/Animas Phases	Joyce Wells Site	1250-1400 LA54038	Deer Creek, s.e. side of Animas Mtns (NM).
			Culberson Ruin	1200-1450 LA31050	Deer Creek, s.e. side of Animas Mtns (NM).
			Pendleton Ruin	1300-1375 LA54038	Cloverdale Creek, s.e. side of Peloncillo Mtns (NM).
			Timberlake Ruin	LA54038	Lower Walnut Creek, east side of Animas Mtns (NM).

[1] Sources: Fish et al. (2006), W. Glenn, MBG, personal communication.
[2] Shows a chronology of prehistoric cultures once inhabiting the Malpai Borderlands, based on on-site archeological evidence and extrapolation from nearby and regional sites.
[3] Shows a sample (but not comprehensive) list of important known archeological sites in the Borderlands. Dates are estimated periods of activity, where available; reference numbers are from Fish et al. (2006).

assemblages (e.g., of artifacts) at and near such sites, and other localities (e.g., rock paintings). These are found throughout the area, but tend to predominate on basin floors near cienegas and major drainages, and on lower mountain slopes where relatively large creeks emerge onto basin bajadas. Particularly large concentrations occur in San Bernardino Valley on present-day Slaughter Ranch and San Bernardino NWR and in the Animas Valley along Animas Creek. Artifacts and other evidence discovered in the Borderlands include pueblo ruins, pithouse remains, roasting pits, and ballcourts; corn, corn pollen, and other plant materials; middens; ceramic pottery and potshards; and grinding implements, lithic scatters, and projectile points. In the Borderlands itself, artifacts from the area are housed at two locations—the Slaughter Ranch Museum on Slaughter Ranch; and in a private collection. In addition, an excellent summary of cultural histories, archeological resources, and related topics for the Malpai Borderlands is available in a report prepared on behalf of MBG (Fish et al. 2006). Table 3 above, summarizes information of two types from this report—a chronology of prehistoric cultures known or believed to have inhabited the Malpai Borderlands together with a summary of evidence supporting these conclusions; and a list of a few important archeological sites in the area.

Archeological resources on Federal and state trust lands in the Malpai Borderlands are protected by a number of Federal and state statutes, regulations, and policies—one consequence of which is that activities that can damage or affect such sites are typically preceded by cultural resource surveys undertaken by the agency on whose lands the activities are to be carried out. In Arizona, for example, the ASLD is party to a programmatic agreement with the State Historic Preservation Office (SHPO),

which, among other things, commits the agency to protect archeological sites that may qualify for inclusion on the Arizona Register of Historic Places; in practice, this means that ASLD lands that are subject to visitation by the public, ground disturbance, and similar activities are routinely surveyed, and any such sites found are avoided or protected. Archeological sites on private lands in the Malpai Borderlands are not statutorily protected; however, MBG, like its state and Federal partners, routinely conducts cultural resource surveys prior to undertaking activities that could damage archeological sites (P. Warren, TNC, pers. comm.).

3.8 LAND USE/SOCIOECONOMIC

Landownership in the Malpai Borderlands is a mosaic of privately owned lands, state trust lands, and federally administered public lands. On the San Bernardino Valley/Peloncillo Mountains side of the area, principal public land management agencies are the ASLD; USFS - Coronado National Forest; U.S. Bureau of Land Management (BLM); and SBNWR. The Animas Valley/Animas Mountains side is comprised primarily of the 321,000-acre Diamond A Ranch, which is owned and managed by the non-profit Animas Foundation. Diamond A Ranch is subject to a conservation easement, which, among other things, prevents subdivision or sale of the ranch for development. Public land management agencies on this side of the area include BLM and the NMSLO.

Land use on privately owned and state trust lands in the Malpai Borderlands consists primarily of livestock ranching, and ranchers in the area operate their grazing programs on their own lands and state trust and Federal lands through grazing leases. The exception is Diamond A Ranch, which is operated primarily for conservation and scientific purposes and secondarily for grazing. Land use on Federal lands in the Malpai Borderlands is based on multiple-use policies mandated by two Federal statutes—the National Forest Management Act (NFMA) in the case of USFS lands, and Federal Land Policy Management Act (FLPMA) in the case of BLM lands. Land uses on Federal lands in the area include livestock grazing, forest management (for wood and fiber), wildlife conservation, and recreation; Federal lands, however, are not included in the scope of either the MBHCP or this EA.

In addition to the above, a limited amount of agricultural, municipal, and residential development occurs around the periphery of the Borderlands area. Municipalities in the area consist of the towns of Douglas, Arizona; Portal, Arizona; Animas, New Mexico; and Rodeo, New Mexico, all of which occur along or near the edge of the Borderlands. Irrigated agriculture also occurs, but only locally and on a limited basis (e.g., in the vicinity of Rodeo and about 10 miles south of Rodeo). In addition, a relatively recent land use factor in the area is rural residential development. Typically, rural lands are subdivided into 20- to 40-acre parcels and developed as residential properties, often referred to as “ranchettes”. To date, this too has been confined to the periphery of the area (e.g., near Douglas, Animas, Rodeo, and Portal), but appears to be on the increase, with many buyers coming from outside the region (Sayre 2003). The future of this trend is unclear, but is a source of significant concern to MBG because of the potential for fragmentation and degradation of the Malpai Borderlands that such development represents, if undertaken on a large scale.

4.0 ENVIRONMENTAL CONSEQUENCES

In this section, the environmental effects of the two alternatives considered in the preceding section are described and analyzed with respect to two sets of factors: (1) the specific environmental components or elements potentially affected by the alternatives (Section 3.0 above); and (2) the particular aspects of the alternatives that are the source of the effects. For purposes of the EA, the potential effects of the alternatives are of three types: (1) direct effects; (2) indirect effects; and (3) cumulative effects.

4.1 ALTERNATIVE 1: NO ACTION ALTERNATIVE

Under the No Action alternative, the MBHCP as proposed by the Preferred Alternative (Section 2.2 above) would not be implemented, the proposed ITP would not be issued, and the *status quo* with respect to planned and ongoing activities in the Malpai Borderlands would be maintained. This does not mean that no such activities would be undertaken, but that they would be undertaken at levels and under circumstances similar to the present. Over the long term, this would have four likely or possible effects.

First, the Grassland Improvement Activities in the Malpai Borderlands, especially fire management, would continue to be significantly limited by the lack of an incidental take authorization allowing them to be undertaken in full accordance with the requirements of the Act. Second, all three categories of Grassland Improvement Activities under this alternative either would not be undertaken if take would occur, or would be undertaken, if take could be addressed under section 7 of the Act through consultation with the NRCS or USFS . This would likely result in these activities being undertaken at substantially reduced levels compared to those achievable under the Preferred Alternative. Third, the ecological problems that are the object of the MBHCP's Grassland Improvement Activities would likely continue to worsen or, at a minimum, would be unlikely to appreciably improve. And fourth, as a result of all of the above, the viability of ranching as an economic livelihood in the Malpai Borderlands would likely deteriorate over time, ranches would fail and/or be sold, and rural development in parts of the Malpai Borderlands not protected by conservation easements would likely increase.[8] The situation with respect to Ranch Management Activities, would be similar—i.e., Malpai-area ranchers would be faced with the options of either foregoing normal and customary ranching activities (e.g., fence and waterline construction) or undertaking such activities through a section 7 by a Federal Agency if take would occur; this, furthermore, in combination with the lack of Grassland Improvement Activities, over time would likely contribute to generally deteriorating conditions in the Malpai Borderlands, both ecologically and with respect to rural ranching economies.

