

**DRAFT ECONOMIC ANALYSIS OF
CRITICAL HABITAT DESIGNATION
FOR THE SACRAMENTO MOUNTAINS
CHECKERSPOT BUTTERFLY**

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EXECUTIVE SUMMARY

1. The purpose of this report is to assess the potential economic impacts associated with the designation of critical habitat for the Sacramento Mountains checkerspot butterfly (*Euphydryas anicia cloudcrofti*).
2. The Sacramento Mountains checkerspot butterfly (butterfly) is a member of the brush-footed butterfly family (Nymphalidae). The adults have a wingspan of approximately 2 inches and are checkered with dark brown, red, orange, white, and black spots and lines. The butterfly inhabits meadows within the mixed-conifer forest at an elevation between 8,000 and 9,000 feet in the vicinity of the Village of Cloudcroft, Otero County, New Mexico. On September 6, 2001 the butterfly was proposed for listing as endangered. Concurrent with this proposal the Service has also proposed critical habitat for the butterfly.

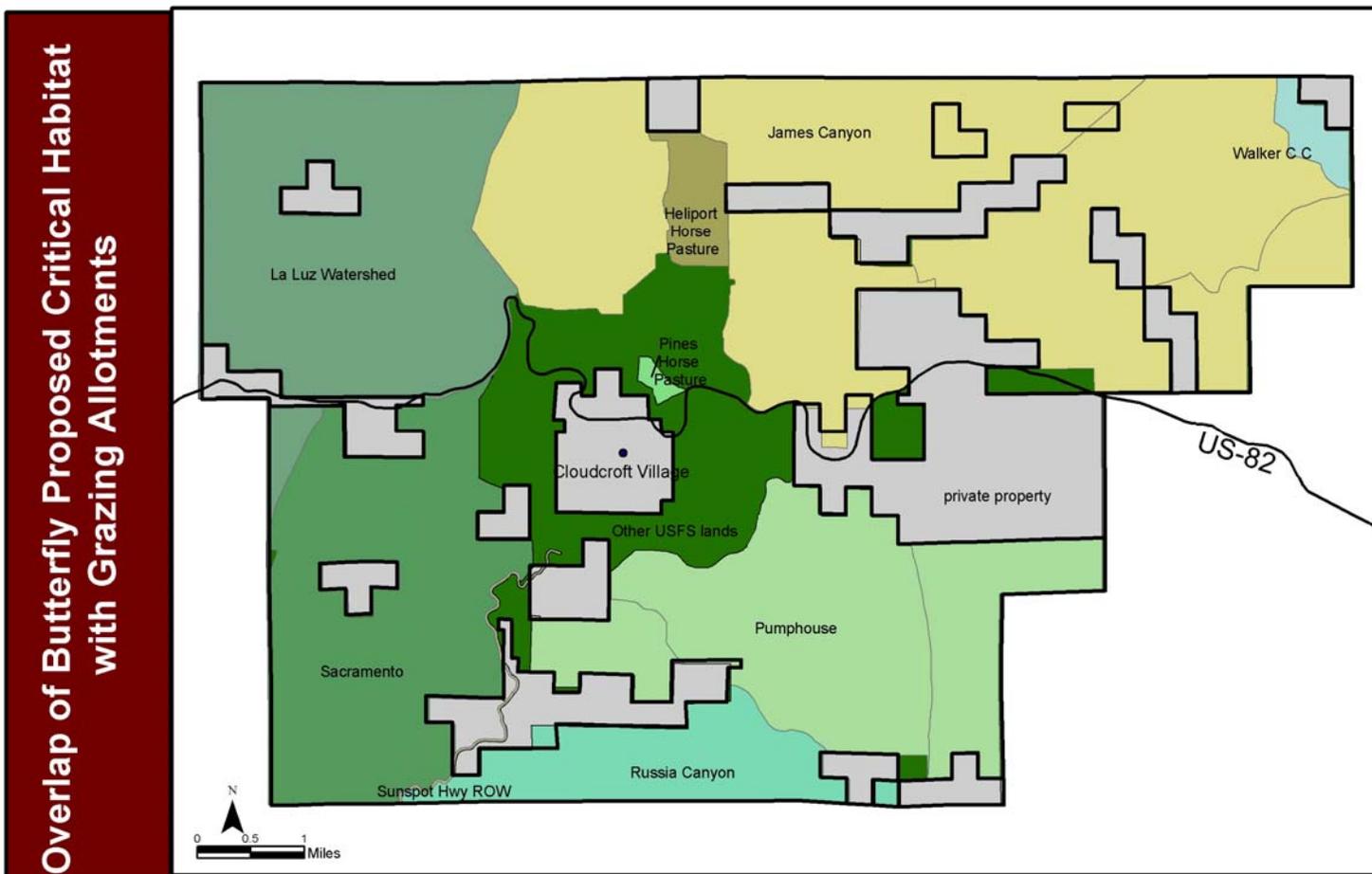
KEY FINDINGS

- The cost of historic conservation measures associated with the butterfly are estimated to be \$100,000 since 2001.
- The present value cost of future conservation measures associated with the butterfly is forecast to be **\$5.6 million to \$8.6 million** (using a seven percent real discount rate), or \$533,000 to \$816,000 annually.
- Approximately 55 percent of these costs are associated with forecast project modifications, and 45 percent of costs are expected to be administrative.
- This analysis forecasts approximately 300 informal, 100 formal, and three programmatic consultations regarding the butterfly over the next 20 years.
- Utility projects are expected to be the activity most heavily impacted by butterfly conservation.
- Most of the costs will be associated with activities on Forest Service (USFS) land (67 percent). Most of these costs (75 percent) are associated with project modifications. These costs are mainly associated with Otero County Electric Cooperative utility line and road maintenance projects.
- Private entities are anticipated to bear 62 percent of the total cost of butterfly conservation, Federal agencies other than the Service 25 percent, the Service 12 percent, and State and local governments the remaining one percent.
- Impacts on livestock grazing on USFS land may reach \$16,000 over the 20 year analysis period.
- Regional economic impacts resulting from a reduction in livestock grazing could include a loss of \$33,000 in regional output and a loss of one job across all sectors of the economy.

3. Exhibit ES-1 provides a map of the designation area. As illustrated on the map, the proposal encompasses one unit. This analysis considers impacts of conservation measures for the butterfly at the sub-unit level, these sub-unit were developed for and are used only in this analysis. These sub-units are based on grazing allotment and private property boundaries, as shown in Exhibit ES-1. Sub-units considered are La Luz Watershed, James Canyon, Pines and Heliport Horse Pastures, Pumphouse, Russia Canyon, Sacramento, "other" USFS, and private property. The estimated butterfly habitat land ownership within the proposed critical habitat boundaries is approximately 2,553 acres of private land and 2,645 acres of USFS land.

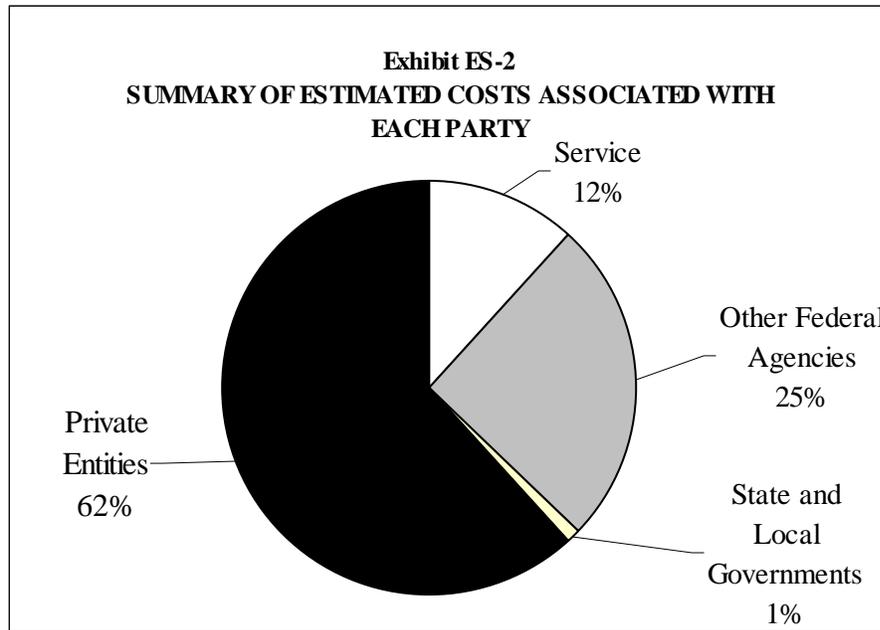
4. Section 4(b)(2) of the Endangered Species Act (Act) requires the Service to designate critical habitat on the basis of the best scientific data available, after taking into consideration the economic impact, and any other relevant impact, of specifying any particular area as critical habitat. The Service may exclude areas from critical habitat designation when the benefits of exclusion outweigh the benefits of including the areas within critical habitat, provided the exclusion will not result in extinction of the species.

**Exhibit ES-1
MAP OF THE DESIGNATION AREA**



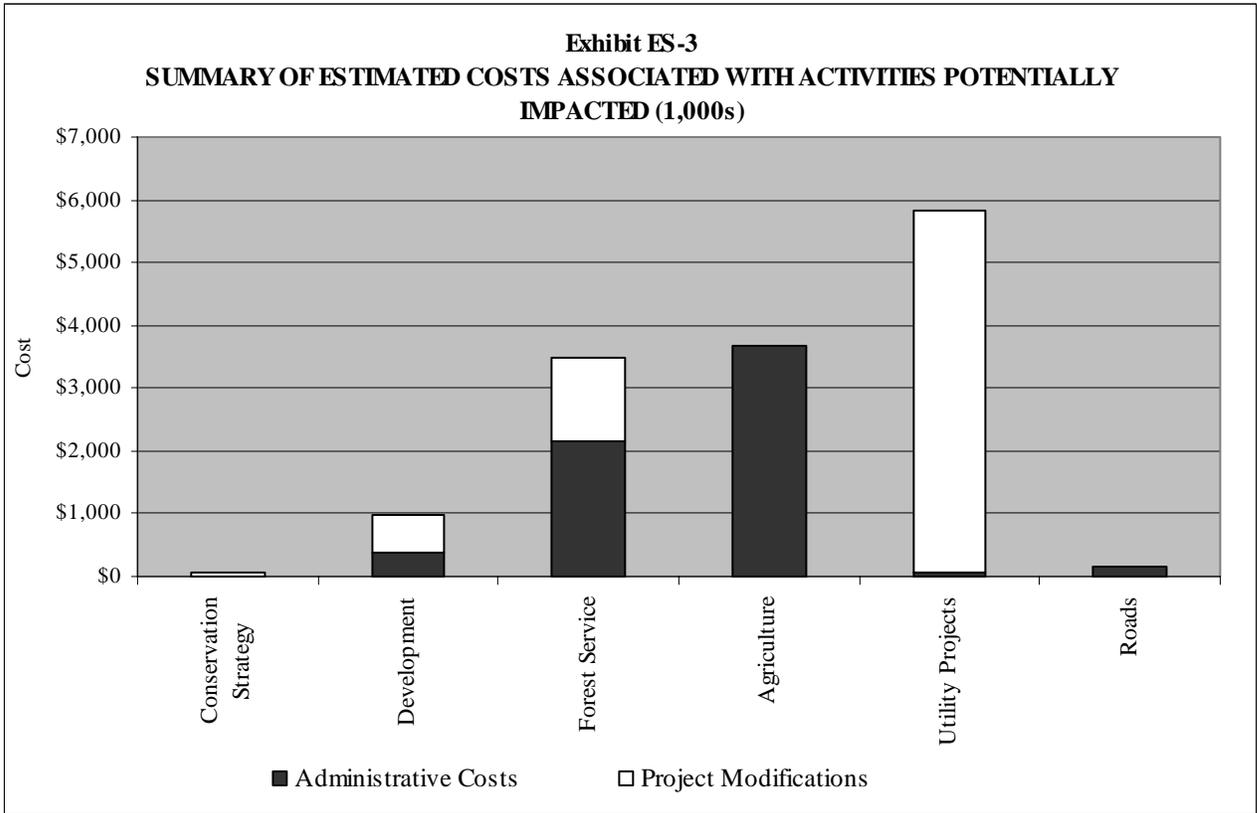
Results of the Analysis

5. This analysis considers the economic impacts of conservation measures taken pre-listing and designation of critical habitat. Pre-designation impacts are typically defined as all management efforts that have occurred since the time of listing; however, the butterfly has not been listed, but was proposed for listing in September 2001. The rough magnitude of costs incurred since the butterfly was proposed for listing and designation of critical habitat in 2001 is \$100,000. These costs were incurred by the USFS associated with conference opinions and conservation measures associated with the butterfly.
6. Estimates of the present value of expected future economic impacts of butterfly conservation measures range from \$5.6 million to \$8.6 million over 20 years, assuming a seven percent discount rate, or \$533,000 to \$816,000 annually. Approximately 55 percent of these costs are associated with project modifications and 45 percent administrative. Activities most affected are utility projects, agriculture and ranching, and USFS land management (mostly recreation-related and road projects). Together, these activities make up 91 percent of the total costs of butterfly conservation.
7. The USFS anticipates it will consult on activities it undertakes including recreation, livestock grazing, land transfers, fire management, road projects, herbicide and insecticide application and will be the Federal nexus for utilities construction and maintenance projects, and will address whether that activity may jeopardize the listed species. The USFS asserts the additional effort to address critical habitat will be administrative in nature. Private landowners are expected to protect the listed species primarily through HCPs and section 7 consultation with NRCS. NRCS activities are beneficial and will not require project modifications.
8. The economic impacts of butterfly conservation will be manifested primarily as increased costs for private entities (62 percent). Federal agencies other than the Service are anticipated to bear 25 percent of the total cost of butterfly conservation, the Service 12 percent, and State and local governments the remaining one percent. Consultations that may involve private entities include those related to utility projects, agriculture and ranching, livestock grazing on Lincoln National Forest range allotments, private right-of-way roads through Lincoln National Forest, and development projects. Exhibit ES-2 provides the distribution of costs.



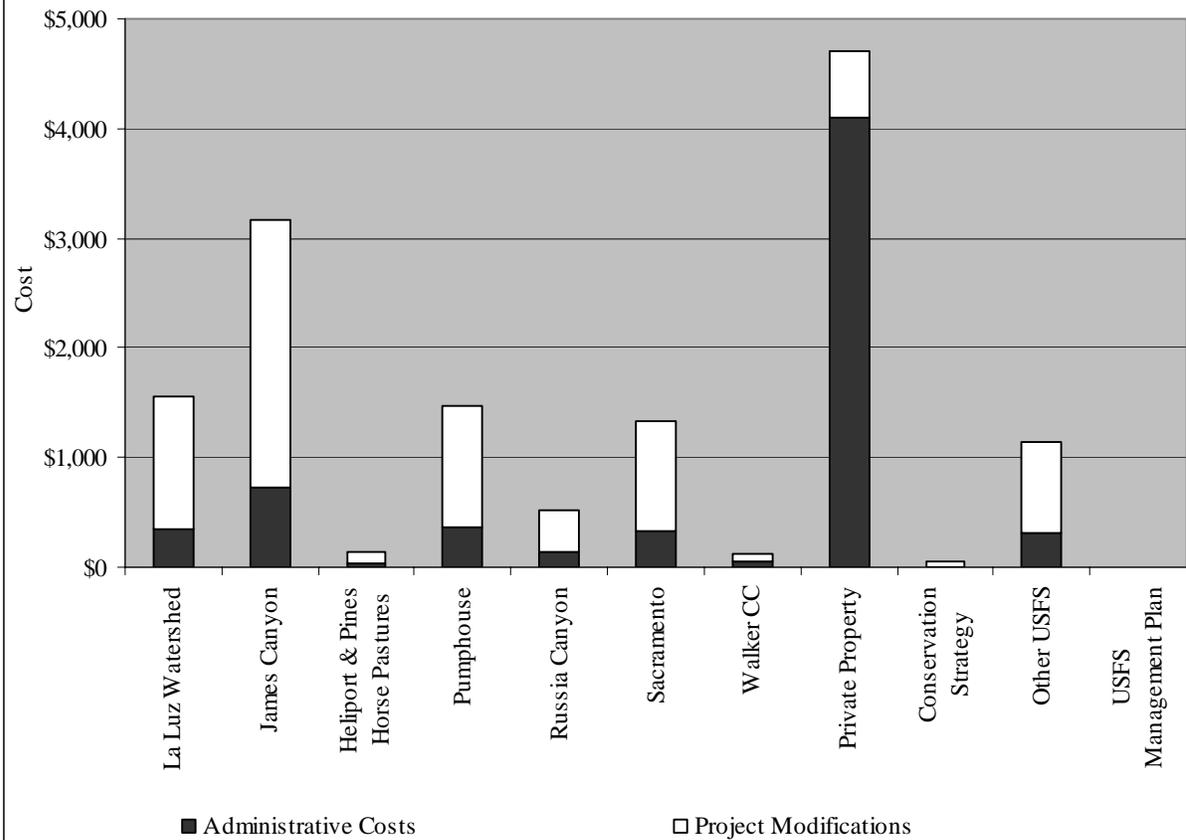
9. Otero County Electric Cooperative utility line and road maintenance projects are anticipated to generate 41 percent of the total costs. NRCS Environmental Quality Incentives Program projects on private farms and ranches are expected to generate 26 percent of the total costs. Approximately 25 percent of the total costs are expected to stem from USFS projects on Lincoln National Forest. Approximately 30 percent of the costs related to the Lincoln National Forest are expected to be associated with recreation and 24 percent with private right-of-way road projects. The remaining nine percent of total costs are expected to stem from road construction and maintenance, conservation strategy, residential and commercial development, and other utility construction and maintenance activities. Exhibit ES-3 is a summary of costs associated with potentially impacted activities.