Another consequence of the No Action Alternative is that most of the conservation program proposed under the Preferred Alternative would not be implemented. A possible exception to this is that MBG and Malpai-area ranchers would likely undertake some of their planned activities notwithstanding the lack of an ITP—and, in connection with such activities, might implement take minimization measures

[8] All this would be contrary to the objectives and/or land-use interests of MBG (whose mission, among other things, is to protect the Malpai Borderlands and improve its ecological health); Malpai-area ranchers (whose interests lie in economically productive livestock ranching); ASLD (which manages Arizona state trust lands to generate revenue for public purposes), NMSLO (which manages New Mexico state trust-lands for similar purposes), and NRCS (whose statutory mandate among other things is to protect and maintain ecological conditions on private rangelands).

voluntarily in an effort to avoid unauthorized takings. Such measures, however, would be *ad hoc* and unformalized, and many of the MBHCP's most important conservation benefits almost certainly would be lost or only partially implemented. These include much of its monitoring and Adaptive Management provisions; its access provisions (providing for access by MBHCP parties and cooperators to private and state trust lands for MBHCP purposes); its mapping program (which provides for detailed mapping of species habitats and occurrence in the Malpai Borderlands); establishment and operation of its Technical Advisory Committee; and, generally, the significantly increased integration of planned activities with species protection needs that the MBHCP would provide.

The use of fire in conjunction with FS burns and other activities in conjunction with NRCS that are consulted on under section 7 of the Act would still occur under the no action alternative as would activities that would not result in take of listed species.

4.2 ALTERNATIVE 2: PREFERRED ALTERNATIVE AND PROPOSED ACTION

Under the Preferred Alternative and Proposed Action (Section 2.2 above), the MBHCP encompasses two categories of activities, which include three types of activities each: Grassland Improvement Activities: fire management, erosion control, and mechanical brush control; and Ranch Management Activities: construction and maintenance of linear projects, livestock management, and stocktank maintenance and use. The action considered under this alternative is a program of individual projects that include the six covered activities implemented and coordinated through the course of implementing the MBHCP.

4.2.1 VEGETATION

No activity directly related to the issuance of the ITP should impact vegetation within the covered area of the MBHCP. Indirect effects of implementing the MBHCP will impact existing vegetation, especially through the Grassland Improvement Activities, as their primary objectives are to reduce invasive upland scrub and restore natural grasslands to more historical conditions.

Fire Management. The effects of fire management (i.e., employment of prescribed fire and wildland fire for management purposes) on vegetation under the MBHCP could vary widely, depending on the type of vegetation involved and the intensity of the fire. Effects could be beneficial or adverse depending on the vegetation type. It is the intent of fire management to promote grasses and forbs within the grassland and reduce the woody brush species, which would be damaged or killed by fire. In addition, prescribed fire may be used in the cool season to reduce fuels in montane vegetation associations. This may assist in protecting the montane vegetation from catastrophic fires by reducing fuels and lessen the chance for such fires to occur or at least limit their size.

Overall, the intention of fire management under the MBHCP is to improve the watershed conditions and provide an ecological benefit within and downstream of the covered area through improving grassland vegetation. However, in managing fire, there is potential for negative effects that are unintentional. These may occur where prescribed or wildland fire burns with unintended intensity and where a fire inadvertently escapes into unintended areas. In both case, this could result in significant damage to or loss of desirable vegetation (e.g., agaves, cacti, and similar species). The extent of such

damage, depending on the severity of the fire, could range from minor (e.g., where understories only are burned) to major (e.g., where the event is stand-replacing). In either case, the negative effects are typically short-term, and long-term beneficial effects usually occur in time. However, these short-term, negative effects could result in increased erosion and impacts to species.

Minor effects to vegetation may also result from the construction of fire lines around prescribed burn areas or to contain wildland fire use situations. These are typically areas dug by hand or by the use of heavy equipment to clear vegetation and fuels where pre-existing fire lines (e.g., roads, washes, and ridgelines) do not already exist. The impacts to vegetation in fire lines can be permanent if the lines are broad, scraped to mineral soil, and reused year after year. However, relatively permanent line is rare and only impacts a relatively small area, as most fire lines will be set along roads, bare rights-of-way, and washes. The primary exception would be to protect some other resource value or property.

The acreage caps and the fire prescription parameters identified for fire management activities (Section 5.5.2.1 of the MBHCP) are anticipated to limit the extent and intensity of the potential adverse effects; while promoting the beneficial effects to vegetation communities in the covered area.

Erosion Control. Construction of erosion control structures which would slow water velocities where erosion now occurs, allow mobilized sediments to be re-deposited, and thus provide a substrate for re-vegetation are proposed under the MBHCP. Re-vegetation, in turn, would stabilize eroding sites and prevent future erosion. Consequently, the effects of erosion control activities on vegetation under the MBHCP would be primarily beneficial. Moreover, because erosion control activities planned under the MBHCP are low in impact (Section 3.5.1.2 of the MBHCP), adverse effects to vegetation as a result of erosion control would be minor to negligible; i.e., consisting of minor, temporary disturbances to vegetation in work areas. These structures would also be constructed to correct any adverse impacts associated with increased erosion from unplanned fire effects as discussed above.

Mechanical Brush Control. As with fire management, the purpose of mechanical brush control under the MBHCP is to damage or kill woody brush species and promote re-vegetation by grasses and forbs. The effects of mechanical brush control on vegetation would be intentionally adverse toward woody brush species. However, because of the relatively high-impact nature of mechanical brush control (involving the use of heavy equipment), the potential for adverse effects to non-target vegetation (e.g., agaves, cacti, and similar species) as a result of crushing and up-rooting would also exist. Mechanical brush control projects would be limited to grassland and scrub vegetation associations, since mechanical brush control would not be undertaken in riparian or forest associations. Furthermore, mechanical brush control would be limited to relatively small areas as a result of cost considerations and an annual average acreage cap of 2,000 acres established by the MBHCP with respect to this activity (Section 5.2.1.3 of the MBHCP). Long term impacts to vegetation in the grassland associations are anticipated to be beneficial in maintaining this vegetation type and reducing shrub invasion into historical grasslands.

The acreage caps identified for mechanical brush control activities (Section 5.5.2.3 of the MBHCP) are anticipated to limit the extent of potential adverse effects; while promoting the beneficial effects to vegetation communities in the covered area.

Livestock Management. The effects of livestock management on vegetation, as this activity is defined by the MBHCP (Section 3.5.2.1 of the MBHCP), would consist primarily of direct trampling effects (i.e., killing or damage of vegetation through crushing), particularly where livestock congregate (e.g., watering sites, shaded areas); and, possibly, of the effects of livestock physically rubbing against small trees, agaves, and similar vegetation (which could result in up-rooting of affected plants or knocking them over). Such effects could occur in riparian and grassland vegetation associations as well as aquatic sites (see following paragraph), since livestock in the Borderlands might from time to time be watered or pastured in any such area. The beneficial effects of the grassland improvement activities and the construction of linear facilities should assist in reducing these impact through improvements in the ability to manage livestock and in the general state of the vegetation communities across the landscape.

Construction of Linear Projects. Construction of linear projects under the MBHCP could adversely affect vegetation to the extent such activities involve vegetation clearing (e.g., within construction corridors) and ground-surface disturbances (e.g., where trenching must be undertaken). Most of these impacts would be temporary, except where new roads are constructed. These effects would be limited, however, since linear projects encompass relatively small work areas. In addition, many of these projects would be placed along existing roads and right-of-ways, as is common practice for utility and pipeline projects. Most of these projects would be undertaken in grassland and scrub associations, as these projects would be typically undertaken to improve livestock management. An exception might occur where linear projects must cross riparian areas. This would likely be rare since few such areas occur in the Malpai Borderlands. The resulting impacts to vegetation however, would be relatively minor since understory grasses, shrubs, and small trees might be affected, but not large trees and these projects would be designed to cross riparian areas to impact the smallest amount of riparian vegetation possible.

Stocktank Maintenance and Use. Stocktank maintenance and use under the MBHCP would result in two types of vegetation impacts: trampling effects as a result of livestock use of stocktanks and immediately surrounding areas and crushing effects and up-rooting as a result of periodic maintenance of stocktanks (e.g., to repair flood damage, remove accumulated sediment, etc., all of which requires heavy equipment use). Such effects would typically involve emergent aquatic vegetation along stocktank perimeters, adjacent grasses and forbs, and be relatively intensive—in the former case, because of the high concentrations of livestock that occur at stocktanks and, in the latter case, because of the disruption to plants inherent in digging up and removing sediment. They would, however, be highly localized and would not occur at higher rates than already occurs in the Malpai Borderlands and are not different from those that are currently occurring in the covered area or would occur under the No Action Alternative.

We anticipate some short-term adverse effects to vegetation, some changes in the distribution of vegetation types in the covered area, and long-term benefits to vegetation quality and quantity through out the covered area. The effects anticipated are to a more historical distribution of grassland, riparian and woodland vegetation types. We do not anticipate significant effects to vegetation from implementation of the Preferred Alternative over the current condition of vegetation in the covered area or over that anticipated under the No Action Alternative.

4.2.2 WILDLIFE

No activity directly related to the issuance of the ITP and approval of the MBHCP should impact wildlife species. Indirect effects of implementing the MBHCP are likely to consist of short-term decreases of forage, water, and cover resources for existing wildlife species (e.g. mule deer, Javelina, Gambel's and scaled quail), but followed by long-term improvements in quantity and quality of forage, water, and cover resources through the implementation of grassland improvement and ranch management activities taken as a whole under the MBHCP.

Fire management. Fire management under the Preferred Alternative could potentially affect wildlife inhabiting the Malpai Borderlands both beneficially and adversely. The benefits of fire (i.e., of restoring more natural fire regimes to the area) would tend to be general, and to consist of the potential for improvement in ecological conditions in the Borderlands overall—including, for example, reductions in fuel loads resulting in a reduced potential for destructive fires; increases in vegetation of bare ground resulting from reduced erosion; and increases in vegetative productivity generally resulting in increased food and cover availability.

Potential adverse effects of fire on wildlife, on the other hand, tend to be specific. In the case of aquatic species, the primary potential for adverse effects of fire management would consist of post-fire, downstream effects in watersheds that degrade aquatic habitats within them. The death or injury of aquatic species may result from increased run-off, sedimentation, and ash mobilized from burn areas and washed downstream by post-fire rainfall. This would result in sedimentation of stream substrates, suspension of sediments in the water columns of affected streams, and changes in water quality and chemistry as a result of ash deposition; all or any of which could result in disease, impaired reproduction and vigor, and mortality of aquatic species present in such habitats.

The potential adverse effects of fire management under the MBHCP would consist, depending on the species involved and the intensity of the fire, of direct killing or injury as result of suffocation in burrows (in the case of fossorial species), and as a result of actual burn effects (in the case of species, and life-stages of species, that are relatively immobile and cannot flee an advancing fire, such as small mammals, reptiles, and amphibians inhabiting a burn area, and the nestlings, pups, and juveniles of all or most species). A significant potential for onsite indirect effects on grassland species would also exist, consisting of the possibility of post-fire mortality to species as a result of displacement and loss of vegetative cover leading to starvation, exposure, and increased risk of predation. Several factors, however, could mitigate such effects—including the fact that fire in grassland vegetation is typically slow-moving and of low intensity, the fact that the adults of many species (i.e., birds and relatively large mammals) could avoid direct fire effects by flying or running away, and the fact that the habitat effects of fire in grasslands are typically minor and transitory.

In the montane vegetation association, fire is proposed only for conservation purposes. In 2006, the Adobe Fire was a wildfire that was used for resource benefit, but when it entered the montane communities in the Animas Mountains, high fuel loads resulted in high severity fire effects within the habitat of the New Mexico ridge-nosed rattlesnake. So, while the Animas Mountains have been managed for a natural fire regime for over a decade, high fuel loads still exist in some areas. Therefore, the MBHCP proposes the option for cool season burning to allow fuel reduction burns to be used. The purpose of these burns is to reduce the likelihood of stand replacing, catastrophic

wildfires, or reduce the total size and their ability to spread across the mountain should one ignite. Therefore, the anticipated effects of this type of fire on wildlife is anticipated to be short-term with a reduction of ground cover and subcanopy layers that provide forage and cover for some wildlife species. However, these burns are not anticipated to be large and are limited by the acreage caps associated with all fire covered by this plan. Long-term beneficial effects are anticipated through increased protection of the upper canopy and regrowth of the ground cover and subcanopy layers.

Fire activities in riparian vegetation associations are not planned under the MBHCP; consequently, the only way fire management under the MBHCP could affect riparian species would be if prescribed or wildland fire should inadvertently escape into such areas. This would probably be rare; however, the effects on riparian species could, depending on the intensity of the fire, be significant. In addition, because of the structure of riparian vegetation (e.g., the presence of relatively dense vegetation, large trees, and ladder fuels) the potential for relatively intense, fast-moving fire in such events would also be significant. Direct killing or injury of riparian species could occur in such cases where nestlings and juveniles are present, as well as adults of small, relatively immobile species. Post-fire effects on species could also occur consisting of possible mortality as a result of displacement and vegetation losses leading to starvation, exposure, and possible increases in predation.