10. This analysis considers the economic impact that could result from a reduction in livestock grazing on portions of the James Canyon and Pumphouse allotments in Lincoln National Forest. Note that these economic impacts would be borne by the permittee and not the USFS. This analysis estimates present value, at a rate of seven percent, grazing permit value losses as high as \$16,400 (\$1,600 annually; assuming a seven percent discount rate) (2003 dollars). Agriculture and ranching impacts are estimated as the increased administrative costs associated with NRCS funded Environmental Quality Incentives Program (EQIP) projects (e.g., forest stand improvement, brush control, control of invasive species or noxious weeds, and wildlife habitat improvement on private lands). Further discussion can be found in Section 4.2.



11. Approximately 33 percent of the costs of butterfly conservation are anticipated to occur on private property, due primarily to the potential for consultations related to NRCS projects on private farms and ranches and surveying and habitat conservation plan (HCP) efforts related to residential and commercial development. The next largest category of costs represent costs associated with James Canyon (22 percent). This is due to the large amount of acreage of the James Canyon range allotment within the critical habitat boundary (34 percent of USFS land). The Forest Management Plan and conservation strategy are not specific to a geographic area, unlike other activities the plans are not associated with a specific geographic area and are therefore not assigned to any sub-unit. Exhibit ES-4 is a graphical representation of the costs by sub-unit over the next 20 years.

Exhibit ES-4
SUMMARY OF ESTIMATED COSTS ASSOCIATED WITH SUB-UNITS POTENTIALLY
IMPACTED (1,000s)



12. Exhibit ES-5 provides an overview of the present value of costs associated with conservation measures for the butterfly over the next 20 years. To discount and annualize costs, guidance provided by the Office of Management and Budget (OMB) specifies the use of a real rates of three and seven percent.

Exhibit ES-5		
PRESENT VALUE OF TOTAL ECONOMIC COSTS		
(20 Years)		
	Total Cost	
	Low	High
Total Activity Cost	\$8,630,000	\$14,222,000
Present Value (3%)	\$7,089,000	\$11,267,000
Present Value (7%)	\$5,644,000	\$8,640,000
Annualized (3%)	\$477,000	\$757,000
Annualized (7%)	\$533,000	\$816,000
Note: This table presents expected costs over the 20-year analysis period as well as the discounted present value of these total costs based on a three and seven percent discount rates. Discounted costs are then annualized.		

Uncertainties

13. Exhibit ES-6 presents several key assumptions that introduce uncertainty into this economic analysis of butterfly conservation activities, as well as the potential direction and relative scale of bias introduced by the assumption.

Exhibit ES-6

CAVEATS TO THE ECONOMIC ANALYSIS

Key Assumption	Effect on Cost Estimate
The presence of other threatened and endangered species with and without critical habitat (i.e., Mexican Spotted Owl and Sacramento Mountains thistle) will have no influence on consultation/project modification costs.	+
Future costs to implement the conservation strategy are not included in this analysis as data do not exist for impacts of the unreleased draft document.	-
Potential lost use values for livestock grazing on USFS lands is estimated as a reduction current and potential permitted future grazing within specific areas.	+
The economic impact associated with potential lost public use of land expected to be transferred between the USFS the Village of Cloudcroft is not quantified.	-
Private landowners planning on constructing homes within meadow habitat will conduct surveys. If those areas surveyed are found to be in use by butterflies the landowner will develop a HCP.	+/-
This analysis does not estimate project modification costs associated with private access roads in Lincoln National Forest.	-
<p>- : This assumption may result in an underestimate of real costs. + : This assumption may result in an overestimate of real costs. Multiple "+" keys refer to the magnitude of effect anticipated. +/- : This assumption has an unknown effect on estimates.</p>	

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14. The purpose of this analysis is to estimate the economic impact of actions taken to protect the Sacramento Mountains checkerspot butterfly (butterfly) and its habitat. It attempts to quantify the economic effects of the designation of critical habitat, as well as the economic effects of the protective measures taken as a result of the listing of the butterfly or other Federal, State, and local laws that also aid habitat conservation in the areas proposed for designation. Because all butterfly-related species and habitat protection efforts likely contribute to the efficacy of the proposed butterfly critical habitat designation efforts, the impacts of these actions may be considered relevant for understanding the full impact of proposed critical habitat designation. Costs are examined that (a) have been incurred since the date the species was proposed for listing and through the final designation of critical habitat (pre-designation costs), and (b) are forecast to occur after the listing designation is finalized, post-designation costs.
15. This information is intended to assist the Secretary in determining whether the benefits of excluding particular areas from the designation outweigh the benefits of including those areas in the designation.¹ In addition, this information allows the Service to address the requirements of Executive Orders 12866 and 13211, and the Regulatory Flexibility Act (RFA), as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA).² This report also complies with direction from the U.S. 10th Circuit Court of Appeals that “co-extensive” effects should be included in the economic analysis to inform decision-makers regarding which areas to designate as critical habitat.³
16. This section provides the framework for this analysis. First, it describes the general analytic approach to estimating economic effects, including discussion of both efficiency and distributional effects. Next, it discusses the scope of the analysis,

¹ 16 U.S.C. §1533(b)(2).

² Executive Order 12866, “Regulatory Planning and Review,” September 30, 1993; Executive Order 13211, “Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use,” May 18, 2001; 5 U.S.C. §§601 *et seq.*; and Pub Law No. 104-121.

³ In 2001, the U.S. 10th Circuit Court of Appeals instructed the Service to conduct a full analysis of all of the economic impacts of proposed critical habitat designation, regardless of whether those impacts are attributable co-extensively to other causes (*New Mexico Cattle Growers Ass’n v. U.S.F.W.S.*, 248 F.3d 1277 (10th Cir. 2001)).

including the link between existing and critical habitat-related protection efforts and economic impacts. Finally, it describes the information sources employed to conduct this analysis.

1.1 Approach to Estimating Economic Effects

17. This economic analysis considers both the economic efficiency and distributional effects that may result from species and habitat protection. Economic efficiency effects generally reflect “opportunity costs” associated with the commitment of resources required to accomplish species and habitat conservation. For example, if activities on private lands are limited as a result of the designation or the presence of the species, and thus the market value of the land is reduced, this reduction in value represents one measure of opportunity cost or change in economic efficiency. Similarly, the costs incurred by a Federal action agency to consult with the Service under section 7 represent opportunity costs of habitat conservation.
18. This analysis also addresses the distribution of impacts associated with the designation, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation activities on small entities, the energy industry, or governments. This information may be used by decision-makers to assess whether the effects of the designation unduly burden a particular group or economic sector. For example, while habitat conservation activities may have a small impact relative to the national economy, individuals employed in a particular sector of the regional economy may experience a significant level of impact. The difference between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.
19. Where data are available, the analysis attempts to capture the net economic impact imposed on regulated entities and the regional economy of butterfly conservation actions. That is, the economic impact of butterfly conservation to the land management agencies and regulated community net of any direct off-setting benefit they experience.

1.1.1 Efficiency Effects

20. At the guidance of the Office of Management and Budget (OMB) and in compliance with Executive Order 12866 “Regulatory Planning and Review,” Federal agencies measure changes in economic efficiency in order to discern the implications on a societal level of a regulatory action. For regulations specific to the conservation of the butterfly, efficiency effects represent the opportunity cost of resources used, or benefits foregone, by society as a result of the regulations. Economists generally characterize opportunity costs in terms of changes in producer and consumer surplus in affected markets.⁴

⁴ For additional information on the definition of “surplus” and an explanation of consumer and producer surplus in the context of regulatory analysis, see Gramlich, Edward M., *A Guide to Benefit-Cost Analysis (2nd Ed.)*, Prospect Heights, Illinois: Waveland Press, Inc., 1990; and U.S. 240-R-00-003, September 2000, available at <http://yosemite.epa.gov/ee/epa/eed.nsf/webpages/Guidelines.html>.

21. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a landowner or manager may enter into a consultation with the Service to ensure that a particular activity will not adversely modify critical habitat. The effort required for the consultation is an economic opportunity cost, because the landowner or manager's time and effort would have been spent in an alternative activity had his or her land not been designated critical habitat. In the case that compliance activity is not expected to significantly affect markets – that is, not result in a shift in the quantity of a good or service provided at a given price, or in the quantity of a good or service demanded given a change in price – the measurement of compliance costs provides a reasonable estimate of the change in economic efficiency.
22. Where habitat protection measures are expected to significantly impact a market, it may be necessary to estimate changes in producer and consumer surpluses. For example, a designation that precludes the development of large areas of land may shift the price and quantity of housing supplied in a region. In this case, changes in economic efficiency (i.e., social welfare) can be measured by considering changes in producer and consumer surplus in the real estate market.
23. This analysis begins by measuring costs associated with measures taken to protect species and habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. In the case of the butterfly, compliance costs are in fact expected to represent a reasonable estimate of efficiency effects, and thus impacts on consumer and producer surpluses in affected markets are considered but not estimated.

1.1.2 Distributional and Regional Economic Effects

24. Measurements of changes in economic efficiency focus on the net impact of conservation activities, without consideration of how certain economic sectors or groups of people are affected. Thus, a discussion of efficiency effects alone may miss important distributional considerations. OMB encourages Federal agencies to consider distributional effects separately from efficiency effects.⁵ This analysis considers several types of distributional effects, including impacts on small entities; impacts on energy supply, distribution, and use; and regional economic impacts. It is important to note that these are fundamentally different measures of economic impact than efficiency effects, and thus cannot be added to or compared with estimates of changes in economic efficiency.

⁵ U.S. Office of Management and Budget, "Circular A-4," September 17, 2003, available at <http://www.whitehouse.gov/omb/circulars/a004/a-4.pdf>.

Measures of Economic Impact

Economists measure economic impacts in terms of both efficiency effects and distributional effects. Economic efficiency refers to the allocation of society's scarce and productive resources. Efficiency is achieved, broadly speaking, when the things people want are produced at the lowest possible cost. Under these conditions, economic well-being, or social welfare, is maximized. A change in the allocation of resources, such as that brought about by government regulation, is potentially efficient if the value of the resultant gains outweighs the value of the losses. Thus, the *efficiency effect* of a regulation represents the net change in welfare to society as a whole. Measures of economic efficiency provide one basis for assessing the absolute costs of a proposed critical habitat designation, as well as the relative costs across different units of the proposed designation.

Designation of critical habitat can lead to disproportionate impacts on local and regional economies. For example, economic activity in the region in which habitat is designated may be displaced and redirected to other areas. From a societal perspective, economic gains and losses are fully captured by the *efficiency effect*, while changes from one region to another represent a redistribution of economic activity. Thus, measures of *distributional effects* provide additional information by indicating how different regions or sectors of a regional economy may expand or contract in response to a regulation.

It is important to note that efficiency and distributional impacts are not additive or directly comparable. Rather, they provide different perspectives on the economic impact of a regulation: The *efficiency effect* measures the change in social welfare associated with a re-allocation of resources. The *distributional effect* describes the pattern of changes underlying that re-allocation.

For example, consider the case of impacts to private grazing operations within critical habitat. Efficiency effects associated with designation may include expenditures on labor and materials for fencing to protect species, administrative costs of consultations, and lost net revenues to the rancher from having to graze fewer head of cattle in a given area. These costs represent a reduction in social welfare by increasing the cost of beef production. Similarly, designation may encourage some grazing operations to re-locate, or for those proprietors to consider alternative uses of their resources. These distributional effects may be expressed in terms of changes in revenues, local employment, and tax receipts in the agricultural sector of one or more local or regional economies, as well as in related sectors (e.g., feed supply, trucking).

Impacts on Small Entities and Energy Supply, Distribution, and Use

25. This analysis considers how small entities, included small businesses, organizations, and governments, as defined by the RFA, may be affected by proposed critical habitat designation.⁶ In addition, in response to Executive Order 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the impacts of critical habitat on the energy industry and its customers.⁷ While small business impacts are discussed, significant impacts on the energy sector are not expected. See Appendix A for an analysis of impacts to small businesses and the energy industry.

⁶ 5 U.S.C. § 601 *et seq.*

⁷ Executive Order 13211, "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," May 18, 2001.

Regional Economic Effects

26. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation measures. Specifically, regional economic impact analysis produces a quantitative estimate of the potential magnitude of the initial change in the regional economy resulting from a regulatory action. Regional economic impacts are commonly measured using input/output models. These models rely on multipliers that represent the relationship between a change in one sector of the economy (e.g., expenditures by recreationists) and the effect of that change on economic output, income, or employment in other local industries (e.g., suppliers of goods and services to recreationists). These economic data provide a quantitative estimate of the magnitude of shifts of jobs and revenues in the local economy.
27. The use of regional input/output models in an analysis of the impacts of species and habitat conservation efforts can overstate the long-term impacts of a regulatory change. Most importantly, these models provide a static view of the economy of a region. That is, they measure the initial impact of a regulatory change on an economy but do not consider long-term adjustments that the economy will make in response to this change. For example, these models provide estimates of the number of jobs lost as a result of a regulatory change, but do not consider re-employment of these individuals over time or other adaptive responses by affected businesses. In addition, the flow of goods and services across the regional boundaries defined in the model may change as a result of the regulation, compensating for a potential decrease in economic activity within the region.
28. Despite these and other limitations, in certain circumstances regional economic impact analysis may provide useful information about the scale and scope of localized impacts. It is important to remember that measures of regional economic effects generally reflect shifts in resource use rather than efficiency losses. Thus, these types of distributional effects are reported separately from efficiency effects (i.e., not summed). In addition, measures of regional economic impact cannot be compared with estimates of efficiency effects, but should be considered as distinct measures of impact.

1.2 Scope of the Analysis

29. This analysis attempts to quantify the economic effects of the designation of critical habitat, *as well as any protective measures taken as a result of the listing or other Federal, State, and local laws that aid habitat conservation in the areas proposed for designation*. Habitat protection efforts undertaken to meet the requirements of other Federal, State, or local agencies can assist the Service in achieving its goals as set out in the Act. In certain cases, other government entities may work cooperatively with the Service to address natural resource management issues, thereby expediting the regulatory process for project proponents. Because habitat protection efforts affording protection to the butterfly likely contribute to the efficacy of the proposed critical habitat designation efforts, the impacts of these actions are considered relevant for understanding the full impact of proposed designation.

1.2.1 Sections of the Act Relevant to the Analysis

30. The analysis begins by looking at the costs incurred since the time that the butterfly was proposed for listing in September 2001 and through the time of the listing and final designation of critical habitat. It focuses on activities that are influenced by the Service through sections 4, 7, 9, and 10 of the Act. It then looks at activities likely to occur post-designation, and quantifies the effects that sections 4, 7, 9, and 10 of the Act may have on those activities.
31. Section 4 of the Act focuses on the listing and recovery of endangered and threatened species, as well as the designation of critical habitat. According to section 4, the Secretary is required to list species as endangered or threatened “solely on the basis of the best available scientific and commercial data.”⁸
32. The protections afforded to threatened and endangered species and their habitat are described in sections 7, 9, and 10 of the Act, and economic impacts resulting from these protections are the focus of this analysis:
- Section 7 of the Act requires Federal agencies to consult with the Service to ensure that any action authorized, funded, or carried out will not likely jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of the species' designated critical habitat. The administrative costs of these consultations, along with the costs of project modifications resulting from these consultations, represent compliance costs associated with the listing of the species and the designation of critical habitat.
 - Section 9 defines the actions that are prohibited by the Act. In particular, it prohibits the “take” of endangered wildlife, where “take” means to “harass, harm, pursue, or collect, or to attempt to engage in any such conduct.” The economic impacts associated with this section manifest themselves in sections 7 and 10.
 - Under section 10(a)(1)(B) of the Act, a non-Federal entity (i.e., a landowner or local government) may develop a Habitat Conservation Plan (HCP) for a threatened or endangered species in order to meet the conditions for issuance of an incidental take permit.⁹ The requirements posed by the HCP may have economic impacts associated with the goal of ensuring that the effects of incidental take are adequately minimized and mitigated. The designation of critical habitat does not require completion of an HCP; however, the designation may influence conservation measures provided under HCPs. Approximately half of land proposed for designation for the butterfly, is Federally-owned, and Federal agencies do

⁸ 16 U.S.C. 1533.

⁹ U.S. Fish and Wildlife Service, “Endangered Species and Habitat Conservation Planning.” From: <http://endangered.fws.gov/hcp/>, as viewed on August 6, 2002.

not develop HCPs. HCPs are expected to be developed by non-Federal entities for activities related to residential and commercial development.

1.2.2 Other Relevant Protection Efforts

33. The protection of listed species and habitat is not limited to the Act. Other Federal agencies, as well as State and local governments, may also seek to protect the natural resources under their jurisdiction.¹⁰ In addition, under certain circumstances, the designation of critical habitat may provide new information to a community about the sensitive ecological nature of a geographic region, potentially triggering additional economic impacts under other State or local laws. In cases where these costs may not have been triggered absent the designation of critical habitat, they are included in this economic analysis.

1.2.3 Additional Analytic Considerations

34. Previous economic impact analyses prepared to support critical habitat decisions have considered other types of economic impacts related to the critical habitat designation, including time delay, regulatory uncertainty, and stigma impacts. This analysis considers these types of economic impacts and has determined that the proposed habitat designation for the butterfly is unlikely to have economic impacts of this nature.