The acreage caps and the fire prescription parameters identified for fire management activities (Section 5.5.2.1 of the MBHCP) are anticipated to limit the extent and intensity of the potential adverse effects; while promoting the beneficial effects to the wildlife habitat.

Erosion control. Like fire management, the effects of erosion control under the MBHCP on wildlife could be both beneficial and adverse. The beneficial effects would be similar to those of fire, except that they would occur on a much smaller scale. The adverse effects of erosion control would likely be minor. This is due to the activities proposed by the MBHCP being generally low in impact, involving minor ground surface disturbances associated with site preparation, materials procurement, and construction of small to medium-sized rock structures primarily employing hand tools. In addition, these activities typically occur in and affect relatively small, linear work areas, such as dry washes and intermittent streambeds. To the extent adverse effects of erosion control on wildlife might occur, they could consist of: (1) disturbance impacts to adult fossorial species, avian species, and bats (e.g., should they be startled from burrows, nests, or roosts as a result of the proximity of the activities); (2) direct killing or injury of fossorial species (e.g., as a result of digging or excavation in the vicinity of burrows or dens); (3) in the case of avian species, indirect effects (if, as a result of disturbance of adults, eggs or nestlings should be left unattended and perish through exposure or predation); and (4) in the case of aquatic species, direct or indirect effects (as a result, respectively, of digging or excavation in, or degradation through sedimentation of, their habitat should erosion control occur in perennial streams). Of these possible impacts, grassland species would be most likely to be affected, since most erosion control activities would occur in grassland vegetation associations. These adverse effects should be of relatively short duration during the construction of these structures, but should provide long-term beneficial effects to the habitat of all species affected.

Mechanical Brush Control Activities. Like fire management and erosion control, the effects on wildlife from mechanical brush control could be beneficial or adverse, depending on the circumstances. Potential beneficial effects would be similar to those of fire and erosion control, except that they would differ in the size of the area impacted. The effects of mechanical brush control

on aquatic species, like those of fire management, would be indirect and consist, potentially, of downstream mobilization of sediment into and water quality impacts within such habitats, which might occur as a consequence of vegetation clearing and the impacts of heavy equipment use. Other potential effects of mechanical brush control on grassland species could include direct killing or injury of animals inhabiting project areas, as a result of den and burrow collapse; disturbance effects, as a result of noise, on animals inhabiting the project area or adjacent to the area; and indirect effects such as, mortality as a result of disturbance, displacement, and vegetation impacts leading to exposure, starvation, and increased risk of predation. Direct effects would only occur in grasslands and scrublands where these projects would be implemented. Indirect effects could occur in any adjacent vegetation type, including riparian and montane associations. Downstream effects could impact aquatic species' habitats as well. However, because mechanical brush control is always carried out early in the year and prior to the growing season, implementation will occur before most species nest, and minimization measures for special status species will minimize impacts to riparian and aquatic species. Furthermore, the acreage caps identified for mechanical brush control activities (Section 5.5.2.3 of the MBHCP) are anticipated to limit the extent the potential adverse; while promoting the beneficial effects to wildlife habitat.

Livestock management. Adverse effects of livestock management on wildlife, to the extent they might occur, would be limited and highly specific. These effects might consist of disturbance impacts as a result of livestock physically rubbing against active nest trees of avian species, if such disturbance should result in nestlings in such nest trees being left unattended and perishing. Adverse affects could also occur if livestock are watered in aquatic habitats, resulting in direct and indirect effects on aquatic species from livestock trampling eggs or juveniles of amphibian or fish species and degradation of water quality through substrate disturbances, streambank destabilization, and subsequent sedimentation which could result in mortality to amphibian and fish species.

Construction/maintenance of linear projects. Effects of this activity on wildlife would be expected to be adverse during the construction or maintenance of linear facilities. These adverse effects would be from temporary disturbance due to the presence of humans and use of heavy equipment in some cases. Additionally, the clearing of rights-of-way will result in the loss of cover sites and forage in the project area. This may be temporary in the case of pipelines and fencelines, but a permanent loss would occur associated with new roads. In some cases direct mortality of slow moving or fossorial species could result from the use of motorized vehicles and heavy equipment. Long-term impacts of these projects would be beneficial for those facilities that improve ranch management and reduce impacts of existing land uses. In the case of new road construction, some level of road mortality is likely to occur, however these would be dirt ranch roads and not subject to high speed rates of travel or large traffic volumes, and road related mortality is not likely to result in population-level effects on wildlife.

Stocktank maintenance and use. Adverse effects on wildlife could include direct killing or injury as a result of trampling by livestock and the heavy equipment used in the course of maintenance activities. Indirect effects could occur if species are displaced from stocktank habitats and are subsequently injured or killed through starvation, exposure, or predation. The above notwithstanding, the existence of stocktanks in the Malpai Borderlands is for the most part a benefit to wildlife, since stocktanks provide relatively reliable water and an important habitat resource in the otherwise arid landscape of

the Malpai Borderlands, where the natural aquatic habitats have been reduced compared to historical levels.

In summary, we anticipate some short-term adverse effects to some wildlife species, some changes in the distribution of wildlife species within the covered area as vegetative associations improve, and generally long-term benefits to the quality of wildlife habitats throughout the covered area. No population-level effects are expected to occur to any wildlife species, and no changes in species' ranges are anticipated. We do not anticipate significant effects to wildlife from implementation of the Preferred Alternative within or adjacent to the covered area or over that which would be anticipated under the No Action Alternative.

4.2.3 LISTED, PROPOSED, AND CANDIDATE SPECIES

No direct impacts to special status species are anticipated from the issuance of the ITP and approval of the MBHCP under this alternative. Indirect impacts to special status species would generally occur from implementation of the actions covered under the MBHCP, as discussed below.

Fire management. The effects of fire management activities under the Preferred Alternative could potentially affect special status species inhabiting the Malpai Borderlands in a manner similar to those described above for Wildlife. The effects of fire management on special status species are also discussed within the MBHCP (Sections 3.5.1.1 and 7.1.1), and efforts that will be taken to minimize and mitigate take of special status species from the adverse effects of fire management are identified in Sections 5.5 and 5.6 of the MBHCP. In summary, these effects are likely to include some direct effects of the burning and fire management related disturbance, indirect adverse effects related to habitat modification, and anticipated long-term beneficial effects from habitat improvements related to the reintroduction of fire into fire-adapted vegetation communities.

Erosion control. The effects of erosion control activities under the Preferred Alternative could potentially affect special status species inhabiting the Malpai Borderlands in a manner similar to those described above for Wildlife. The effects of erosion control activities on special status species are also discussed within the MBHCP (Sections 3.5.1.2 and 7.1.2), and efforts that will be taken to minimize and mitigate take of special status species from the adverse effects of erosion control activities are identified in Sections 5.5 and 5.6 of the MBHCP. In summary, these effects are likely to include some direct adverse effects from light equipment use and human presence, indirect adverse effects related to habitat modification, and anticipated long-term beneficial effects from habitat improvements related to the reduction in erosion and associated sediment transport into aquatic communities.

Mechanical Brush Control Activities. The effects of mechanical brush control activities under the Preferred Alternative could potentially affect special status species inhabiting the Malpai Borderlands in a manner similar to those described above for Wildlife. The effects of mechanical brush control on special status species are also discussed within the MBHCP (Sections 3.5.1.3 and 7.1.3), and efforts that will be taken to minimize and mitigate take of special status species from the adverse effects of mechanical brush control activities are identified in Sections 5.5 and 5.6 of the MBHCP. In summary, these effects are likely to include some direct effects of the heavy equipment use and human presence, indirect adverse effects related to habitat modification, and anticipated long-term beneficial effects

from habitat improvements related to the reduction of shrub cover in grassland vegetation communities.

Livestock management. The effects of livestock management under the Preferred Alternative could potentially affect special status species inhabiting the Malpai Borderlands in a manner similar to those described above for Wildlife. The effects of livestock management on special status species are also discussed within the MBHCP (Sections 3.5.2.1 and 7.1.4), and efforts that will be taken to minimize and mitigate take of special status species from the adverse effects of livestock management are identified in Sections 5.5 and 5.6 of the MBHCP. In summary, these effects are likely to include some direct effects of the livestock presence and movement, indirect adverse effects related to habitat modification, and beneficial effects from implementation of take minimization measures.

Construction/maintenance of linear projects. The effects of linear project construction and maintenance under the Preferred Alternative could potentially affect special status species inhabiting the Malpai Borderlands in a manner similar to those described above for Wildlife. The effects of linear project construction and maintenance on special status species are also discussed within the MBHCP (Sections 3.5.2.2 and 7.1.5), and efforts that will be taken to minimize and mitigate take of special status species from the adverse effects of linear project construction and maintenance are identified in Sections 5.5 and 5.6 of the MBHCP. In summary, these effects are likely to include some direct effects of the heavy equipment use and human presence, indirect adverse effects related to habitat modification – both short-term and long-term, and anticipated long-term beneficial effects from improvements in livestock management capabilities and aquatic site quality, quantity, and persistence.

Stocktank maintenance and use. The effects of stocktank maintenance and use under the Preferred Alternative could potentially affect special status species inhabiting the Malpai Borderlands in a manner similar to those described above for Wildlife. The effects of stocktank maintenance and use on special status species are also discussed within the MBHCP (Sections 3.5.2.3 and 7.1.6), and efforts that will be taken to minimize and mitigate take of special status species from the adverse effects of stocktank maintenance and use are identified in Sections 5.5 and 5.6 of the MBHCP. In summary, these effects are likely to include some direct adverse effects from heavy equipment use and human presence, indirect adverse effects related to habitat modification, and anticipated long-term beneficial effects from habitat improvements related to the maintenance of these artificial aquatic sites.

In summary, we anticipate some short-term adverse effects to some special status species and their habitats, but generally long-term benefits to the quality of special status species and their habitats throughout the covered area. We do not anticipate significant effects to special status species from implementation of the Preferred Alternative within or adjacent to the covered area or over that which would be anticipated under the No Action Alternative.

4.2.4 WATER RESOURCES/WATER QUALITY

No activity directly related to the issuance of the ITP and approval of the MBHCP should impact wetlands. Indirect impacts of this alternative to the covered area with one exception, would involve no new consumption, use, or transport of water supplies in the Malpai Borderlands not already taking

place. That exception would be waterline projects, which, under the MBHCP, would involve construction of 2-inch, PVC pipelines to move water from its sources (wells, springs, etc.) to livestock watering locations (stocktanks and stockponds); however, the capacity of such lines, and the amounts of water transported and used as a result of their construction, would be negligible. The effects of the MBHCP on water resources in the area are therefore limited to one consideration—the potential for impacts to water quality.

Grassland Improvement Activities. The effects of fire management, mechanical brush control, and erosion control on water quality under the MBHCP have already been noted in Section 4.2.2 above. These consist of the potential for mobilization of sediment into downstream aquatic habitats (in the case of mechanical brush control) and for mobilization of sediment and ash into downstream such areas (in the case of fire management). The former of which could degrade water quality physically (e.g., through sedimentation) and the latter physically and chemically (e.g., through sedimentation and adverse changes in pH levels). The effects of erosion control on water quality (while, in principle, similar to the above) would likely be minor for three reasons—first, as a result of the low-impact character of control methods proposed in the MBHCP; second, because of the relatively small work areas involved in erosion control; third, because most erosion control projects in the Malpai Borderlands would be undertaken in ephemeral (i.e., not perennial) steams, arroyos, and washes (or, if occasionally necessary, in dry stretches of intermittent streams). All such adverse effects would be transitory, however, while the long-term effects of fire management, brush control, and erosion control on water quality in the area almost certainly would be beneficial as a result of increases in grass and forb cover, increases in vegetative productivity generally, and reductions in sheet and gully erosion. Minimization measures such as acreage caps, buffer areas, and fire prescription parameters will be used to reduce chances and/or the intensity of the potential adverse effects described.

Ranch Management Activities. Linear project construction, livestock management, and stocktank maintenance and use could all, to one degree or another, adversely affect water quality in the Malpai Borderlands. The potential agent of such effects, as with the Grassland Improvement Activities, would be sedimentation. This could occur as a result of vegetation clearing, grading of corridors, trenching, and associated ground-surface disturbances in the vicinity of natural aquatic sites in the case of linear projects. Direct streambed and streambank disturbances could result from livestock trampling effects where livestock are watered in and are adjacent to aquatic sites. All such effects, however, while locally intensive, would typically be transitory (i.e., periodic or short-term) and of limited scope (i.e., would affect relatively small areas); as a result, none of the Ranch Management Activities would be expected to adversely affect water quality in the Borderlands either significantly, extensively, or permanently. In addition, linear projects, livestock management, and stocktank maintenance is anticipated to be used to improve livestock distribution and utilization over the landscape resulting in an overall improvement in water quality through the life of the MBHCP.

In summary, we anticipate some short-term adverse effects, but generally long-term benefits to the Water Resources/Water Quality are anticipated. We do not anticipated significant effects to Water Resources/Water Quality from implementation of the Preferred Alternative over those that would be anticipated under the No Action Alternative.

4.2.5 WETLANDS

All activities (except stocktank maintenance and use). As discussed above in Section 3.6 above, while no jurisdictional determinations identifying waters of the United States have been undertaken in the Malpai Borderlands, in January 2004 the Corps issued to MBG a Nationwide section 404 Permit for erosion control activities in unspecified waters in the area. It is therefore assumed, based on this action, that all natural springs, seeps, perennial and ephemeral drainages, and associated cienegas, arroyos, and other wetlands present in the Borderlands are in effect jurisdictional; it is also assumed that artificial livestock watering sites (i.e., stocktanks and stockponds) are not jurisdictional. Accordingly, the effects of the MBHCP's covered activities on jurisdictional waters of the U.S. are assumed to be equivalent to those described in Section 4.2.4 above for water resources generally—with the exception that stocktank maintenance and use, which affects stocktanks and stockponds only and do not affect wetlands or jurisdictional waters.