Time Delay and Regulatory Uncertainty Impacts

Time delays are costs due to project delays associated with the consultation process or compliance with other regulations. Regulatory uncertainty costs occur in anticipation of having to modify project parameters (e.g., retaining outside experts of legal counsel to better understand their responsibilities with regard to critical habitat designation).

Stigma Impacts

Changes to private property values associated with public attitudes about the limits and costs of critical habitat designation are known as "stigma" impacts.

1.2.4 Benefits

35. The published economics literature has documented that real social welfare benefits can result from conservation and recovery of endangered and threatened species. Such benefits have also been ascribed to preservation of open space and biodiversity, both of which can be associated with species conservation, but which are not the purpose of critical habitat. Likewise, regional economies and communities can benefit from the preservation of healthy populations of endangered and threatened species, and the habitat on which these species depend.

¹⁰ For example, the Village of Cloudcroft has enacted local zoning ordinances to protect future annexed property as greenbelt (Chapter 7 of the Village Code - Greenbelt Zones Use Regulations G-1 Zone).

36. In Executive Order 12866, OMB directs Federal agencies to provide an assessment of costs and benefits of a proposed regulatory actions.¹¹ However, in its guidance for implementing Executive Order 12866, OMB acknowledges that often, it may not be feasible to monetize, or even quantify, the benefits of environmental regulations.¹² Where benefits cannot be quantified, OMB directs agencies to describe the benefits of a proposed regulation qualitatively. *Given the limitations associated with estimating the benefits of proposed critical habitat designation for the butterfly, the Service believes that the benefits of proposed critical habitat designation are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.*

1.3 Analytic Time Frame

37. The analysis examines activities taking place both within and adjacent to the proposed designation. Estimates of post-designation impacts are based on activities that are “reasonably foreseeable,” including, but not limited to, activities that are currently authorized, permitted, or funded, or for which proposed plans are currently available to the public. The analysis estimates economic impacts to activities from 2004 (anticipated year of species’ final listing) to 2024 (twenty years from the year of final designation).

1.4 Information Sources

38. The primary sources of information for this report were communications with and data provided by:

- U.S. Fish and Wildlife Service (Service);
- U.S. Forest Service (USFS);
- Natural Resources Conservation Service (NRCS);
- U.S. Environmental Protection Agency (EPA);
- U.S. Army Corps of Engineers (USACE);
- New Mexico Department of Transportation (NMDOT);
- Otero County;
- Village of Cloudcroft; and
- Local ranchers and other stakeholders.

¹¹ Executive Order 12866, “Regulatory Planning and Review,” September 30, 1993.

¹² U.S. Office of Management and Budget, “Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice,” 68 *Federal Register* 5492, February 3, 2003; and U.S. Office of Management and Budget, “Appendix 4: Guidelines to Standardize Measure of Costs and Benefits and the Format of Accounting Statements,” in *Report to Congress on the Costs and Benefits of Federal Regulations*, March 22, 2000.

39. The Service has proposed to designate critical habitat for the proposed Federally endangered Sacramento Mountains checkerspot butterfly (*Euphydryas anicia cloudcrofti*). The butterfly inhabits meadows within the mixed-conifer forest in the vicinity of the Village of Cloudcroft, Otero County, New Mexico. This section provides background on the geography, ecology, and human-uses of the proposed critical habitat designation. It details the current state of the proposed lands, including a description of management activities, land ownership, and ecology of the area.

2.1 Species and Designation¹³

2.1.1 Description of Species

40. The butterfly is a member of the brush-footed butterfly family (Nymphalidae). The adults have a wingspan of approximately 2 inches and they are checkered with dark brown, red, orange, white, and black spots and lines. The butterfly inhabits meadows within the mixed-conifer forest at an elevation between 8,000 and 9,000 feet in the vicinity of the Village of Cloudcroft, Otero County, New Mexico. The adult butterfly is often found in association with the larval food plants New Mexico Penstemon (*penstemon neomexicanus*) and valerian (*Valeriana edulis*), and adult nectar sources such as sneezeweed (*Helenium hoopesii*).
41. Adult butterflies apparently lay their eggs on *Penstemon neomexicanus* and perhaps *Valeriana edulis*, the known larval host plants. After hatching, larvae feed on host plants and, during the 4th or 5th instar (the period between molts in the larval stage of the butterfly), enter an obligatory and extended diapause (maintaining a state of extended inactivity), generally as the food plants die back in the fall from freezing. Some larvae may remain in diapause for more than one year, depending on environmental conditions. During diapause, larvae probably remain in leaf or grass litter near the base of shrubs, under the bark of conifers, or in the loose soils associated with pocket gopher (*Thomomys bottae*) mounds. Once larvae break diapause, they feed and grow through three or four more instars before pupating (entering the inactive stage within a chrysalis) and emerging as adults. Diapause is generally broken in late spring (March-April) and adults emerge in midsummer (June-July).

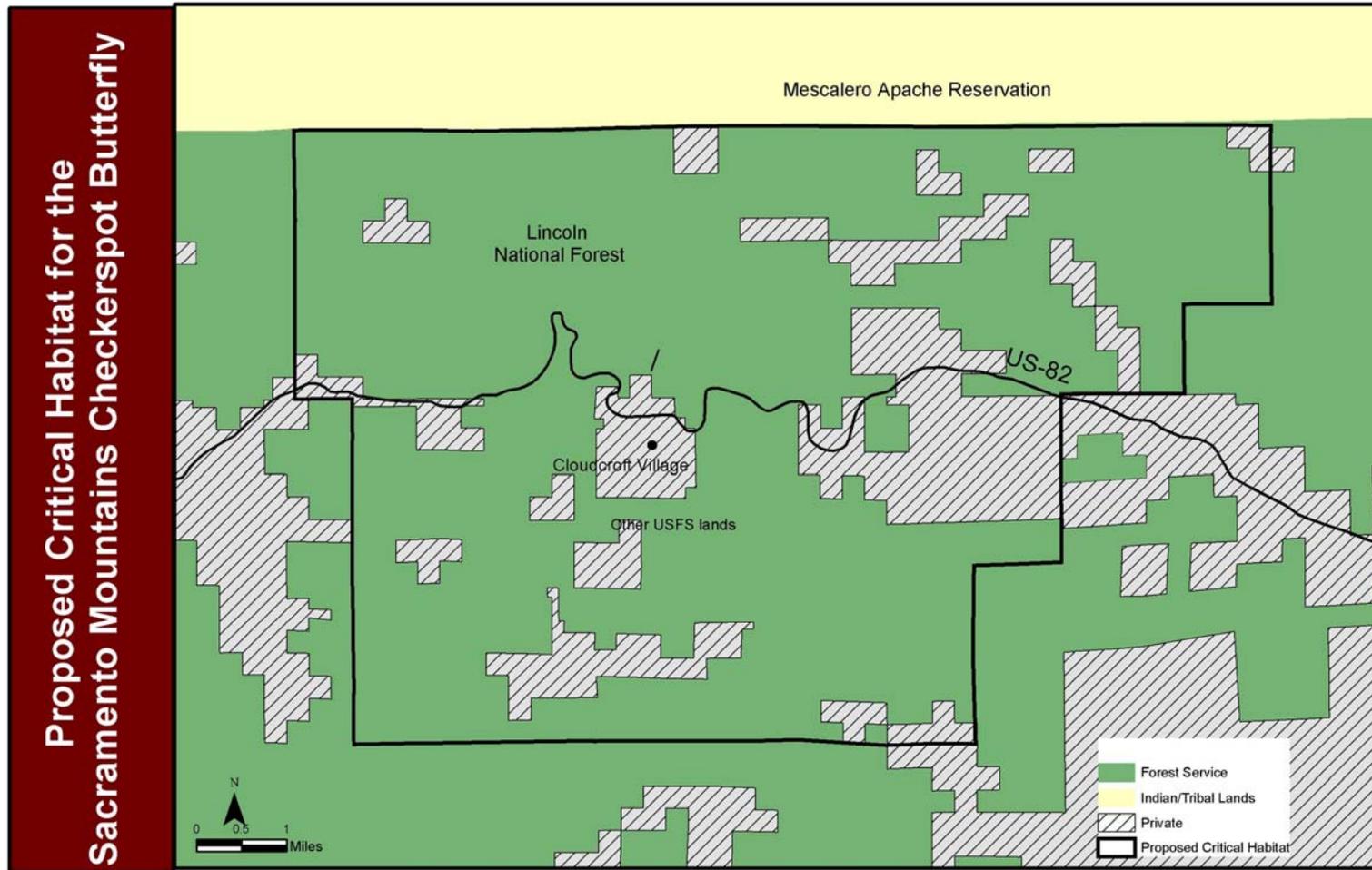
¹³ U.S. Fish and Wildlife Service, *Proposed Endangered Status for the Sacramento Mountains Checkerspot Butterfly and Proposed Designation of Critical Habitat*, Federal register, Vol. 66, No. 173, September 6, 2001.

2.1.2 Description of Designation¹⁴

42. The proposed critical habitat designation includes the area found within a 54 square mile polygon centered around the Village of Cloudcroft, Otero County, New Mexico, south of the Mescalero Apache Nation boundary. Mescalero Apache Nation lands are not included in the proposed designation. The proposal includes those areas that currently support the butterfly, as well as some that may not currently support the butterfly but which are considered essential for reestablishment to conserve the species. Within this proposed area, only land exhibiting the primary constituent elements is considered actual critical habitat. Any land within the proposed area that is lacking the PCEs is not considered critical habitat. Therefore, the actual area of critical habitat may be considerably less than the area within the critical habitat unit boundaries. Within the proposed critical habitat boundaries, only lands containing some or all of the primary constituent elements are proposed as critical habitat. According to the proposed rule, existing features and structures within proposed critical habitat, such as buildings, roads, cultivated agricultural land, residential landscaping (e.g., mowed nonnative ornamental grasses), ponds, wetlands (i.e., a lowland area that is permanently saturated with water), forests, and other features, are not proposed for critical habitat.
43. The primary constituent elements are: (1) elevation between 8,000 to 9,000 feet within the mixed-conifer forest and within an approximate 54 square miles polygon centered around the Village of Cloudcroft, Otero County, New Mexico, south of the Mescalero Apache Nation boundary; (2) drainages, meadows, or grasslands; (3) supporting the known food plants New Mexico penstemon (*Penstemon neomexicanus*), sneezeweed (*Helenium hoopesii*), or valerian (*Valeriana edulis*); (4) less than five percent canopy cover; and (5) composed of plants such as arrowleaf groundsel (*Senecia triangularis*), curlycup gumplant (*Grindelia squarrosa*), figworts (*Scrophularia* sp.), penstemon (*Penstemon* sp.), skyrocket (*Ipomopsis aggregata*), milkweed (*Asclepias* sp.), Arizona rose (*Rosa woodsii*), or Wheeler's wallflower (*Erysimum capitatum*). Areas adjacent to or linking areas that have some or all of the above elements and are sufficient to provide for dispersal between areas of butterfly habitat are necessary for the conservation of the species and thus are proposed as critical habitat. Habitat that provides for dispersal may not support all of the other primary constituent elements.
44. About half of the suitable habitat for the butterfly occurs on private land; these areas are rather evenly distributed throughout the known range of the butterfly. The estimated land ownership within the proposed critical habitat boundaries is approximately 2,553 acres of private land and 2,645 acres of Forest Service lands. Exhibit 2-1 provides a map of the designation area.

¹⁴ Ibid.

**Exhibit 2-1
Map of Designated Area**



2.1.3 Overlap with other Endangered Species

45. Two other Federally-protected species may be found within the proposed critical habitat designation for the butterfly. The threatened Sacramento Mountains thistle likely occurs within the same geographic boundaries as the butterfly though the thistle grows primarily within springs and wet areas while the butterfly is found mostly upland.¹⁵ Most of the proposed designation for the butterfly (approximately 96 percent) also overlaps with proposed critical habitat and multiple protected activity centers (PACs) for the federally threatened Mexican Spotted Owl (MSO).¹⁶

2.2 Land Use Activities in the Proposed Critical Habitat Designation

46. The Service has identified the following activities that may occur within the proposed critical habitat designation as potentially affecting the conservation status of the species or habitat: commercial and private development, road construction and maintenance, and USFS activities, fire suppression activities, highway and forest road reconstruction, recreation, domestic livestock grazing, nonnative vegetation, and insect control.
47. This analysis focuses on the following activities identified as the most likely to be affected by critical habitat designation for the butterfly: actions implemented as part of the conservation strategy, residential and commercial development, and USFS activities (including recreation, livestock grazing, land transfers, fire management, road projects, herbicide and insecticide application), road construction and maintenance, agriculture and ranching, and utilities construction and maintenance. Each of these activities are discussed further in Section 4.

¹⁵ Personal communication with Service personnel May 28, 2004.

¹⁶ Based on an analysis of available Geographic Information System (GIS) maps of the proposed critical habitat designations for the Mexican Spotted Owl and Sacramento Checkerspot butterfly provided by the Service Ecological Services Field Office in Albuquerque.

48. This section summarizes key economic and demographic information for the county likely to be impacted by the proposed critical habitat designation for the butterfly. County level data are presented to provide context for the discussion of economic impacts and to illuminate trends that may influence these impacts.

49. To provide context and comparison for the economic analysis, this section first provides demographic information for the broader study area, Otero County, and more specifically the Village of Cloudcroft, which is surrounded by the proposed critical habitat designation. This section then details economic activities taking place within and surrounding the proposed critical habitat designation.

3.1 Economic Profile of Otero County

3.1.1 Population Patterns

50. The proposed critical habitat designation covers approximately 5,200 acres within a 54 square mile boundary within Otero County, New Mexico. The population of Otero County in 2000 was 62,298 individuals. Otero County's population declined by approximately 0.6 percent between 2000 and 2002. The only incorporated community in the proposed designation is the Village of Cloudcroft, with a population of 755 individuals in 2000. The population of Cloudcroft declined by approximately 4.5 percent between 2000 and 2002.

3.1.2 Business Patterns

51. Exhibit 3-1 below provides payroll and employment data for Otero County. The "Number of Establishments" column displays the total number of physical locations at which business activities are conducted with one or more paid employees in the year 2001. These figures provide a measure of the average density of commercial and industrial establishments in the region. The principal industries in Otero County, in terms of annual payroll, include retail trade, health care and social assistance, and accommodation and food services—all industries that are unlikely to be impacted by the proposed designation.

3.1.3 Employment by Industry

52. Over 1,030 business establishments operate and employ over 16,501 individuals in Otero County. The largest employment sectors within Otero County are health care and social assistance, retail trade, accommodation and food services and public administration. Employment within the public administration sector represented approximately 37 percent of the job base while employment within the retail trade constituted approximately 13 percent of all jobs in the county. Health care and social assistance and accommodation and food services both accounted for nearly nine percent of employment.

Exhibit 3-1			
ECONOMIC ACTIVITY WITHIN OTERO COUNTY: ANNUAL PAYROLL, EMPLOYMENT, AND TOTAL ESTABLISHMENTS BY INDUSTRY (2001)			
	Annual Payroll (\$1,000)	Employees*	Total Establishments
Forestry, fishing, hunting, and agriculture support	\$0**	49	3
Mining	\$0	19	6
Utilities	\$4,775	78	12
Construction	\$15,725	918	123
Manufacturing	\$9,060	516	26
Wholesale Trade	\$3,720	179	27
Retail Trade	\$37,837	2,141	207
Transportation & warehousing	\$3,814	510	27
Information	\$6,953	241	23
Finance & insurance	\$10,405	425	51
Real estate & rental & leasing	\$3,416	149	53
Professional scientific & technical services	\$15,938	715	77
Management of companies & enterprises	\$0	51	5
Admin, support, waste management, remediation services	\$8,165	739	52
Educational services	\$9,672	131	8
Health care & social assistance	\$54,534	1,520	98
Arts, entertainment and recreation	\$0	57	19
Accommodation and food services	\$29,211	1,484	101
Other services (except public health administration)	\$7,574	356	109
Unclassified establishments	\$0	Not available	3
Public Administration	Not available	6,223	Not available
Source: (1) Adapted from: New Mexico Development Department, New Mexico's 2002 County Profiles, accessed at: http://www.edd.state.nm.us/PUBLICATIONS/Profiles.pdf . (2) U.S Census Bureau, County Business Patterns Data 2001, accessed at: http://censtats.census.gov * Employment data is an average of 2 nd and 3 rd quarter figures in 2001. ** In accordance with U.S. Code, Title 13, Section 9, no data are published that would disclose the operations of an individual employer. The number of establishments in an industry classification and the distribution of these establishments by employment-size class are not considered to be disclosures, so this information may be released even though other information is withheld from publication.			

3.1.4 Income and Unemployment

53. Otero County has a per capita income of \$14,345. This is lower than New Mexico's average per capita income of \$17,261. The poverty rate in Otero County is 19.3 percent, which is higher than New Mexico's average of 18.4 percent. The unemployment rate in Otero County is 4.2 percent, which is slightly lower than the statewide average of 4.4 percent.

3.2 Regionally Important Industries

3.2.1 Military

54. The military installations in Otero County, especially Holloman Air Force Base (Holloman), which lies entirely within Otero County, are the area's largest employers and contribute significantly to the local economy.¹⁷ However, the future of both Holloman and White Sands Missile Range are uncertain. Currently, under the Base Realignment and Closure process of 2005 (BRAC 2005) the Department of Defense is evaluating whether to close Holloman and White Sands entirely or to realign the bases with additional missions.¹⁸ The outcome of the BRAC process in 2005 could significantly impact the economy of Otero County.