In summary, we anticipate some short-term adverse effects, but generally long-term benefits to the Wetlands are anticipated. We do not anticipated significant effects to Wetlands from implementation of the Preferred Alternative over those that would be anticipated under the No Action Alternative.

4.2.6 AIR QUALITY

Fire management. Of the six sets of activities covered by the MBHCP, only fire management has the potential to adversely affect air quality. Such effects would occur in the course of undertaking prescribed fires and managing wildland fires in the Malpai Borderlands, as called for by the MBHCP, and would consist of the impacts of the smoke generated by such fires, individually and cumulatively: (1) on the occurrence or presence of seven criteria pollutants monitored by the State of Arizona (ADEQ 2006; Section 3.6 above) and visibility (which ADEQ also monitors); and (2) on air quality parameters monitored by the State of New Mexico (which are not specified here). Of the former, three pollutants—carbon monoxide and particulate matter (PM^{10} and $PM^{2.5}$), together with other chemicals and irritants, as well as visibility—would be expected to be present in or to be affected by smoke generated by rangeland fires in the Malpai Borderlands. The effects of such fire-generated smoke, furthermore, could potentially occur: (1) onsite and be direct (in the case of immediate effects at the time of a fire and within its vicinity); (2) onsite and be indirect (in the case of lingering such effects, if smoke does not quickly dissipate); (3) offsite and be direct (if smoke is carried quickly to offsite locations); and (4) occur offsite and be indirect (in the case of lingering such effects, if smoke is carried to offsite locations).

However, the severity, duration, and location of such effects in individual circumstances would depend on numerous factors, including: (1) the size and intensity of fires undertaken or managed under the MBHCP; (2) their periodicity (i.e., frequency); (2) wind direction and speed (which determines the rate and direction in which fire-generated smoke would dissipate or be blown); and (4) decisions, in the course of fire planning, by regulatory agencies responsible for fire control and fire-related air quality effects, and, in the course of undertaking fire, by on-the-ground fire control personnel. Therefore, if fire management is undertaken at appropriate scales and intensity, suitable intervals, and in proper conditions, assuming that air quality monitoring by ADEQ and other agencies continues to be carried out, and given the lack of other significant sources of air pollution in the region, two conclusions can be drawn: (1) that the air quality impacts of smoke generated by fire

events under the MBHCP would be individually manageable and cumulatively insignificant; and (2) that, to the extent that such effects might become significant, this would be detectable (i.e., through the states' air quality monitoring programs) and could be corrected through appropriate adjustments to fire management conducted under the MBHCP.

The other Grassland Improvements and Ranch Management activities proposed for coverage under the MBHCP would help to reduce bare soil areas within the Malpai Borderlands which should reduce wind erosion of soil. Thus, we expect a reduction in particulates related to wind erosion of soil in the area over the duration of implementation of the MBHCP and the term of the ITP, if issued.

In summary, we anticipate some short-term adverse effects during implementation, but generally long-term benefits to Air Quality are anticipated. We do not anticipated significant effects to Air Quality from implementation of the Preferred Alternative over those that would be anticipated under the No Action Alternative.

4.2.7 CULTURAL RESOURCES

No activity directly related to the issuance of the ITP and approval of the Agreement is anticipated to impact cultural resources. Indirect impacts of implementation of the MBHCP could occur to one degree or another by at least four of the MBHCP's six covered activities, as described below. These include fire management, erosion control, mechanical brush removal, and construction of linear facilities.

Fire management. For two reasons, the effects of fire *per se* on cultural resources in most cases would be minor—first, because fire would be managed under the MBHCP to be of low to moderate intensity (i.e., would not be destructive); and, second, because most archeological sites and artifacts would be relatively unaffected by moderate-intensity fire either because of their makeup (in the case of clay, ceramic, and stone such materials) or because they typically occur below the present-day ground surface (in the case of organic such materials, such as pollen, which would be affected by even low-intensity fire). Consequently, the primary threat of fire management on cultural resources would be the activities associated with managing and controlling it—particularly those involving ground-surface disturbances (e.g., cutting fire lines), relatively intensive ground-surface activity (e.g., fire camps), and off-road use of large vehicles (e.g., bulldozers and fire engines)—all of which, should they occur on or in the immediate vicinity of cultural sites or artifacts, could damage or destroy them as a result of crushing (e.g., of building foundations and artifacts); disruption (of soil profiles, artifact location, etc.); and exposure (of artifacts to collection, of trace materials to erosion, etc.).

Erosion control/mechanical brush control/linear project construction. These activities to varying degrees could affect archeological sites and artifacts in a manner similarly to fire management activities. That is, associated ground-surface disturbances and/or vehicle and equipment use, if they should occur on or in the vicinity of such resources, could damage or destroy them as described above. This would most likely occur in the case of mechanical brush control.

Livestock management/stocktank maintenance and use. These activities would not be likely to significantly affect cultural sites or resources, because livestock presence alone would not significantly disrupt the ground surface or below-ground materials (at known or unknown cultural

sites). It addition, stocktank locations have already been disturbed (on multiple occasions at many tanks); cultural resources at such sites, therefore, have either long since been lost, would have long since been discovered (if they were present), or are simply not present.

Therefore, cultural resources in the Malpai Borderlands could be adversely affected to one degree or another by at least four of the MBHCP's six covered activities. These activities are part of the normal infrastructure improvements related to a livestock operation. Therefore, the impacts from these activities are not completely associated with this alternative and may be common to both of the alternatives.

Any activities carried out in association with the MBHCP and the associated ITP will need to be treated like federally funded projects, in compliance with the National Historic Preservation Act. Therefore, any proposed ground-disturbing activities or fire management will go through individual project review and appropriate consultation with the SHPO, similar to projects currently on State Trust Lands, funded by NRCS, or implemented by a Federal agency. It is anticipated that any potential adverse effects to cultural resources will be mitigated in accordance with SHPO requirements or the project sites moved to avoid adverse effects. Construction, ground breaking, and any other activity that may impact cultural resources will be better managed under this alternative than if there were no State or Federal agency involvement. Therefore, it is anticipated that no significant local or cumulative impact to cultural resources is likely to occur under this alternative.

In summary, we anticipate some adverse effects to Cultural Resources when these effects can only be minimized and not eliminated. However, we do not anticipated significant effects to Cultural Resources from implementation of the Preferred Alternative over those that would be anticipated under the No Action Alternative.

4.2.8 LAND USE/SOCIOECONOMIC

No activity directly related to the issuance of the ITP should impact land use or the socioeconomic environment within or adjacent to the covered area. There are no indirect effects expected from the implementation of the MBHCP, as MBG does not seek change in current land uses in the Malpai Borderlands or in the social or economic traditions currently in place in the area, which consists primarily of livestock ranching (Section 3.8 above). Instead, MBG seeks to ensure that these traditions and uses do not change. MBG and the MBHCP do, however, seek to effect certain changes in land management practices in the Malpai Borderlands (as distinct from land use practices), but these are sought for the express purpose of preserving livestock ranching in the Borderlands, not changing it, and of ensuring the ecological health and stability that is essential to long-term ranching in the area. Also a purpose of the MBHCP is to ensure that activities necessary to achieve these goals (as represented by its proposed ecological improvement and Ranch Management Activities) are carried out in a fashion that ensures the protection of federally listed (and other) species covered by the MBHCP.

Grassland Improvement Activities. Consistent with the above, the purpose of the MBHCP's Grassland Improvement Activities: (1) in the case of fire management, is to restore periodic, cyclic fire to the Malpai Borderlands as a natural, functioning component of the ecology of the area; (2) in the case of erosion control, is to minimize sheet erosion and identify, abate, and repair areas exhibiting

acute erosion in the area; and (3) in the case of mechanical brush control, is to stop or abate (on a localized basis) the encroachment of woody brush species into the area's historical grasslands (this purpose would also be served, but on a more widespread basis, by fire management). The collective effects of these activities, furthermore—it is hoped—would be the correction of currently-existing ecological problems in the Borderlands; the restoration of more healthy, stable ecological conditions in the area; and, thus providing a basis for sustainable rural, agricultural land use and economic base of the area.

Ranch Management Activities. Also consistent with the above, the MBHCP's Ranch Management Activities seek to ensure that certain activities essential to operating and managing livestock ranches (e.g., fence and waterline construction, certain aspects of livestock management, and maintenance and use of stocktanks) can be carried out both effectively (from an operational point of view) and consistently with protection of the MBHCP's covered species (from a biological point of view). The effect of this, as with the Grassland Improvement Activities, would be to contribute to the effective continuation of livestock ranching in the Malpai Borderlands.

In summary, we anticipate some beneficial effects to Land Use/Socioeconomic conditions in the covered area to occur under this alternative. However, we do not anticipate significant effects to Land Use/Socioeconomic conditions from implementation of the Preferred Alternative over those that would be anticipated under the No Action Alternative.

4.2.9 CUMULATIVE EFFECTS

The Council on Environmental Quality defines cumulative impacts as the incremental impacts of multiple present and future actions with individually minor, but collectively significant effects. Cumulative impacts can be concisely defined as the total effects of the multiple uses and development, including their interrelationships, on the environment. This section considers the effects of past, present, and future projects and activities that have been authorized, are under review, or can reasonably be anticipated in the Malpai Borderlands, together with the effects of the proposed action (i.e., the Preferred Alternative). These are considered to contribute to the cumulative effects of such activities not only on special status species, but also on society and the human environment in the Malpai Borderlands.

The existing condition, as a result of past events, is described in Section 3.0 above and Sections 1.2.3 and 2.2.2 of the MBHCP, and is incorporated here by reference. The effects of many activities that have occurred in the past and are presently occurring on the private, state trust and Federal lands in the Malpai borderlands has been summarized in Sections 1.2, 1.3, and 2.2 of the MBHCP, and Sections 3.0 and 4.2 above, and are incorporated here by reference. These include the following:

- MBG's Chiricahua leopard frog Safe Harbor Agreement, Conservation Easement Program, and Grassbanking Program described in Section 1.2 of the MBHCP.
- Three prescribed burns recently undertaken on private, state, and Federal lands (i.e., the Maverick burn, Baker burn, and Baker II burn), the effects of which have been generally beneficial (P. Warren, TNC, pers. comm.), as well as all other fires that may have occurred in the recent past.

- All future prescribed burns or wildland fire use incidences occurring on Federal lands covered by the Peloncillo Mountain Fire Management Plan.
- All future wildfires (i.e., uncontrolled fires) occurring on private, state, and Federal lands (the effects of which would likely be adverse in the short-term, but have long-term benefits to vegetation). These will be suppressed or allowed to burn under Wildland fire use provisions depending on prescription parameters, fire behavior, and in accordance with the Incident Commander's Agency policies.
- All the various erosion control activities undertaken by MBG and San Bernardino NWR, and mechanical brush control activities undertaken by MBG and Malpai-area ranchers, to date. The effects of these treatments have been primarily beneficial.
- Erosion and mechanical brush control activities on Federal lands, if any, undertaken in the past or taken in the future.
- All ongoing Ranch Management Activities in the categories of those covered by the MBHCP that have been undertaken to date on all lands - the specifics of which are unknown and may be undertaken in the future on Federal lands.

The impacts of these activities are consistent with those described for the Preferred Alternative in Section 4.2 above, without the coordination between the planned activities and the species conservation component. In addition, several activities occurring in the Malpai Borderlands not mentioned in the MBHCP and this document are:

- Border security activities of the US Department of Homeland Security through the Border Patrol and Customs Service. This has resulted in increases in Off Highway Vehicle (OHV) impacts. Additional infrastructure, such as border walls and observation facilities, has not been proposed for the portion of US/Mexico border in this area. Impacts occurring are similar to those described above for construction of linear facilities, except these roads are typically made by OHV travel rather than heavy equipment. Border Patrol, in cooperation with the MBG and Malpai-area ranchers, works to reduce the impacts from these activities.
- As described in Section 2.1.1.1 of the MBHCP, subdivision of rangeland into 20- and 40-acre parcels for "ranchettes" development is occurring adjacent to Covered Area. This trend from rural agricultural use of the land to rural residential use is an ongoing trend throughout much of southeastern Arizona and parts of southwestern New Mexico. It is anticipated that this trend will continue into the near future, however, the rate of this land use conversion will change with the housing market and the economy. There are no known plans for similar development in the covered area of the MBHCP.

The actions and their effects under the Preferred Alternative, described above, are also part of the cumulative impacts that are reasonably likely to occur in this area if the ITP is issued and the MBHCP is approved. They are also included in the following analysis.

4.2.9.1 VEGETATION

Activities covered under the Preferred Alternative and their effects would contribute cumulatively to the effects on vegetation of the Malpai Borderlands (Section 4.2.1 above). The cumulative impacts of implementing the proposed MBHCP on vegetation in the covered area should generally be beneficial, but insignificant, due to the anticipated small size of the implementation sites relative to the covered

area and the reversibility of any adverse effects that may occur. Furthermore, the Preferred Alternative does not result in significant changes to historical or current activities that affect vegetation in the covered area, but unifies these activities and provides measures to minimize and correct any potential adverse effects through implementation of the MBHCP.