3.2.2 Timber Industry

55. The timber industry was historically important in Otero County. In 1899 a railroad line was constructed between Alamogordo and the proposed resort village of Cloudcroft, for the purpose of tapping the timber resources of the Sacramento Mountains. Once an important regional industry, it represents only a small portion of Otero County's economy today. Forestry related earnings in Otero County account for only 0.03 percent of the county's total industry earnings.¹⁹ Various factors have simultaneously affected the timber industry in Otero County. These include changes in the regional, national and world timber market, changes in USFS land management (unrelated to species conservation), and changes that may be related to the MSO and other species conservation measures.
56. *Changes in the timber market* include increased production from the southeast U.S. and imports from Canada and other countries. Overall, both the volume and value of timber harvested in the U.S. declined from 1986 to 1996. Reductions in Western timber harvest resulted in a shift of the supply curve. Although, consumption was not significantly affected, as consumers were willing to pay higher prices and substitute

¹⁷ Alamogordo Daily News, *Holloman is Critical to Future of Alamogordo*.

¹⁸ Otero County Economic Development Council, *BRAC 2005 – The Process for the Next Round of Base Closings has Begun*. Issue 29, October 2003.

¹⁹ Source: Bureau of Economic Analysis, Regional Economic Accounts, <http://www.bea.doc.gov/bea/regional/data.htm>.

supply sources from other regions of the U.S., and timber from other countries became available quickly.²⁰

57. *Changes in the USFS National Forest timber sales program.* A recent paper by the USFS examined the changing economics of the National Forest Timber Sale program. This paper highlighted trends that have taken place in the program from 1989 to 1997. The first trend discussed is the decrease in the size of the timber sales program, with a more than 70 percent decrease in the quantity of timber harvested. The second trend was a change in harvest objectives from "timber commodity" purposes to "forest stewardship" objectives. Two other trends were examined including changes in harvest methods since the FY 1992 policy decision de-emphasizing the use of clear cutting, and the changing nature of timber products being harvested off USFS lands. The paper attributes changes to "factors including: evolving administrative and judicial interpretations of agency legal requirements, advances in our scientific understanding of how ecosystems work, and shifting public attitudes concerning the most appropriate management priorities for National Forest lands."²¹
58. *Injunctions against USFS Region 3 halting timber harvest.* In 1994, USFS Region 3 was sued for continuing to harvest timber under existing Forest Plans prior to completing formal consultation with the Service after the MSO was listed. In July 1995, the District Court of Arizona suspended all timber harvesting in USFS Region 3. This injunction continued until USFS Region 3 completed consultation with the Service on its existing Land and Resource Management Plans (LRMPs) in November 1996.²² Another injunction in 1997 halted timber harvest in Region 3 for six months when the 9th Circuit Court of Appeals ruled that the USFS had not complied with its revised forest plan with respect to species protections. The 1997 injunction was related to other species in addition to the MSO, not including the butterfly.
59. Only two small, non-Tribal mills continue to operate in the critical habitat designation region, with a total capacity of 1,100,00 board feet (BF). The last large mill in the county, which cut approximately 18 million board feet (MBF) a year, closed in 2000 due to declining timber supplies in the region.²³ Exhibit 3-2 illustrates the location of currently operating mills in Otero County.

²⁰ Haynes, Richard W. Tech. Coord. "An analysis of the timber situation in the United States: 1952-2002." Gen. Tech. Rep. PNW-GTR-560. Portland, OR: USDA, Forest Service, Pacific Northwest Research Station, 254 p, 2003.

²¹ USFS. 2004. Changing Economics of the National Forest Timber Sale Program. Available on the web at www.fs.fed.us/forestmanagement/reports/tspirs/1997/index.shtml.

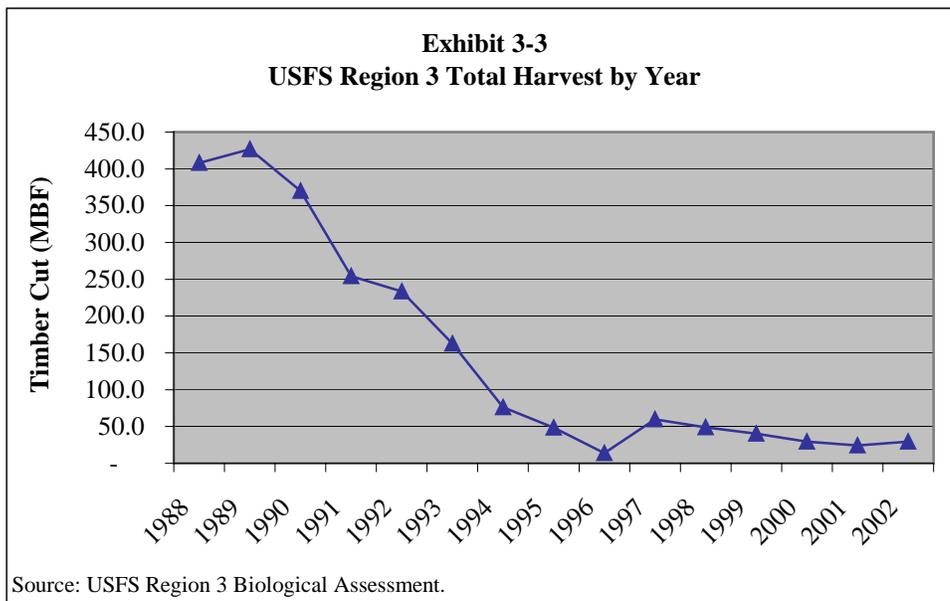
²² Discussed in Court Order, January 13, 2003, United States District Court, District of Arizona, CV 01-409 TUC DCB.

²³ Romo, Rene. Logging Caps Fell Another Sawmill - No timber left to process in southeastern NM, Albuquerque Journal, August 20, 2000.

Exhibit 3-2				
LOCATION AND CAPACITY OF CURRENTLY OPERATING MILLS				
Name	Location	County	State	Capacity (BF)
Dees Sawmill	Weed	Otero	NM	500,000
Chippaway	Sacramento	Otero	NM	600,000
Total capacity				1,100,000

Sources: (1) Romo, Rene. Logging Caps Fell Another Sawmill - No timber left to process in southeastern NM, Albuquerque Journal, August 20, 2000.
(2) Rand, Pat. *Logging in the Sacramento Mountains*. Mountain Monthly, accessed at: <http://www.mountainmonthly.com/logging.html>

60. Limited historical data are available for timber harvest within the proposed designation. The USFS reports that in 1986, 13.2 MBF of timber was cut in the Lincoln National Forest but by 1999 this had fallen to 2.3 MBF. Data for timber harvest within USFS Region 3 shown in Exhibit 3-3, indicate that harvest has been declining in the southwest over the past 15 years. Over the past 15 years the annual harvest on Region 3 forests averaged 148 million million board feet (MMBF), while over the past five years, the average harvest was 34 MMBF per year.



3.2.3 Development

61. Current developed areas within the proposed critical habitat designation include three golf courses, 12 private developments, the Village of Cloudcroft, schools, several recreational parks, a ski area, and a network of paved, gravel or dirt roadways.

62. From 1990 to 2000, the number of housing units in Cloudcroft Village increased from 781 to 920.²⁴ This is an increase of 139 housing units over this 10 year period, which represents approximately 18 percent growth in residential development.
63. The USFS is currently involved in two potential land transfers involving butterfly habitat with the Village of Cloudcroft pursuant to the Townsite Act. The first land transfer originally included three parcels of land totaling 100 acres in which a number of butterflies had been observed. The Village of Cloudcroft and the USFS have since agreed to eliminate these three parcels from the land transfer leaving 80 acres available for purchase by the Village. To date, the Village has not purchased the land. Three of the 80 acres being offered to Cloudcroft are occupied butterfly habitat, but the USFS has affirmed that the majority of the land being offered is not suitable for the butterfly. The Village's intended use of the land is 22 acres for a sports field, 42 acres of greenbelt, and eight acres for a wastewater treatment plant.²⁵
64. The USFS is also in the planning phase of a three-way proposal with the Village of Cloudcroft and the Otero County Electrical Cooperative to acquire 80 acres of butterfly habitat, 15 of which are occupied. This land is currently owned by Cloudcroft and is adjacent to the Ski Cloudcroft ski area. The Village would in turn receive five commercial lots in the center of town, approximating one acre total.²⁶ This land currently owned by the Otero County Electrical Cooperative. The Otero County Electrical Cooperative would acquire 40 acres of forested USFS land outside of town to consolidate and relocate their offices. According to the USFS, the proposed three-way transfer would be entirely beneficial to the butterfly.
65. The Village of Cloudcroft has stated its intention to keep all new land annexed from the USFS as greenbelt. The Village explains that, “[c]urrently the Village’s only plans for any land that would be acquired from the USFS would be for use as ball fields (baseball, soccer, etc). The ball fields, if built, would create forest edge habitat and a ‘non-forested opening’ which is exactly the type of action beneficial to the butterfly.²⁷ The other areas being studied for transfer are for administrative purposes such as the land on which our sewage treatment plant sits.”²⁸

3.2.4 Grazing

66. Cattle grazing has been a historically important industry within Otero County and around the Village of Cloudcroft. Over the past 15 years, however, Otero County’s cattle

²⁴ U.S. Census Bureau, *American FactFinder 1990 and 2002 Data Sets*, accessed at: <http://factfinder.census.gov>.

²⁵ Personal communication with Service personnel, July 12, 2004.

²⁶ Personal communication with Ed Bunn, Retired Village of Cloudcroft Planner, June 17, 2004.

²⁷ According to the Service the ball fields, if built, would create forest edge habitat and a 'non-forested opening'. Depending on the plants present (e.g., Penstemon), this type of action could be beneficial to the butterfly. Personal communication with Service personnel July 9, 2004.

²⁸ Village of Cloudcroft, Official Comments on the Proposed Rule for Endangered Status for the Sacramento Mountains Checkerspot Butterfly and Proposed Designation of Critical Habitat, October 14, 2001.

inventory has been steadily declining.²⁹ In 2002, cash receipts from cattle in Otero County represented one percent of that of the state of New Mexico as a whole.³⁰

67. Livestock grazing occurs in approximately one third of the known occupied butterfly habitat within the Lincoln National Forest.³¹ The proposed designation contains portions of six grazing allotments as well as two horse pastures. The grazing allotments within the critical habitat designation are: La Luz Watershed, James Canyon, Sacramento, Russia Canyon, Walker C.C., and Pumphouse. The La Luz Watershed and James Canyon allotments, as well as the portion of the Sacramento that lies within the critical habitat designation boundary, are not currently grazed. Walker C.C., Pumphouse, and Russia Canyon are each permitted for 69, 64, and 38 head of cattle respectively. Four cattle ranches exist within the proposed designation. Approximately 170 cattle (or 2,410 animal unit months) are currently grazed within the proposed designation, representing roughly one percent of all cattle in Otero County (approximately 21,000).³²

3.2.5 Recreation

68. The Village of Cloudcroft was founded in 1898 largely as a tourist destination. From 1900 to 1938, a passenger train carried visitors from the desert floor to the village to enjoy the wilderness and to escape the heat of the lower elevations.³³ Today, Cloudcroft continues to attract thousands of visitors each year and tourism is a large contributor to the Village economy. Over 500,000 acres of Lincoln National Forest surround the village. Recreational activities such as off-highway vehicle (OHV) use, hiking, camping, and mountain biking occur regularly in the proposed designation for the butterfly.
69. Limited data are available regarding OHV use in the proposed designation. Two annual events are held near the Cloudcroft Village.³⁴ The first is a high altitude motorcycle race, which has taken place for roughly 20 years in May. The second is the two-day High Altitude Classic Mountain Bike Race in mid-May, which regularly attracts several hundred racers and makes use of trails along which the butterfly is known to exist. This race has been run for roughly five to six years. Efforts are being made, however, to relocate the event further from the Village to avoid impact to butterfly habitat. Reports from Lincoln National Forest also suggest that OHV use is increasing. Despite efforts by the USFS to restrict OHV access in known butterfly habitat in Lincoln

²⁹ National Agricultural Statistics Service. 1992, 1997 and 2002 Censuses of Agriculture, Historical Highlights: Otero County, accessed at: <http://www.nass.usda.gov/census/>.

³⁰ New Mexico Department of Agriculture, 2002 New Mexico Agricultural Statistics, Cash Receipts: Cattle and Calves, accessed at: http://www.nass.usda.gov/nm/nmbulletin/17_02.pdf

³¹ Personal communication with Service personnel, July 12, 2004.

³² New Mexico Department of Agriculture, 2002 New Mexico Agricultural Statistics, Cattle and Calves: Number on Farms by County, accessed at: http://www.nass.usda.gov/nm/nmbulletin/32_02.pdf.

³³ Cloudcroft Online, A Brief History of Cloudcroft, accessed at: <http://www.cloudcroft.com/history.htm>.

³⁴ Personal communication with Marcie Stokes, USFS Recreation Lands and Minerals Staff, June 9, 2004.

National Forest, they have continued to notice OHV tracks in butterfly monitoring plots, even when the area was partially fenced.³⁵

70. Hiking and camping are also popular within the proposed designation. There are fourteen campgrounds in the Lincoln National Forest within the proposed designation.³⁶ The USFS reports that these campgrounds are very popular with tourists, attracting many visitors from West Texas. Additionally, the Lincoln National Forest allows dispersed camping outside of designated campgrounds. Dispersed camping is allowed along a 300-foot corridor surrounding existing roads.³⁷ Dispersed camping is popular with many people returning to the same sites each year. Visitors tend not to camp in the meadow areas, thus impact to the butterfly is not likely to be large. The USFS does not have an accurate count of the number of people participating in dispersed camping in Lincoln National Forest.

³⁵ U.S. Fish and Wildlife Service, *Proposed Endangered Status for the Sacramento Mountains Checkerspot Butterfly and Proposed Designation of Critical Habitat*, Federal Register, Vol. 66, No. 173, September 6, 2001.

³⁶ USFS, Lincoln National Forest, accessed at: <http://www.fs.fed.us/r3/lincoln/recreation/d2-camping.shtml>

³⁷ Personal communication with Marcie Stokes, USFS Recreation Lands and Minerals Staff, June 9, 2004.

71. This section considers the economic impacts of actions taken to protect the butterfly and its habitat. It quantifies the economic effects of the proposed critical habitat designation, as well as protective measures taken as a result of the species' proposed listing or other Federal, State, and local laws that aid habitat conservation in the areas proposed for designation. First, it provides a discussion of *pre-designation impacts*, as the impacts associated with species and habitat conservation efforts in place from the time of the proposed listing and designation of critical habitat to listing and final designation of critical habitat. Impacts associated with these management efforts may be on-going until the time of final designation. Second, this section provides estimates of *post-designation impacts*, potential future impacts associated with the critical habitat designation as proposed and other species and habitat conservation management efforts related to the butterfly.
72. Economic impacts associated with butterfly conservation are related to the conservation strategy for the butterfly, residential and commercial development, USFS activities within the Lincoln National Forest, road construction and maintenance, agriculture and ranching, and utilities construction and maintenance.
73. The impacts associated with potential future species and habitat management efforts are manifested in economic efficiency effects (i.e., social welfare) as outlined below.
- Administrative Costs: Costs associated with engaging in section 7 consultation, including time spent attending meetings, preparing letters and biological assessments, and in the case of formal consultations, the development of a Biological Opinion by the Service are quantified as administrative costs. Section 7 consultation can require substantial administrative effort on the part of all participants. These impacts are measured as the cost of labor required to fulfill these managerial duties. Estimates of per-effort costs associated with informal and formal consultations are presented in Exhibit 4-1. Costs of the biological assessment are typically borne by the Action agency. Unless otherwise stated, this table is used to develop total administrative costs for consultations associated with activities within the proposed critical habitat designation for the butterfly.

- Project Modification Costs: Species and habitat management efforts that involve project consultation activity are likely to result in project modifications to comply with the goals of the management efforts. Costs of implementing these modifications are associated with changes in labor or material requirements that may occur at one point in time and/or be on-going.

EXHIBIT 4-1				
ESTIMATED ADMINISTRATIVE COSTS OF CONSULTATION AND TECHNICAL ASSISTANCE EFFORTS FOR THE BUTTERFLY (PER EFFORT)^a				
Consultation Type	Service	Action Agency	Third Party	Biological Assessment
Technical Assistance	\$260 - \$680	N/A	\$600 - \$1,500	N/A
Informal Consultation	\$1,000 - \$3,100	\$1,300 - \$3,900	\$1,200 - \$2,900	\$0 - \$4,000
Formal Consultation	\$3,100 - \$6,100	\$3,900 - \$6,500	\$2,900 - \$4,100	\$4,000 - \$5,600
Programmatic Consultation	\$11,500 - \$16,100	\$9,200 - \$13,800	N/A	\$5,600

^a Low and high estimates primarily reflect variations in staff wages and time involvement by staff.
Sources: IEC analysis based on data from the Federal Government General Schedule Rates, Office of Personnel Management, 2002, a review of consultation records from several Service field offices across the country. Confirmed by local action Agencies.
Note: The costs of a conference opinion was estimated by the USFS and is discussed in Section 4.1.

74. The remainder of this section details these economic impacts. The first section discusses pre-designation impacts associated with species and habitat management efforts, including all management efforts that have occurred since the time of the proposed listing of the butterfly, in September 2001, and are expected to continue to occur through the time period when final designation is established in late 2004. The second section discusses post-designation impacts forecast from 2004 through 2024.

75. Appendix A presents a screening level analysis of the potential effects of proposed critical habitat designation on small entities (i.e., small businesses, small organizations, and small government jurisdictions) to satisfy the requirements of the Regulatory Flexibility Act as amended by the Small Business Regulatory Enforcement Fairness Act (SBREFA) of 1996.³⁸ Finally, pursuant to Executive Order No. 13211, Appendix A reports the potential impacts the proposed critical habitat designation is likely to have on the energy industry.