4.2.9.2 WILDLIFE

Activities covered under the Preferred Alternative would contribute cumulatively to the effects on wildlife in the Malpai Borderlands (as described in Section 4.2.2 above). The cumulative impacts of implementing the proposed MBHCP on wildlife in the covered area should generally be beneficial, but insignificant, due to the anticipated small size of the implementation sites relative to the covered area and the reversibility of any adverse effects that may occur. Furthermore, the Preferred Alternative does not result in significant changes to historical or current activities that affect wildlife in the covered area, but unifies these activities and provides measures to minimize potential adverse effects through implementation of the MBHCP.

4.2.9.3 LISTED, PROPOSED, AND CANDIDATE SPECIES

Activities covered under the Preferred Alternative that would cumulatively affect special status species in the Malpai Borderlands are the same as those described for wildlife in the preceding section. With respect to the effects themselves, the explanation and rationale described in Section 4.2.3 above are incorporated here by reference. The cumulative impacts of implementing the proposed MBHCP on special status species in the covered area should generally be beneficial, but insignificant, due to the anticipated small size of the implementation sites relative to the covered area and the reversibility of any adverse effects that may occur. Furthermore, the Preferred Alternative does not result in significant changes to historical or current activities that affect special status species in the covered area, but unifies these activities and provides measures to minimize potential adverse effects through implementation of the MBHCP.

4.2.9.4 WATER RESOURCES/WATER QUALITY

Activities covered under the Preferred Alternative would contribute cumulatively to the effects on water quality in the Malpai Borderlands as described in Sections 4.2.4 above. The cumulative effects on water resources/water quality of these fire management, erosion control, and mechanical brush control activities would be expected to have been primarily beneficial with some accompanying and incidental short-term adverse effects on water quality as a result of temporary sedimentation in and possible chemical changes to affected aquatic habitats. The effects on water quality of these Ranch Management Activities would also be expected to be similar to those described in Section 4.2.4 above, and to include possible, but relatively minor sedimentation effects. Furthermore, the Preferred Alternative does not result in significant changes to historical or current activities that affect water resources/water quality in the covered area, but unifies these activities and provides measures to minimize potential adverse effects through implementation of the MBHCP.

4.2.9.5 WETLANDS

Activities covered under the Preferred Alternative would contribute cumulatively to the effects on wetlands in the Malpai Borderlands as described in Sections 4.2.5 above. The cumulative effects on wetlands of fire management, erosion control, and mechanical brush control activities would be expected to have been primarily neutral to beneficial with some accompanying and incidental short-term adverse effects on wetlands as a result of temporary sedimentation in and possible chemical changes to affected aquatic habitats. The effects on wetlands of Ranch Management Activities would also be expected to be similar to those described in Section 4.2.5, and to include possible, but relatively minor sedimentation effects. The Preferred Alternative is not likely to result in significant cumulative effects on wetlands as it unifies the existing Grassland Improvement Activities and Ranch Management Activities into a more coordinated manner through implementation of the MBHCP.

4.2.9.6 AIR QUALITY

Activities covered under the Preferred Alternative would contribute cumulatively to the effects on air quality in the Malpai Borderlands as described in Section 4.2.6 above. The effects on air quality of fire management, erosion control, and mechanical brush control activities would be expected to have been primarily neutral to beneficial with some accompanying and incidental short-term adverse effects on air quality as a result of smoke from fire management activities and any substrate disturbance during heavy equipment use for Grassland Improvement and Ranch Management Activities. These effects are anticipated to be short-term and in accordance with state and Federal air quality permits. The Preferred Alternative is not likely to result in significant cumulative effects on air quality as it unifies the existing Grassland Improvement Activities and Ranch Management Activities into a more coordinated manner through implementation of the MBHCP.

4.2.9.7 CULTURAL RESOURCES

Activities covered under the Preferred Alternative would contribute cumulatively to the effects on cultural resources in the Malpai Borderlands as described in Sections 4.2.7 above. The cumulative impacts of implementing the proposed MBHCP on cultural resources in the covered area may range from adverse to neutral from those activities that involve movement of substrate that could contain cultural resources. These effects consist of impacts to archeological sites (e.g., damage or destruction to the sites themselves or to artifacts associated with them) as a result of inadvertent, but direct disruption or disturbance of such sites. This, however, likely has been (and in the future would be) largely avoided as a result of existing statutory protections for cultural sites, the fact that the location of many such sites in the Malpai Borderlands are known, and the fact that cultural resource surveys or clearances prior to the undertaking of activities that could damage such sites appear to be a routine practice on all lands in the Malpai Borderlands (Section 3.7 above). Furthermore, the Preferred Alternative does not result in significant changes to historical or current activities that affect cultural resources in the covered area, but unifies these activities and provides measures to minimize potential adverse effects through implementation of the MBHCP.

4.2.9.8 LAND USE/SOCIOECONOMIC

As seen in Section 4.2.8, the MBG and the MBHCP under the Preferred Alternative would not result in land use or significant economic changes of any kind in the Malpai Borderlands, and in fact, it seeks to preserve existing land uses in the area. Activities covered under the Preferred Alternative would not therefore contribute cumulatively to effects on land use activities that seek changes in such use or would have the effect of resulting in such change. Such activities currently occurring in the Malpai Borderlands, or that might occur in the future, include rural development (e.g., of 20- to 40-acre rural properties; see Section 3.8) and the various economic forces that contribute to or could contribute to such development (e.g., failure of ranching in the Borderlands, and the resulting sale and subdivision of failed ranches).

Conversely, activities covered under the Preferred Alternative would contribute cumulatively to effects on land use activities that seek to preserve the Malpai Borderlands in their current state (i.e., to prevent land use changes). Activities of this kind consist of those that tend to secure open space land uses in the Malpai Borderlands and to improve and secure the future of livestock ranching in the area and include virtually all activities undertaken by MBG and Malpai-area ranchers that are not covered by the MBHCP (e.g., MBG's conservation easement program, grassbanking program, etc.; Section 1.2.3 of the MBHCP). Therefore, the impact of issuing the ITP and implementing the proposed MBHCP in the covered area should not result in significant cumulative effect on land use and socioeconomic conditions in the Malpai Borderlands. Furthermore, the Preferred Alternative does not result in significant changes to historical or current activities that affect land use and socioeconomic conditions in the covered area, but unifies these activities through implementation of the MBHCP.

5.0 PUBLIC INVOLVEMENT

5.1 AGENCY INVOLVEMENT

The MBHCP and this draft Environmental Assessment were developed by a Technical Team assembled by MBG that included individuals from FWS Arizona Ecological Services Office, FWS New Mexico Ecological Services Office, FWS San Bernardino NWR, Arizona Game and Fish Department, New Mexico Department of Game and Fish, and Natural Resources Conservation Service Office in Douglas, Arizona. In addition, MBG invited The Nature Conservancy to assist in the development of the draft MBHCP.

5.2 PUBLIC REVIEW

This document, along with the MBHCP and ITP application, will be made available for public review. The review period will be for a minimum of 60 days. A Notice of Availability will be mailed to interested parties and agencies and posted on the Arizona Ecological Services Office website (http://www.fws.gov/southwest/es/arizona/).

6.0 LITERATURE CITED

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