4.1 Pre-Designation Impacts

76. Part of the administrative burden of the Act is a consultation requirement imposed on Federal agencies (section 7). Since the proposed listing of the butterfly in September 2001, there have been seven conference opinions, all of which were related to USFS

³⁸ Regulatory Flexibility Act, 5 U.S.C. 601 et. seq.

activities on the Sacramento Ranger District on the Lincoln National Forest. Activities discussed in the conference opinions include: utility projects, recreation projects, land transfers, fire management, insecticide application, vegetation management, and study of the butterfly. Conservation measures have included butterfly surveys, host plant relocation, habitat flagging, revegetation and restoration efforts, monitoring, compliance reporting, season restrictions, minimizing habitat impact, herbicide application restrictions, etc. Each conference opinion is explained separately below.

- **Butterfly genetics study.** On October 8, 2002, the Service issued a formal conference opinion evaluating a proposal to study the genetics of the butterfly. The study involved the collection of no more than 100 individual prediapause butterfly larvae from 10 different monitoring plots and extraction of their genetic material for analysis. The impact of the study is harm to the collected butterfly larvae. The conference opinion issued a finding of no-jeopardy for the study. As conservation measures, the Service recommended that USFS (1) work cooperatively with other entities to develop a regional conservation strategy for the butterfly and (2) that the study investigators contact other researchers working on the butterfly for possible collaboration with existing genetic work.
- **Water Well and Pipeline.** On May 28, 2002 the Service issued a formal conference opinion on the proposed construction of a water well and 0.75 mile pipeline to service the Village of Cloudcroft. The project involved the installation of a cement pad surrounded by a graveled area around a newly drilled well, as well as a fiberglass heated house and a six inch in diameter pipeline. It also included a 20 foot. buffer around the construction area yielding an approximate project area of 3.7 acres within occupied proposed critical habitat. The conference opinion issued a finding of no-jeopardy for the study and no adverse modification of proposed critical habitat. As conservation measures, the Service recommended that USFS (1) work cooperatively with other entities to develop a regional conservation strategy for the butterfly and (2) inform the special use permittee that impacts could be minimized by constructing the well during the non-active season of the butterfly (October-March).
- **Mark and release butterfly study.** On June 20, 2002 the Service issued a formal conference opinion evaluating a proposed capture, mark and release butterfly study within the meadow systems of Pumphouse and Spud Patch canyons. The study was required as a mitigation measure for a road widening project conducted by the New Mexico Department of Transportation (NMDOT). The conference opinion issued a finding of no-jeopardy for the study and no adverse modification of proposed critical habitat. As conservation measures, the Service recommended that USFS work cooperatively with other entities to develop a regional conservation strategy for the butterfly. Other butterfly conservation measures undertaken by the NMDOT include a \$30,000 population study between 1999-2003 and a \$10,000 translocation of plant species used by the butterfly.
- **Dry Canyon Telephone Project.** On October 29, 2001 the Service issued an informal conference opinion on the proposed installation of an underground copper cable by Penasco Valley Telephone. Approximately 0.46 acres of butterfly habitat on

National Forest land and 4.1 acres on private land would contain buried cable. The conference opinion issued a finding of no-effect to the species and may affect/not likely to adversely affect critical habitat. As conservation measures, the Service recommended that USFS (1) salvage and transplant host plants within the project area to an appropriate site, (2) situate any staging areas only within areas that do not contain host plants, (3) revegetate any habitat that is impacted by the project with appropriate native plants, including host plants, (4) monitor the project to ensure these conservation measures are met, and (5) monitor the survival of relocated host plants.

- **Various separate Projects.** On January 16, 2002 the Service issued a collective conference opinion for nine ongoing or proposed projects including a power line installation, a campground capital improvement, a land transfer, fire management, vegetation management, and exploratory water drilling. Three of the projects have already undergone formal section 7 consultation, four have undergone informal consultation, and two have not undergone consultation at all. The conference opinion issued varied findings for each project but determined that collectively none of the projects were likely to jeopardize the butterfly or adversely modify critical habitat.
- **Penasco II Vegetation Management Project.** On September 27, 2002 the Service issued a formal biological and conference opinion on the proposed implementation of the Penasco II Non-Programmatic Vegetation Management Program. No treatment was slated to occur directly in butterfly habitat but treatment was scheduled for 1,770 acres adjacent to unoccupied habitat and on 3,385 acres adjacent to occupied habitat. The project further included 18.7 miles of open system road, reopened road, and proposed new temporary road which would disturb one acre of unoccupied and nine acres of occupied critical habitat. The conference opinion issued a finding of not likely to jeopardize the butterfly or adversely modify critical habitat. As conservation measures, the Service recommended that USFS work cooperatively with other entities to develop a regional conservation strategy for the butterfly.
- **Pines Campground Capital Improvement.** On July 16, 2002 the Service issued a formal conference report on the proposal to reconstruct Pines Campground to improve or replace existing facilities and decrease camp capacity by 100 persons. The project also included construction of a fence to provide an area of protection and interpretation for the butterfly. In total the project intended to cover approximately 10.5 acres of occupied butterfly habitat, and foresaw the elimination of some larval food and adult host plants. The conference opinion issued a finding of not likely to jeopardize the butterfly or adversely modify critical habitat. As conservation measures, the Service recommended that USFS (1) work cooperatively with other entities to develop a regional conservation strategy for the butterfly, (2) routinely monitor and report campground use, (3) determine which grazing allotments overlap with the butterfly and whether grazing is affecting the butterfly, and initiate formal or informal conferencing based on their determinations, (4) provide an annual report to the New Mexico Ecological Services Field Office to update and review butterfly monitoring data and report on the implementation status of all reasonable and prudent measures and terms and conditions provided in all previous conference opinions.

77. The USFS also conducted a biological study of the butterfly of it's own initiative. The study was completed at a cost of \$30,000 to the USFS.
78. This analysis measures impacts of conservation measures associated with the butterfly pre-listing and designation of critical habitat. Typically pre-designation impacts include all management efforts that have occurred since the time of listing, however, the butterfly has not been listed but was proposed for listing in September 2001. The costs incurred by the USFS associated with conference opinion and conservation measures associated with the butterfly since 2001 is \$100,000.³⁹

4.2 Post-Designation Impacts

79. This section forecasts costs that may occur after the designation is finalized in September 2004 through 2024. It discusses future management actions involving species and habitat protection, including a discussion of the types of economic impacts associated with each component of these management actions.

4.2.1 Conservation Strategy

80. The Service, Otero County, Village of Cloudcroft, USFS, and other stakeholders are working on a conservation plan for the butterfly.⁴⁰ The goal of this plan is to establish the conservation measures needed for the continued existence of the butterfly. The conservation plan is currently in draft form and is expected to be released to the public in late 2004 for comment. The plan will address commercial and private development, catastrophic wildfire, domestic livestock grazing, recreation including OHV use, and roads. Conservation actions may include:

- weed and pest control practice guidelines;
- decrease risk of catastrophic wildfire;
- manage campgrounds near habitat;
- inventory meadows and assess whether closures of meadows to OHV use are necessary;
- develop appropriate grazing regimes on Lincoln National Forest;
- control habitat loss due to rural development;
- curtail expansion of the Village of Cloudcroft into butterfly meadows;

³⁹ Personal communication with Danney Salas, Lincoln National Forest District Biologist, June 14, 2004a.

⁴⁰ Personal communication with Service personnel, Southwest Ecological Services Regional Office, June 16, 2004.

- land transfers of butterfly habitat from the Village of Cloudcroft to USFS;
- implement local ordinances to establish green belts and open space;
- develop Partners for Fish and Wildlife projects;
- restore habitat and watersheds;
- conduct research to inform management;
- conduct a natural history study;
- conduct surveys;
- monitor the status of species, habitat, and threats;
- education and outreach;
- develop an interpretive kiosk at Pines campground;
- develop outreach and education programs for the local community; and
- provide adequate regulatory protection.

81. Because the plan is in the draft planning stage the economic costs of implementing potential conservation measures (the list above includes potential measures discussed in the draft plan) are not estimated in this analysis. Measures associated with the conservation strategy are anticipated to be similar to those forecast in this analysis (i.e., conservation measures associated with the butterfly within the critical habitat designation). Potential costs of the strategy are expected to be associated with conservation actions undertaken by government entities.

82. This analysis does estimate the costs to develop the conservation strategy. The Service anticipates the internal efforts to develop the conservation strategy may cost \$15,200. USFS expects efforts to develop the conservation strategy are likely to range from \$12,700 to \$13,100.⁴¹ Otero County estimates efforts to develop the conservation strategy may be \$7,000.⁴² The Village of Cloudcroft expects to incur costs of \$15,000 to develop the conservation strategy. Thus, total costs to develop the conservation strategy may range from \$49,900 to \$50,200.

⁴¹ Personal communication with Rene Guaderrama, Wildlife Biologist, Sacramento District, Lincoln National Forest, U.S. Forest Service, June 23, 2004.

⁴² Personal communication with Michael Nivision, Otero County Commissioner, June 23, 2004.

4.2.2 Residential and Commercial Development

83. Two categories of impacts are investigated in this section, 1) impacts related to residential development projects; and 2) impacts related to the Village of Cloudcroft and Otero County ordinances.

4.2.2.1 Development Projects

84. In recent years, approximately eight to 10 new homes have been constructed annually within the boundary of the proposed designation. This trend is expected to continue in the foreseeable future.⁴³ In the future, new construction in suitable butterfly habitat may occur.⁴⁴ As a result, the potential exists for butterfly conservation efforts to affect small-scale development projects of one to three lots per project.⁴⁵ The following section estimates the number of development projects expected to be built in suitable butterfly habitat that may be impacted by butterfly conservation measures.
85. Two Federal agencies, the EPA and the USACE, have jurisdiction within the proposed butterfly designation. EPA is the sole permitting authority for the National Pollutant Discharge Elimination System (NPDES) in New Mexico until 2006, at which time permitting authority will be transferred to the State of New Mexico. A review of current NPDES permit applications for general construction and industrial facilities revealed that, as of June 2004, no pending permits will require a Federal storm water permit within the proposed designation.⁴⁶ Furthermore, a review of EPA-permitted construction within Otero County revealed that no permits have been issued within the proposed designation since 1992. On the basis of this record, EPA anticipates that up to one permit request may occur within the critical habitat designation prior to the transfer of EPA authority to the State of New Mexico.⁴⁷ Should the butterfly be listed and critical habitat designated, EPA anticipates that either a formal or informal consultation with the Service could occur.⁴⁸ Cost estimates for this potential future consultation are provided below. The USACE also has jurisdiction within the proposed designation. However, USACE reports that no civil works activities or other development projects are scheduled within the proposed designation within the next twenty years.⁴⁹

⁴³ Personal communication with Michael Nivison, Otero County Commissioner, June 10, 2004.

⁴⁴ Ibid. Personal communication with Service personnel, July 9, 2004.

⁴⁵ Personal communication with Service personnel, July 8, 2004. In addition, the potential for future impacts to non-federally permitted large scale subdivision development is low (the one parcel of suitable size within the proposed designation that is privately owned is in the middle of an existing golf course). Nivison, 2004.

⁴⁶ EPA, Region 6. Storm Water General Permit Database, accessed at: <http://www.epa.gov/earth1r6/6en/w/sw/data.htm>

⁴⁷ Personal communication with Taylor Sharpe, EPA Region 6 Compliance Assurance and Enforcement, Water Enforcement Branch, June 14, 2004.

⁴⁸ Personal communication with Denise Hamilton, EPA, June 15, 2004. Administrative costs are for EPA are expected to be \$3,000 per permit.

⁴⁹ Personal communication with William DeRagon, Biologist, U.S. Army Corps of Engineers, Environmental Resources Branch, June 03, 2004.

86. For all development projects in meadow habitat, the Service anticipates recommending conducting butterfly surveys.⁵⁰ If habitat in the construction area is determined to be occupied by the butterfly, the Service anticipates the landowner will develop a HCP if no Federal nexus is present.⁵¹ To calculate the number projects likely to be affected by butterfly conservation efforts, this analysis makes a series of assumptions:

- Approximately eight to ten small-scale development projects will be commenced annually within the critical habitat boundary.
- One of these projects will require a Federal permit and undergo a consultation. The remaining projects are not expected to have a Federal nexus. This analysis assumes that the Service will encourage surveys and development of HCPs for these projects.
- Surveys will be recommended for approximately 34 percent of projects within the critical habitat boundary. This assumption is based on the ratio of privately-owned acreage within the critical habitat boundary (7,416 acres)⁵² to the privately-owned acreage that the Service considers to be suitable butterfly habitat (2,553 acres).⁵³
- Of the surveys conducted, 15 percent to 35 percent will find butterflies and will therefore complete a HCP. This assumption is based on Forest Service data, as cited in the proposed rule, which indicates that 15 percent to 35 percent of the total acres of suitable habitat is used by the butterfly.⁵⁴ This range encompasses the estimated 23 to 29 percent of potential habitat that the Service estimates is occupied by the butterfly.⁵⁵

87. Thus, over the next 20 years, approximately 160 to 200 small-scale residential projects may occur within the butterfly critical habitat boundary. Of these, 55 to 69 may require butterfly surveys. Eight to 24 of those areas surveyed may be found to be in use by butterflies. This analysis assumes one project will have a Federal nexus, and the rest of the projects will not. As a result, this analysis assumes that seven to 23 HCPs will be developed, and one formal consultation will be conducted.

⁵⁰ Personal communication with Service personnel, July 9, 2004.

⁵¹ Ibid.

⁵² Based on an analysis of available Geographic Information System (GIS) maps of the proposed critical habitat designation for the Sacramento Checkerspot butterfly provided by the Service Ecological Services Field Office in Albuquerque. U.S. Fish and Wildlife Service.

⁵³ U.S. Fish and Wildlife Service, *Proposed Endangered Status for the Sacramento Mountains Checkerspot Butterfly and Proposed Designation of Critical Habitat*, Federal register, Vol. 66, No. 173, September 6, 2001.

⁵⁴ U.S. Fish and Wildlife Service, *Proposed Endangered Status for the Sacramento Mountains Checkerspot Butterfly and Proposed Designation of Critical Habitat*, Federal register, Vol. 66, No. 173, September 6, 2001.

⁵⁵ Ibid.

88. **Survey Costs.** A biological survey is anticipated to cost third parties \$4,900 to \$7,000 per effort, and the Service is assumed to incur up to \$400 for survey review.⁵⁶ As a result, the total costs associated with butterfly surveys over the next 20 years are estimated to range from \$269,900 to \$509,500.
89. **HCP Costs.** Based on the findings above, seven to 23 HCPs may be completed over the next 20 years. According to the Service's regulations, the HCP applicant would be required to minimize or mitigate the impact to the species.⁵⁷ To calculate the costs associated with completing HCPs, this analysis makes a series of assumptions:
- The administrative costs to develop a HCP for an individual landowner are similar to the costs to complete a formal consultation (for Service and the third party costs, see Exhibit 4-1).
 - The costs of mitigation per project will be \$2,700 to \$3,400 based on the following:
 - A mitigation ratio of one to one (i.e., for every acre of habitat disturbed one acre will be set aside) is likely to be recommended.⁵⁸
 - The typical size of the impact is equal to the median lot size in the Cloudcroft area (0.34 acres).⁵⁹
 - The average price of an acre of meadow is \$8,000 to \$10,000.⁶⁰
90. Using these assumptions, the total administrative costs associated with completing seven to 23 HCPs over the next 20 years are expected to range from \$72,600 to \$365,100.⁶¹ Total project modification costs are expected to range from \$19,800 to \$79,000 over the same time period. Thus, the total costs associated with HCPs developed for the butterfly are expected to range from \$92,500 to \$444,000.
91. **Consultation costs.** As stated above, EPA estimates that, at most, one formal consultation on a small-scale residential development project is likely within the critical habitat boundary over the next 20 years. The costs associated with this are expected to be

⁵⁶ Estimate based on personal communication with Biologists, Dudek and Associates, Encinitas, California, April 30, 2001. Information was collected for Industrial Economics, Incorporated, *Draft Economic Analysis of Proposed Critical Habitat Designation for the Quino Checkerspot Butterfly*, prepared for the U.S. Fish and Wildlife Service, June 2001.

⁵⁷ (50 CFR 17.22)

⁵⁸ Personal communication with Service personnel, August 2, 2004.

⁵⁹ Green Mountain Real Estate, Inc. Woodlands Development advertisement in the Mountain Monthly July 2004. Gary Mack Real Estate Property Listing accessed at <http://www.gmackre.com/unccw14.htm> on July 28, 2004.

⁶⁰ Personal communication with local realtor, Gary Mack Real Estate, July 28 2004.

⁶¹ The cost of developing a HCP for a private landowner is expected to be similar to conducting a formal consultation, without the action agency cost.

\$13,000 to \$18,800 for the administrative costs to all parties to conduct the consultation. EPA does anticipate that project modifications may be associated with this potential consultation, but is unsure at this time what those modifications would be. This analysis therefore assumes that this project will incur mitigation costs similar to HCP mitigation costs or \$2,700 to \$3,400. Thus, total costs anticipated to be incurred as a result of this consultation are expected to range from \$15,700 to \$22,200.

4.2.2.2 Development Impacts of Local Ordinances

92. The Village of Cloudcroft has implemented local zoning regulations related to open space which may benefit the butterfly. The Village of Cloudcroft's Village Code document (Chapter 7 of the Village Code – Greenbelt Zones Use Regulations G-1 Zone), states that Greenbelt Zones shall consist of open space with no structures or commercial signs allowed.⁶² In addition, there shall be no overnight parking or camping allowed within these areas.⁶³ The Village of Cloudcroft will implement greenbelts in any annexed lands. Because this zoning regulation applies only to annexed lands it is not anticipated to impact future residential development.
93. Otero County is in the process of considering an ordinance that may require green belt or open space set-a-sides for new subdivision development within the county.⁶⁴ This ordinance may affect any lots divided in two within critical habitat for any endangered species, including the butterfly.⁶⁵ Butterfly conservation impacts on residential development associated with this ordinance are unknown.

4.2.3 Forest Service Activities

94. The USFS owns 2,645 acres of butterfly habitat within the boundaries of critical habitat. USFS activities including recreation, livestock grazing, land transfers, fire management, road projects, herbicide and insecticide application impact the butterfly and habitat. The following sections discuss each of these activities and the potential impacts associated with conservation measures for the butterfly.

4.2.3.1 Recreation

95. Recreation on the Lincoln National Forest is an important part of the local economy. The main recreational activities that take place in Lincoln National Forest include camping, skiing, mountain biking, dirt biking, hiking, and OHV use. The USFS anticipates conservation measures for the butterfly may impact camping within managed campgrounds, dispersed camping, OHV special events, and skiing.⁶⁶

⁶² Ordinance 277A, 8-10-1999; amd. 2000 Code.

⁶³ Ordinance 277A, 8-10-1999.

⁶⁴ Personal communication with Dan Bryant, Otero County Attorney, August 9, 2004.

⁶⁵ New Mexico law a subdivision is the division of land into two or more parcels. New Mexico Statutes Ann. Chapter 47 Article 6 Section 2.

⁶⁶ Personal communication with Danney Salas, Lincoln National Forest District Biologist, May 28, 2004.

- **Campgrounds. One formal consultation** is anticipated regarding campground renovation. Conservation measures for the butterfly may include a reduction in the number of camping sites, season restrictions for construction, monitoring of construction, and surveying for the butterfly, on the five campgrounds slated for renovations (Sleepy Grass, Black Bear Group, Aspen Group, Deerhead, and Slide Group). Increased costs are anticipated to be associated with construction monitoring and surveying, these costs are included in the \$35,000 surveying and monitoring costs estimated by the USFS for all projects, discussed below in the summary section. The main driver for the reduction in the number of campsites is handicap accessibility concerns, not concerns for the butterfly. Historically, conservation measures for the butterfly did not reduce the number of sites but dictated the location of the new sites. The additional costs associated with site relocation is expected to be minimal.
- **Dispersed Camping. One formal consultation** is anticipated regarding dispersed camping. Dispersed camping visitors tend to return to the same sites year after year. Those sites tend not to be in meadows, tend to be denuded, and are not likely to be butterfly habitat. Conservation measures for the butterfly may include posting educational signage informing visitors not to camp in meadows. Signs can range from \$2,500 to \$5,000, and 20 signs are likely to be posted. Thus, the total costs associated with project modifications for dispersed camping are expected to range from \$50,000 to \$100,000.
- **ORV Special Events.** Approximately 40 formal consultations are anticipated regarding ORV special events by USFS, that is two formal consultations annually regarding the established motorcycle and High Altitude Classic Mountain Bike races. The Service anticipates two programmatic consultations in 2005, one regarding the motorcycle race and one regarding the mountain bike race. Therefore, **2 programmatic to 40 formal consultations** may be completed regarding ORV special events. Project modifications are not anticipated if established routes are not modified, and changes in the established routes are not anticipated.
- **Skiing.** Most of the Ski Cloudcroft ski area is located on land owned by the Village of Cloudcroft (80 percent), about 20 percent is located on USFS land. The portion located on USFS land is currently not occupied by butterfly. There is currently an agreement between the USFS and the Service for the continued maintenance of existing roads and water ditches. The USFS does not anticipate additional costs associated with maintenance of existing roads and water ditches under this agreement.
- **Hiking.** No impacts to hiking are anticipated.

96. Therefore, **2 formal and 2 programmatic to 42 formal consultations** are anticipated regarding recreation activities on USFS land over the next 20 years. The administrative cost associated with these activities is expected to range from \$80,400 to \$936,600, and project modifications are expected to range from \$50,000 to \$100,000.

4.2.3.2 Livestock Grazing

97. Livestock grazing is an important economic activity in the area of the designation and residents have expressed concern that the butterfly conservation activities may limit livestock grazing on USFS land.⁶⁷ There are portions of eight range allotments within the proposed critical habitat boundary. They are:

- *La Luz Watershed*. Not currently grazed due to soil concerns.
- *James Canyon*. Not currently grazed but may be grazed in the future.⁶⁸ As proposed, up to 70 head of cattle may be permitted for this allotment.⁶⁹ Grazing may occur for three to four months of the year. The utilization of forage may be 35 percent. Two separate entities may gain permits to graze this allotment.
- *Heliport Horse Pasture*. USFS administrative buildings are located on this allotment. The pasture is used for two months in the summer for USFS horses.⁷⁰
- *Pines Horse Pasture*. This area is used for the same horses that utilize Heliport Horse Pasture.
- *Walker C.C.* Currently permitted for 69 head of cattle.⁷¹ The utilization of forage is 35 percent. One entity holds the grazing permit for this allotment; this permittee also holds the permit to Pumphouse and South La Luz.
- *Pumphouse*. Currently permitted for 64 head of cattle. The permitted utilization of forage is 35 percent. This range allotment is grazed from May 15 to October.⁷² The permittee also holds the permit to South La Luz and Walker CC. The grazing permit is held by a single permittee at this time, and this permit is likely to be re-issued by September 2004.
- *Russia Canyon*. Currently permitted for 38 head of cattle. The permitted utilization of forage is 35 percent. Two entities hold permits to this allotment. The permit is likely to come up for re-issuance as the permit is being transferred within the family.⁷³

⁶⁷ Personal communication with R.L. Posey, Posey Springs Ranch, June 8, 2004. Salas, 2004.

⁶⁸ Salas, 2004.

⁶⁹ Personal communication with Rick Newman, Lincoln National Forest, Sacramento Ranger District, June 7, 2004.

⁷⁰ Salas, 2004.

⁷¹ Newman, 2004.

⁷² Salas, 2004.

⁷³ Newman, 2004.

- *Sacramento*. Not currently grazed within the boundaries of critical habitat for the butterfly, as it is inaccessible to cattle.

98. Of these range allotments Sacramento, Pumphouse, James Canyon, Russia Canyon, and Walker CC are expected to undergo consultation. A consultation regarding Sacramento concluded in early 2004. Pumphouse and James Canyon are expected to complete consultations in 2004. Russia Canyon is expected to undergo consultation in 2005-2006. Walker CC is expected to undergo consultation in 10 years. Each allotment is expected to undergo consultation with each permit review, every 10 years. Therefore, **12 formal consultations** regarding ranching allotments are anticipated over the next 20 years. The administrative costs associated with livestock grazing consultations are forecast to range from \$166,800 to \$267,600, borne by the Service, USFS, and ranchers.
99. Livestock grazing has an unknown effect on the butterfly and its habitat. Potential project modifications may include a reduction in forage utilization; however, a reduction in available grazing area is expected. On the pumphouse allotment 10 acres are expected to be excluded from domestic livestock grazing, and about half of the James Canyon allotment, including occupied and unoccupied meadow habitat, is expected to remain ungrazed.⁷⁴
100. To calculate the impact of reduced grazing on Federal lands this analysis first converts head of cattle to animal units months (AUMs). This is done by multiplying the number of head by 1.5 for each month cattle are grazed in each allotment.⁷⁵ To estimate the impact of reducing forage this analysis determines the proportion of grazing which may occur on 10 acres of the Pumphouse allotment and half of the James Canyon allotment.⁷⁶

⁷⁴ Personal communication with Service personnel, July 12, 2004.

⁷⁵ Assuming one calf per cow and a monthly requirement of 0.5 AUMs per calf. Lewandrowski, Jan and Kevin Ingram. Restricting Grazing on Federal Lands in the West to Protect Threatened and Endangered Species: Ranch and Livestock Sector Impacts. Review of Agricultural Economics, Volume 24, Number 1 (78-107). Unless otherwise stated assume cattle are grazed year round.

⁷⁶ This analysis assumes grazing is evenly distributed throughout the entire range allotment. The amount of grazing which may be affected is calculated by multiplying the head of cattle permitted for the allotment by the proportion of the total expected to be excluded. This proportion is based on an analysis of available Geographic Information System (GIS) maps of the proposed critical habitat designations for the Sacramento Mountains Checkerspot butterfly provided by the Service Ecological Services Field Office in Albuquerque.

Exhibit 4-2
AUMs POTENTIALLY IMPACTED BY CONSERVATION
MEASURES FOR THE BUTTERFLY

Range Allotment	AUMs in Range Allotment	Total AUMs Potentially Impacted by the Butterfly
La Luz Watershed	None	None
James Canyon	420	210
Heliport Horse Pasture	None	None
Pines Horse Pasture	None	None
Walker C.C.	1,242	None
Pumphouse	480	1
Russia Canyon	684	None
Sacramento	None	None
Total	2,826	211

Note: Totals may not sum due to rounding.

Value of Federal Grazing Permits

101. A 1970 court decision (*Pankey Land and Cattle Co. V. Hardin and Hickel*, 427 F.2d 43 10th Cir. 1970) formed the basis for the government’s position that ranchers “are not given title to the grazing resource and as such do not own a property right or have a corresponding economic right to permit value.”⁷⁷ Nonetheless, numerous published studies have found that a rancher holds a value for holding a Federal grazing permit, which he holds whether or not he has title to the permit, and whether or not he sells his property.⁷⁸ Thus, this analysis assumes that value, in terms of rancher wealth, is lost to a rancher when he is forced to reduce his AUMs grazed (regional livestock production loss and regional economic impacts are discussed later in this section). This lost rancher wealth is measured in terms of lost value of his grazing permit.

102. Numerous published articles have focused on the derivation of permit value for Federal grazing permits. For example, Torell et al. states that “permit value represents the only available direct valuation of public land forage, except for a few scattered instances where public land is competitively leased. Using an appropriate capitalization rate, annualized estimates of forage value can be determined from the observed permit value.”⁷⁹ In a summary of recommended forage valuation methods, the author states that “permit values provide a direct and site-specific estimate of forage value. Theoretically, this estimate should provide a site-specific estimate of value while considering the

⁷⁷ Torell et al. “The Market Value of Public Land Forage Implied from Grazing permits.” Current issues in Rangeland Economics: 1994. Western Research Coordinating Committee 55: Range Economics, 1994.

⁷⁸ “The general observation is that public land grazing permits do have market value,” Torell et al. “The Lack of Profit motive for ranching: Implications for policy analysis.” Current issues in Rangeland Economics, Western Coordinating Committee 55 (WCC-55), 2001. See also Torell and Doll 1991. Rowan and Workman, 1992, Sunderman and Spahr 1994, Spahr and Sunderman 1995, Torell and Kincaid, 1996

⁷⁹ Torell et al. “The Lack of Profit Motive for Ranching: Implications for Policy Analysis.” Current issues in Rangeland Economics, Western Coordinating Committee 55 (WCC-55), 2001.

inherent production characteristics, regulations, and economic potential of specific allotments.”⁸⁰ This paper notes, however, that this method has yielded inconsistent results, and permit values have been affected by factors other than ranch economics. Bill Stern of University of Montana describes permit value this way:

*To clearly understand permit value, it is necessary to have a clear understanding of the benefits that leasing a public land grazing allotment have to a ranching operation. The fundamental benefit is that such a lease provides a source of relatively secure forage that allows the operation to run more cattle...In most cases, as long as [ranchers] follow the legal requirement of their leases, they can keep their leases for decades. In some areas, forage from allotments is also difficult to replace, simply because the surrounding pastures are in use. This makes ranchers feel dependent on their allotments. Further, even if it is available, replacement forage is usually more expensive than running stocks on an allotment.*⁸¹

103. As defined in a public comment on Draft Economic Analysis of Critical Habitat for the MSO from the New Mexico Department of Agriculture, “permit value is essentially a measure of rancher wealth based on the number of federally permitted AUMs he is allowed to graze, the value of the Federal grazing fee, and the private property rights owned by the permittee.”⁸² Exhibit 4-3 presents the results of nine recent studies that attempt to measure the permit value of Federal grazing (per AUM).

Exhibit 4-3				
SUMMARY OF RELEVANT PERMIT VALUE ESTIMATES				
(1985-present)				
Study	Method	Years	Location	\$/AUM (2002\$)
Rowen & Workman	Regression	1975-1987	Utah	\$31
Torell & Doll	Regression	1979-1988	New Mexico	\$93
Rowen & Workman	Regression	1980-1988	Utah	\$58
Torell & Kincaid	Various	1988	New Mexico	\$96
Torell et.al.	Regression	1992	New Mexico	\$87
Kincaid	Regression	1987-1994	New Mexico	\$95
Torell & Kincaid	Various	1994	New Mexico	\$69
Torell et.al.	Case studies	2002	Idaho, Nevada, Oregon	\$92
Average				\$78

Values adjusted to 2002 using "Table B-3: Quantity and price indexes for gross domestic product, and percent changes, 1959-2003 dollars." *Economic Report to the President*, Department of Commerce, Bureau of Economic Analysis, 2003. Sources: Stern, Bill S. "Permit Value: A Hidden Key to the Public Lands Grazing Dispute," University of Montana, Master of Science thesis, 1998; Torell et al., "Ranch level impacts of changing grazing policies on BLM land to protect the Greater Sage-Grouse: Evidence from Idaho, Nevada, and Oregon." Policy Analysis Center for Western Public Lands, Policy Paper SGB01B02, 2002.

⁸⁰ Torell, L. Allen et al. "Theoretical Justification and Limitations of Alternative Methods Used to Value Public Land Forage." 1994. Western Research Coordinating Committee 55: Range Economics, 1994.

⁸¹ Stern, Bill S. *Permit Value: A Hidden Key to the Public Lands Grazing Dispute*, University of Montana, Master of Science thesis, 1998.

⁸² Private property referred to here are private land values. Public comment on Draft Economic Analysis of Critical Habitat for the MSO from Julie Maitland, Division Director, New Mexico Department of Agriculture, April 26, 2004.

104. In one of the above case studies, the Policy Analysis Center for Western Public Lands estimates ranch-level annual economic income losses associated with grazing forage reductions at \$3 to \$10 per AUM,⁸³ which translates to approximately \$42 to \$142 per AUM permit value in perpetuity at a seven percent discount rate. The range of values in the permit value studies in Exhibit 4-3 is likely to result from variations in study method, region, availability of substitutes, capitalization rate, and other factors. This analysis adopts estimated value per AUM as the average of the permit value studies above, or \$78 per AUM.
105. This analysis estimates that the present value, at a rate of seven percent, of permit value losses that may result from butterfly conservation activities may be \$16,400 in perpetuity (\$1,600 annually when a seven percent discount rate is used) (2003 dollars).⁸⁴ This estimate of lost permit value on USFS lands relies on the following assumptions:
- The number of AUMs excluded is proportional by acreage to the total number of AUMs grazed in that allotment. This assumption may misstate the number of AUMs that occur in butterfly habitat because grazing may not be evenly distributed, or small reductions in available forage may not impact overall production levels.
 - The permit value for USFS livestock grazing permits is \$78 per AUM (2002 dollars) (based on the literature review above).

Regional Economic Impacts

106. The above estimates state that approximately 211 AUMs or 35 head of cattle may be lost from butterfly critical habitat annually. This estimated annual reduction in grazing anticipated to result from butterfly conservation measures represents about 0.2 percent of the cattle grazed in Otero County (approximately 21,000).
107. To assume that a reduction in AUMs in butterfly critical habitat areas will result in an accompanying decrease in livestock production requires the assumption that no substitutions in forage will be made to adjust for the reductions in AUMs authorized in butterfly critical habitat. This is unlikely, given the well-documented behavior of ranchers wishing to maintain existing herds. For example, Rimbey et al. states that when faced with changes to public forage availability, ranchers “would do everything they could do to maintain their existing herd. Depending upon when the reductions occurred during the year, the ranchers identified alternatives for maintaining herd size and remaining in business: purchase (or not sell) additional hay (to replace forage in winter, early spring or late fall), and look for private pasture and rangeland leases (summer forage). The last alternative mentioned by ranchers was the reduction in the number of

⁸³ Torell et al., "Ranch level impacts of changing grazing policies on BLM land to protect the Greater Sage-Grouse: Evidence from Idaho, Nevada, and Oregon." Policy Analysis Center for Western Public Lands, Policy Paper SGB01B02, 2002.

⁸⁴ Approximately \$2,400 to \$4,400 annually when a three percent discount rate is used.

cattle they would run on their ranches.”⁸⁵ Torell et al. state that “given the stated and observed desire to remain in ranching, perhaps the most reasonable assumption for policy analysis is that western ranchers will continue in business until forced to leave.”⁸⁶ In another example, Rowe et al states that “in general, ranchers favor finding alternatives to Federal forage rather than selling their ranch if faced with reductions in Federal forage.”⁸⁷ Thus, given observed rancher behavior, it is unclear that a reduction in permitted or authorized AUMs of Federal allotments in butterfly critical habitat would necessarily lead to a reduction herd size, as long as replacement forage is available.

108. However, it is possible that substitute forage is not available, or supplemental forage is prohibitively expensive. This analysis assumes that AUMs will be reduced as a result of butterfly conservation (i.e., effectively assuming that no replacement forage is available). The analysis captures the value of these losses to rancher wealth by assuming that ranchers lose the value of AUMs reduced on Federal lands. While assuming a region-wide reduction in AUMs equal to that estimated in the analysis is clearly conservative (i.e., more likely to overstate costs than understate costs), it provides additional context for the reader who wishes to understand the potential impacts to the regional economy.
109. To estimate the regional economic impact of grazing restrictions, the analysis first estimates the number of head likely to be lost annually as a result of butterfly conservation measures. Direct effects are calculated by estimating loss in livestock production based on number of head potentially reduced. Next, the analysis utilizes IMPLAN to estimate indirect and induced impacts on the region in terms of output and jobs.

Running the IMPLAN Model

110. For the purposes of this regional economic impact analysis, the study area includes Otero County. The study area includes only the county in which butterfly critical habitat is proposed. The socioeconomic characteristics of Otero County are discussed in Section 2.
111. The restrictions in grazing activity would primarily affect the livestock sectors of the economy. Decreased operations in these industries would also result in secondary effects on related sectors in the study area. Some of these related sectors may be closely

⁸⁵ Rimbey, Neil, Tim Darden, L. Allen Torell, John Tanaka, Larry Van Tassell, and J.D. Wulfhorst. “Ranch Level Economic Impacts of Public Land Grazing Policy Alternatives in the Bruneau Resource Area of Owyhee County, Idaho.” Agricultural Economics Extension Series No. 03-05, University of Idaho, College of Agricultural and Life Sciences, June 2003.

⁸⁶ Torell, L. Allen. et al, “The Lack of Profit Motive for Ranching: Implications for Policy Analysis.” *Current Issues in Rangeland Resource Economics, Proceedings of a Symposium Sponsored by Western Coordinating Committee* 55 (WCC-55), February 2001.

⁸⁷ Rowe, Helen I., Matt Shinderman, and E.T. Bartlett. “Change on the range.” *Rangelands* 23 (2), April 2001.

associated with the livestock, such as feed grains and hay and pasture; while others may be less closely associated with the industry, such as the insurance sector.

112. This analysis relies on regional economic modeling to estimate the economic impacts of these initial and secondary effects. In particular, it utilizes a software package called IMPLAN to estimate the total economic effects of the reduction in economic activity in the livestock-related industries in the study area. IMPLAN is commonly used by State and Federal agencies for policy planning and evaluation purposes. The model draws upon data from several Federal and State agencies, including the Bureau of Economic Analysis and the Bureau of Labor Statistics.

113. IMPLAN translates initial changes in expenditures into changes in demand for inputs to affected industries. These effects can be described as direct, indirect, or induced, depending on the nature of the change:

- *Direct effects* represent changes in output attributable to a change in demand or a supply shock. These are specified initially by the modeler (e.g., the change in recreation expenditures on goods and services, by sector);
- *Indirect effects* are changes in output of industries that supply goods and services to those that are directly affected by the initial change in expenditures; and
- *Induced effects* reflect changes in household consumption, arising from changes in employment (which in turn are the result of direct and indirect effects). For example, changes in employment in a region may affect the consumption of certain goods and services.

114. These categories are calculated for all industries and aggregated to determine the regional economic impact of grazing restrictions resulting from butterfly-related conservation efforts.

Regional Economic Impact Estimates

115. The calculation of the direct effect of reduced AUMs on annual livestock production are estimated to be \$26,500 annually, and are presented in Exhibit 4-4. This calculation is based on the expected reduction in number of head of cattle in each range allotment where grazing area may be reduced due to concerns for the butterfly. The number of cattle potentially affected is then multiplied by the five-year average value of livestock production per head in New Mexico (\$756).⁸⁸

⁸⁸ Value of all cattle and calves per head (dollars), 1999-2003. New Mexico Agricultural Statistics, accessed at http://www.nass.usda.gov/nm/nmbulletin/29_02.pdf, on June 14, 2004.

Exhibit 4-4			
CALCULATION OF DIRECT EFFECT OF GRAZING REDUCTIONS ON LIVESTOCK PRODUCTION (ANNUAL)			
Range Allotment	Estimated Reduction in Head of Cattle	Value of Livestock Production (per Head)*	Total Livestock Production Loss (Annual)**
James Canyon	35	\$756	\$26,460
Pumphouse	0.1	\$756	\$74
Total	35		\$26,534

*Based on the five year average of a head of cattle in New Mexico. From the 2002 New Mexico Agricultural Statistics, accessed at http://www.nass.usda.gov/nm/nmbulletin/29_02.pdf, on June 14, 2004.

**Totals may not sum due to rounding.

116. Exhibit 4-5 presents the results of the IMPLAN analysis. The reduction in livestock production as a result of AUM reductions is shown to result in an annual reduction of \$33,000 in regional output and a loss of one job across all sectors of the economy. This impact represents approximately 0.5 percent of total output from the livestock sector in this region and 0.5 percent of regional employment in the livestock sector.⁸⁹

Exhibit 4-5				
REGIONAL ECONOMIC IMPACT OF REDUCTIONS IN LIVESTOCK PRODUCTION (ANNUAL)*				
Management Unit	Direct Effect (Output/ Employment)	Indirect Effect (Output/ Employment)	Induced Effect (Output/ Employment)	Total Impact (Output/ Employment)**
James Canyon	\$23,814	\$1,721	\$7,321	\$32,857
	0.77	0.06	0.15	0.97
Pumphouse	\$66	\$5	\$20	\$91
	0.00	0.00	0.00	0.00
Total Output Loss (\$)	\$23,880	\$1,726	\$7,341	\$32,948
Total Employment Loss (Jobs)	0.77	0.06	0.15	0.98

* Regional economic impact measures represent one-time changes in economic activity (i.e., not present values); thus, these estimates represent annual losses.

**Totals may not sum due to rounding.

117. There are two important caveats relevant to the interpretation of IMPLAN model estimates, generally, and within the context of this analysis. The first is that the model is static in nature and measures only those effects resulting from a specific policy change (or the functional equivalent specified by the modeler) at a single point in time. Thus, IMPLAN does not account for posterior adjustments that may occur, such as the subsequent re-employment of workers displaced by the original policy change. In the present analysis, this caveat suggests that the long-run net output and employment effects resulting from grazing restrictions are likely to be smaller than those estimated in the model, which implies an upward bias in the estimates. A second caveat to the IMPLAN analysis is related to the model data. The IMPLAN analysis relies upon input/output

⁸⁹ These data are from IMPLAN for the Range-Fed, Ranch-Fed and Cattle Feedlots livestock sectors.

relationships derived from 1998 data. Thus, this analysis assumes that this historical characterization of the affected county economy is a reasonable approximation of current conditions. If significant changes have occurred since 1998 in the structure of the economy of Otero County, the results may be sensitive to this assumption. The magnitude and direction of any such bias are unknown.

4.2.3.3 Land Transfers

118. The USFS is currently involved in two potential land transfers involving butterfly habitat with the Village of Cloudcroft. As discussed in Section 2.3.2 considerations for the butterfly have reduced the acreage of the proposed transfer by 20 percent. The USFS has offered the Village 80 acres of land for purchase but to date, the Village has not purchased the land. Three of the 80 acres being offered to Cloudcroft are occupied butterfly habitat. **One formal consultation** may be required if Cloudcroft purchases the 80 acres. This proposal is not likely to change unless there is a drastic change in the land characteristics (e.g., fire) or the property is not purchased within five years and the proposal undergoes NEPA review. The reduction in the size of the land transfer may potentially reduce public use as any annexed lands are zoned as open space, however, the land is also available for public use under USFS management.⁹⁰
119. The USFS is also in the planning phase of a three-way proposal with the Village of Cloudcroft and the Otero County Electrical Cooperative to acquire 80 acres of butterfly habitat. As discussed in Section 2.3.2 land is currently owned by Cloudcroft adjacent to the Ski Cloudcroft ski area would be acquired by the USFS, the Village would in turn receive land in town currently owned by the Otero County Electrical Cooperative, and the Otero County Electrical Cooperative would acquire 40 acres of USFS land. **One informal consultation** may be required if the three way land transfer is conducted. This land transfer is expected to benefit the butterfly.
120. While the USFS, Otero County, and Village of Cloudcroft acknowledge future land transfers impacting the butterfly are possible none are currently planned.⁹¹ It is anticipated that any future land transfers would benefit the butterfly. Therefore, the total costs associated with land transfers are forecast to range from \$17,400 to \$36,200, the administrative costs of one informal and one formal consultations.

4.2.3.4 Fire Management

121. Re-consultation for Rio Penasco II and 16 Springs (a.k.a. Elk Canyon) fuels treatment projects are anticipated, thus **2 informal consultations** are expected.⁹² Fuels reduction may be impacted by conservation measures for the butterfly by reducing the acres of fuels treatment or timber sales. However, impact is not anticipated to be large as the number of acres anticipated to be impacted is modest. Conservation measures may

⁹⁰ Chapter 7 of the Village Code - Greenbelt Zones Use Regulations G-1 Zone.

⁹¹ Nivison, 2004. Salas, 2004.

⁹² The Service does not anticipate re-initiating the conference for Rio Penasco unless the USFS treatments change from what was originally proposed. Personal communication with Service personnel August 31, 2004.

include timing restrictions (seasonal limits on meadows crossing November to March) and habitat surveys. It is possible that the delay of treatments for several months could result in a decrease in the effectiveness of actions taken to reduce fire risk to surrounding communities. Timing restrictions are expected to increase the cost of thinning an acre by \$2 (typically it costs \$500 to \$600 to thin an acre of forest for fuels management purposes). The annual increased cost forest thinning 3,500 to 5,000 acres due to timing restrictions is \$7,000 to \$10,000. Thinning activities in butterfly habitat are expected to occur from 2004 to 2009 and 2015 to 2024. Thus, additional costs associated with timing restrictions are anticipated to range from \$98,000 to \$140,000 over the next 20 years. The administrative costs associated with these consultations are anticipated to range from \$4,600 to \$22,000.

4.2.3.5 Road Projects

122. No new road projects are proposed by the USFS in occupied habitat. The USFS does expect two to three access roads for private landowners will be constructed annually and will require special use permits. Right-of-way access for private landowners cannot be denied by the USFS so conservation measures are likely to include minimization of habitat disturbance, and season restrictions on construction. Any increase in costs associated with these measures would be borne by the landowner. Information is not available to estimate the potential cost, however, the costs are anticipated to be modest as each project is expected to have multiple siting options available. Therefore, **40 to 60 informal consultations** regarding special use permits for access roads are anticipated over the next 20 years. The administrative costs associated with road project consultations are forecast to range from \$140,000 to \$834,000.

4.2.3.6 Herbicide Application

123. In 2002 the USFS conferenced with the Service regarding a Noxious Weed Management Program. Conservation measures associated with herbicide application can increase the cost of management two to ten times depending on the density of noxious plants. Management of an acre with noxious weeds costs about \$90. Annually 20 acres are managed. Therefore, an annual increase in management costs of \$3,600 to \$18,000 is estimated, or \$72,000 to \$360,000 over the next 20 years.

4.2.3.7 Insecticide Application

124. **One programmatic consultation** is anticipated associated with insecticide application.⁹³ The administrative cost is anticipated to range from \$26,300 to \$35,500. Insecticide application guidelines are expected to be similar to noxious weed guidelines, including spot application techniques and measures to minimize drift if the application is

⁹³ Salas, 2004.

aerial.⁹⁴ These measures may be costly, however the USFS does not have enough experience with these types of projects to estimate potential impact.⁹⁵

4.2.3.8 Forest Management Plan

125. **One programmatic consultation** is anticipated associated with revising the Forest Management Plan to include recovery measures for the butterfly. The administrative cost associated with revising the Forest Management Plan is expected to range from \$26,300 to \$35,500. The Forest Management Plan calls for surveying and monitoring occupied habitat, these measures are associated with all USFS activities. These efforts are expected to cost \$35,000 a year, or \$700,000 over the next 20 years.⁹⁶

4.2.3.9 Summary of Forest Service Activities

126. Economic impacts are estimated for recreation, livestock grazing, land transfers, fire management, road projects, herbicide and insecticide application. Administrative cost are estimated to range from \$461,800 to \$2,167,400, and project modification costs are anticipated to range from \$936,400 to \$1,316,400 over the next 20 years. Therefore, total costs associated with USFS activities are anticipated to range from \$1,398,200 to \$3,483,800.

4.2.4 Road Construction and Maintenance

127. The proposed designation includes approximately 10 miles of US Highway 82. Future road activities along this stretch of U.S. 82 include routine maintenance, preventative maintenance, and reconstruction projects. Routine maintenance activities include pothole patching, guard rail repair, fence replacements, cattle-guard installations, roadside mowing and herbicide application, and restriping. These are frequent operations that are typically performed on an annual basis. Preventative maintenance activities include heater scarification, in which propane-fuelled flames are used to lift and relay the top two inches of the road, as well as a variety of road sealing activities. One of these activities may occur as often as every five years. Reconstruction projects are ground disturbing activities involving widening of the entire road through the addition of shoulders or lanes.
128. NMDOT expects that 11 maintenance and one reconstruction project may occur over the next twenty years.⁹⁷ No road construction or maintenance projects are planned by the Village of Cloudcroft or Otero County.⁹⁸ Therefore, **12 informal consultations** regarding NMDOT maintenance and road reconstruction projects are anticipated over the

⁹⁴ Personal communication with Service personnel, June 3, 2004.

⁹⁵ Salas, 2004.

⁹⁶ Salas, 2004.

⁹⁷ Personal communication with Gary Schubert, District 2 Engineer, New Mexico Department of Transportation, June 10, 2004.

⁹⁸ Nivison, 2004.

next 20 years. Administrative costs are expected to range from \$42,000 to \$166,800.⁹⁹ Project modifications are likely to be studies of the butterfly host plants, estimated at \$5,000 per effort. Thus, total project modification costs may be \$60,000.

4.2.5 Agriculture and Ranching

129. The NRCS provides cost-share and other Federal assistance to private ranchers and farmers for the establishment of environmentally sustainable land use practices. Typical conservation activities in the proposed critical habitat area include forest stand improvement, brush control, control of invasive species or noxious weeds, and wildlife habitat improvement. The NRCS may provide funding through voluntary partnership with private landowners under conservation programs such as Environmental Quality Incentives Program (EQIP). EQIP provides technical and financial assistance for the installation or implementation of structural and management conservation practices on agricultural land to farmers and ranchers who face particular land and water quality threats. In 2003 there were 42 EQIP projects impacting 25 to 30 ranches.¹⁰⁰ NRCS EQIP projects are anticipated to increase in the future as additional staff have been assigned to the area and additional funding is expected to become available.
130. NRCS anticipates **180 to 200 informal and 20 to 40 formal consultations** regarding EQIP projects over the next 20 years.¹⁰¹ The increased administrative burden associated with the butterfly may result in two to three projects annually not being undertaken. The total number of projects in the region would not be reduced, as projects would be shifted to lower elevation desert projects. Total administrative costs are anticipated to range from \$908,000 to \$3,672,000 over the next 20 years. Project modifications are not anticipated.

4.2.6 Utilities Construction and Maintenance

131. The Village of Cloudcroft is planning on constructing a water re-use pipeline along the Highway 82 right-of-way.¹⁰² This project would result in **1 informal consultation**.¹⁰³ Total administrative costs are anticipated to range from \$3,500 to \$13,900. A similar pipeline was constructed in 2002.¹⁰⁴ The conservation measures related to the pipeline constructed in 2002 for the butterfly were minimal (host plants were marked and avoided). Additional costs were also minimal, as the construction area did not approach the plants. An additional conservation measure associated with this

⁹⁹ Personal communication with Rand Morgan, Environmental Officer, New Mexico Department of Transportation, June 23, 2004.

¹⁰⁰ Personal communication with Dan Abercrombie, Natural Resources Conservation Service, Alamogordo District Conservationist, June 16, 2004.

¹⁰¹ Abercrombie, 2004.

¹⁰² Nivison, 2004.

¹⁰³ Nivison, 2004. Salas, 2004.

¹⁰⁴ Nivison, 2004.

project may be a construction season restriction of two weeks, which is expected to impose minimal economic burden.

132. The Otero County Electric Cooperative expects to conduct ongoing utility line and road maintenance projects. Data is available to estimate the impacts of conservation measures associated with the butterfly on projects over the next 10 years. The existing infrastructure consists of 2,400 total miles, 90 of which are within the Lincoln National Forest and may be impacted by conservation measures for the butterfly. These projects will result in **1 programmatic consultation**.¹⁰⁵ Total administrative costs are anticipated to range from \$30,400 to \$39,600. The project modification expected to be recommended is work window constraint (i.e., work in the winter).¹⁰⁶ In the past this type of work window constraint tripled the cost of a utility line project, for an added cost of \$64,000 per mile. Therefore, the total cost of project modification for the butterfly is anticipated to be \$5,760,000 over the next ten years. Future impacts to Otero County Electric Cooperative projects are likely, however, no new projects are currently planned and impacts cannot be estimated.¹⁰⁷ Projects most likely to be impacted are connections to private property and system improvements.

4.3 Summary of Impacts

133. This analysis considers the economic impacts of conservation measures taken pre-listing and designation of critical habitat. Pre-designation impacts are typically defined as all management efforts that have occurred since the time of listing; however, the butterfly has not been listed, but was proposed for listing in September 2001. The rough magnitude of costs incurred since the butterfly was proposed for listing and designation of critical habitat in 2001 is \$100,000. These costs were incurred by the USFS associated with conference opinions and conservation measures associated with the butterfly.
134. Estimates of the present value of expected future economic impacts of butterfly conservation measures range from \$5.6 million to \$8.6 million over 20 years, assuming a seven percent discount rate, or \$533,000 to \$816,000 annually. Approximately 55 percent of these costs are associated with project modifications and 45 percent administrative. Activities most affected are utility projects, agriculture and ranching, and USFS land management (mostly recreation-related and road projects). Together, these activities make up 91 percent of the total costs of butterfly conservation.
135. The economic impacts of butterfly conservation will be manifested primarily as increased costs for private entities (62 percent). Federal agencies other than the Service are anticipated to bear 25 percent of the total cost of butterfly conservation, the Service 12 percent, and State and local governments the remaining one percent. Consultations

¹⁰⁵ Salas, 2004. Personal communication with Vic Plumb, General Manager Otero County Electric Cooperative, Inc., July 27, 2004. Note the Otero County Electric Cooperative incurs administrative costs associated with this programmatic consultation. This cost is assumed to be the same as a high level formal consultation for a third party and the cost of the biological assessment.

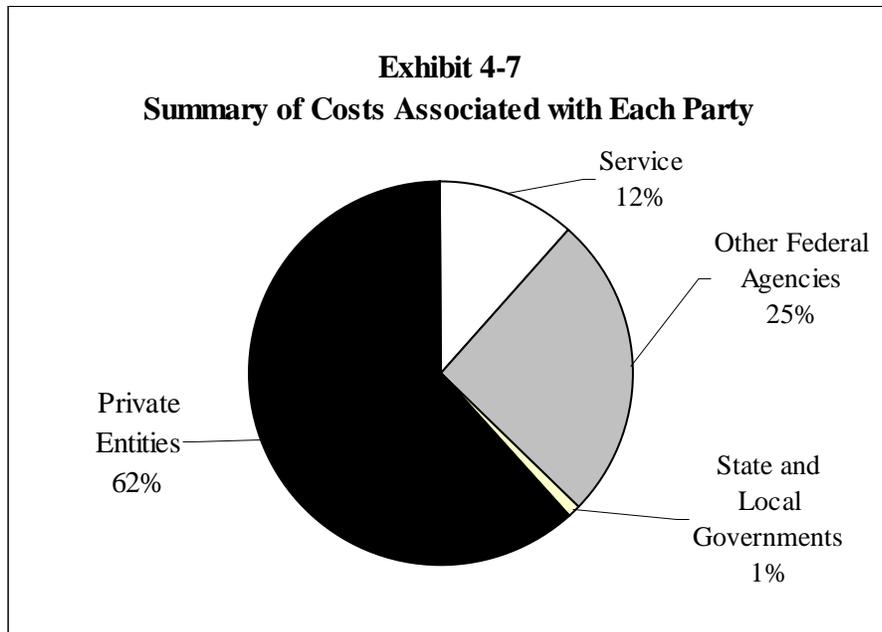
¹⁰⁶ Plumb, 2004.

¹⁰⁷ Ibid.

that may involve private entities include those related to utility projects, agriculture and ranching, livestock grazing on Lincoln National Forest range allotments, private right-of-way roads through Lincoln National Forest, and development projects. Exhibit 4-6 represents the distribution of costs borne by party. Exhibit 4-7 is a graphical representation of the costs expected to be borne by each party.

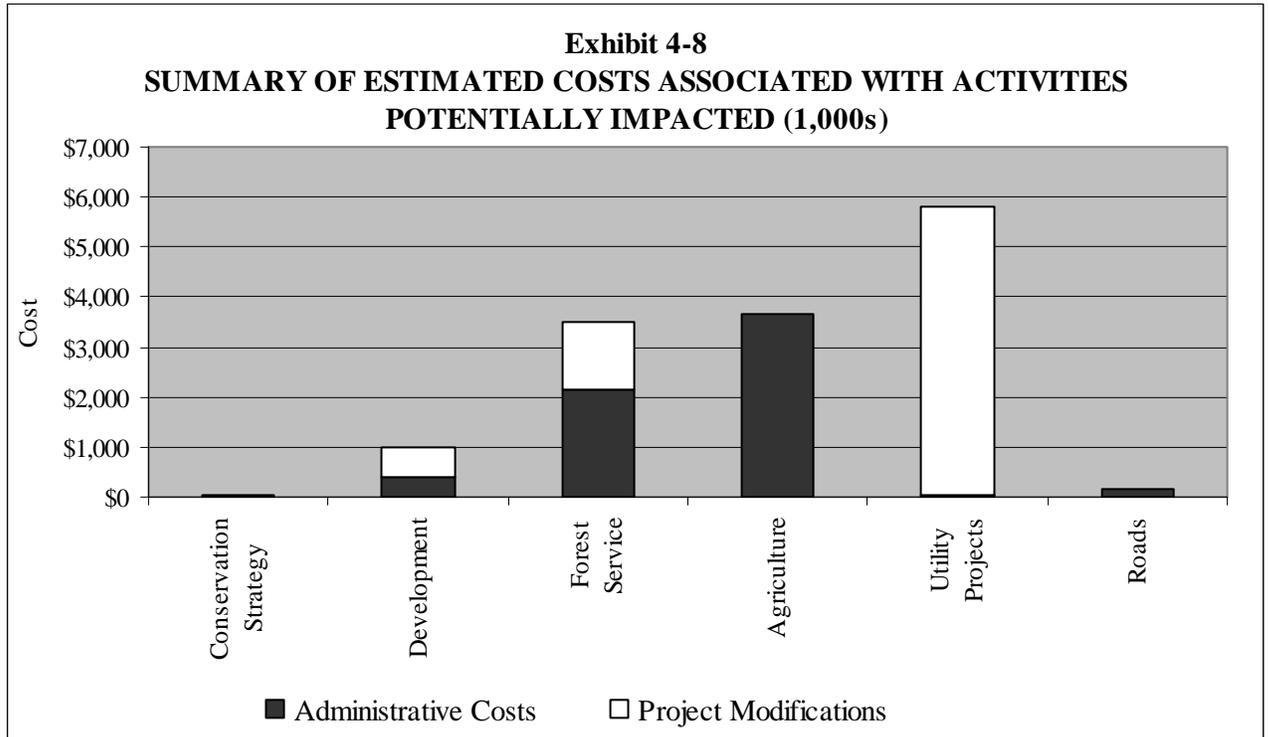
Exhibit 4-6						
SUMMARY OF ESTIMATED COSTS ASSOCIATED WITH EACH PARTY						
Cost Category	Range	Service	Other Federal Agencies	State and Local Governments	Private Entities	Total
Administrative	Low	\$428,000	\$575,000	\$16,000	\$513,000	\$1,532,000
	High	\$1,630,000	\$2,310,000	\$90,000	\$2,414,000	\$6,444,000
Project Modification	Low	\$15,000	\$933,000	\$82,000	\$6,069,000	\$7,099,000
	High	\$43,000	\$1,313,000	\$82,000	\$6,341,000	\$7,779,000
Total	Low	\$443,000	\$1,507,000	\$98,000	\$6,582,000	\$8,630,000
	High	\$1,673,000	\$3,623,000	\$172,000	\$8,755,000	\$14,223,000

*Note totals may not sum due to rounding.



136. Of all the activities that may be affected Otero County Electric Cooperative utility line and road maintenance projects are anticipated to generate 41 percent of the total costs. NRCS Environmental Quality Incentives Program projects on private farms and ranches are expected to generate 26 percent of the total costs. Approximately 25 percent of the total costs are expected to stem from USFS projects on Lincoln National Forest. Approximately 30 percent of the costs related to the Lincoln National Forest are expected

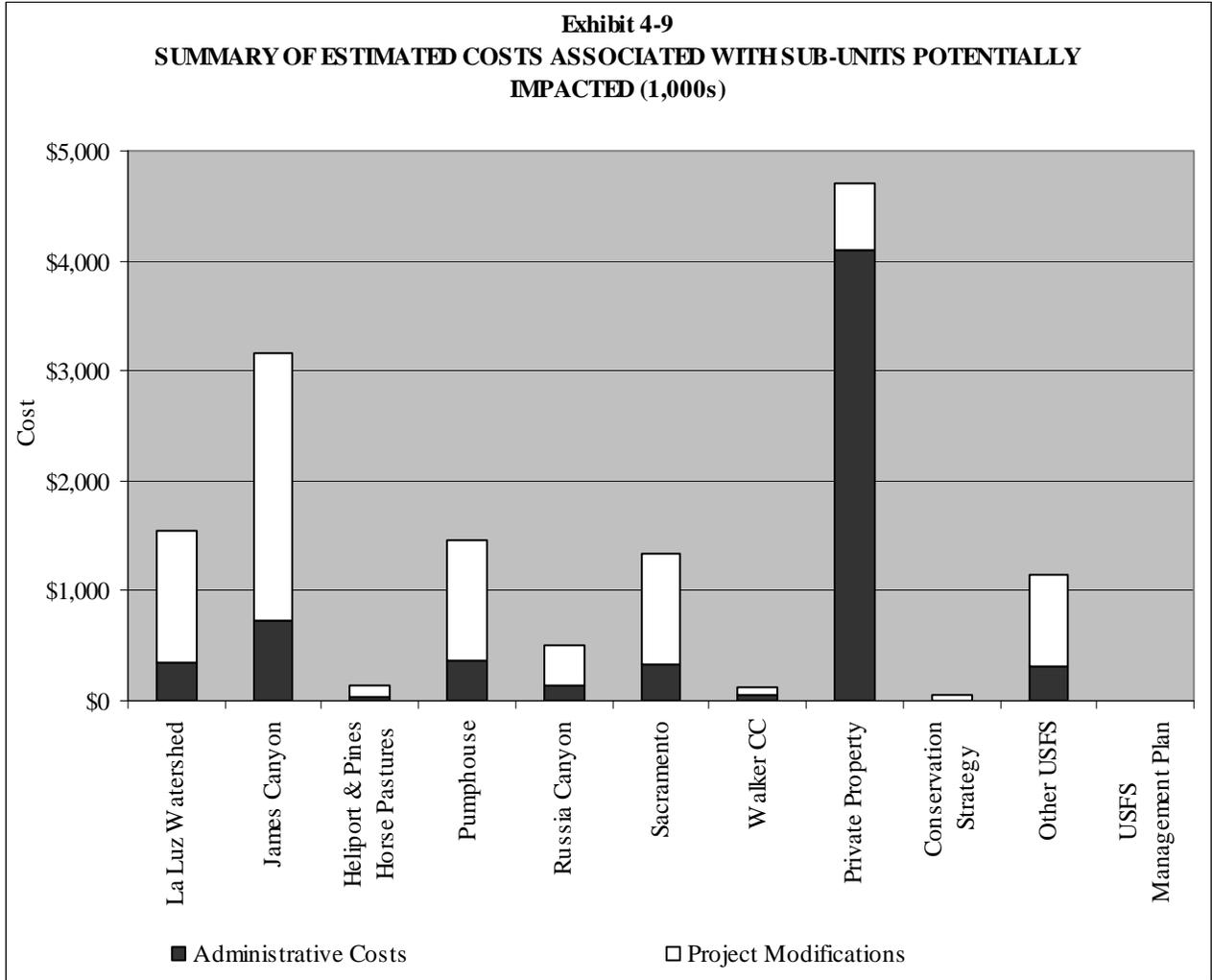
to be associated with recreation and 24 percent with private right-of-way road projects. The remaining nine percent of total costs are expected to stem from road construction and maintenance, conservation strategy, residential and commercial development, and other utility construction and maintenance activities. Exhibit 4-8 presents a summary of the costs associated with activities potentially impacted.



137. This analysis considers the economic impact that could result from a reduction in livestock grazing on portions of the James Canyon and Pumphouse allotments in Lincoln National Forest. Note that these economic impacts would be borne by the permittee and not the USFS. This analysis estimates present value, at a rate of seven percent, grazing permit value losses as high as \$16,400 (\$1,600 annually; assuming a seven percent discount rate) (2003 dollars). Agriculture and ranching impacts are estimated as the increased administrative costs associated with NRCS funded EQIP projects (e.g., forest stand improvement, brush control, control of invasive species or noxious weeds, and wildlife habitat improvement on private lands).

138. Approximately 33 percent of the costs of butterfly conservation are anticipated to occur on private property, due primarily to the potential for consultations related to NRCS projects on private farms and ranches and surveying and habitat conservation plan (HCP) efforts related to residential and commercial development. The next largest category of costs represent costs associated with James Canyon (22 percent). This is due to the large amount of acreage of the James Canyon range allotment within the critical

habitat boundary (34 percent of USFS land). The Forest Management Plan and conservation strategy are not specific to a geographic area, unlike other activities the plans is not associated with a specific geographic area. Exhibit 4-9 is a graphical representation of the costs by sub-unit over the next 20 years.



139. Exhibit 4-10 provides a overview of the present value of costs associated with conservation measures for the butterfly over the next 20 years. To discount and annualize costs, guidance provided by the Office of Management and Budget (OMB) specifies the use of a real rates of three and seven percent.

Exhibit 4-10		
PRESENT VALUE OF TOTAL ECONOMIC COSTS		
(20 Years)		
	Total Cost	
	Low	High
Total Activity Cost	\$8,630,000	\$14,222,000
Present Value (3%)	\$7,089,000	\$11,267,000
Present Value (7%)	\$5,644,000	\$8,640,000
Annualized (3%)	\$477,000	\$757,000
Annualized (7%)	\$533,000	\$816,000
Note: This table presents nominal costs as well as discounted present value of total costs based on three and seven percent discount rates. Discounted costs are then annualized.		

140. Exhibit 4-11 and Exhibit 4-12 provide more detailed summaries of the total costs associated with conservation activities for the butterfly by activity and sub-unit over the next 20 years.

Exhibit 4-11
SUMMARY OF ESTIMATED COSTS ASSOCIATED WITH POTENTIALLY IMPACTED ACTIVITIES

Activity	Consultations						Administrative Costs		Project Modifications		Total	
	Informal		Formal		Programmatic		Low	High	Low	High	Low	High
	Low	High	Low	High	Low	High						
Conservation Strategy	0	0	0	0	0	0	\$0	\$0	\$50,000	\$50,000	\$50,000	\$50,000
Development	0	0	1	1	0	0	\$86,000	\$384,000	\$292,000	\$592,000	\$378,000	\$976,000
Forest Service	43	63	15	55	4	2	\$462,000	\$2,167,000	\$936,000	\$1,316,000	\$1,398,000	\$3,484,000
Agriculture	180	200	20	40	0	0	\$908,000	\$3,672,000	\$0	\$0	\$908,000	\$3,672,000
Utilities	1	1	0	0	1	1	\$34,000	\$54,000	\$5,760,000	\$5,760,000	\$5,794,000	\$5,814,000
Roads	12	12	0	0	0	0	\$42,000	\$167,000	\$60,000	\$60,000	\$102,000	\$227,000
Total*	236	276	36	96	5	3	\$1,531,000	\$6,444,000	\$7,099,000	\$7,779,000	\$8,630,000	\$14,222,000

*Totals may not sum due to rounding.

**Exhibit 4-12
SUMMARY OF ESTIMATED COSTS ASSOCIATED WITH GEOGRAPHIC AREAS**

Sub-Unit	Consultations						Administrative Costs		Project Modifications		Total	
	Informal		Formal		Programmatic		Low	High	Low	High	Low	High
	Low	High	Low	High	Low	High						
La Luz Watershed	10	13	0	7	1	0	\$54,000	\$345,000	\$1,141,000	\$1,206,000	\$1,195,000	\$1,551,000
James Canyon	17	24	3	17	1	1	\$141,000	\$730,000	\$2,307,000	\$2,437,000	\$2,449,000	\$3,167,000
Heliport & Pines Horse Pastures	1	1	0	1	0	0	\$4,000	\$30,000	\$110,000	\$116,000	\$114,000	\$146,000
Pumphouse	7	10	3	9	1	0	\$84,000	\$357,000	\$1,049,000	\$1,108,000	\$1,132,000	\$1,465,000
Russia Canyon	2	3	2	4	0	0	\$42,000	\$141,000	\$350,000	\$370,000	\$392,000	\$511,000
Sacramento	8	11	2	8	1	0	\$74,000	\$335,000	\$944,000	\$997,000	\$1,018,000	\$1,332,000
Walker CC	0	0	2	2	0	0	\$30,000	\$59,000	\$53,000	\$56,000	\$83,000	\$115,000
Private Property	183	203	21	41	0	0	\$1,006,000	\$4,103,000	\$304,000	\$604,000	\$1,310,000	\$4,707,000
Conservation Strategy	0	0	0	0	0	0	\$0	\$0	\$50,000	\$50,000	\$50,000	\$50,000
Other USFS	8	11	2	7	0	0	\$71,000	\$307,000	\$790,000	\$834,000	\$861,000	\$1,141,000
USFS Management Plan	0	0	0	0	1	1	\$26,000	\$36,000	\$0	\$0	\$26,000	\$36,000
Total*	236	276	36	96	5	3	\$1,531,000	\$6,444,000	\$7,099,000	\$7,779,000	\$8,630,000	\$14,222,000

*Note totals may not sum due to rounding.

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16 U.S.C. 1532.

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Appendix A
Small Business Impact Analysis and
Potential Impacts to the Energy Industry

A.1 Small Business Impact Analysis

141. This section considers the extent to which the analytic results presented above reflect impacts to small businesses. The small business analysis presented in this section is based on information gathered from the Small Business Administration (SBA), U.S. Census Bureau, U.S. Department of Agriculture, and Dun and Bradstreet, and comparisons with the results of the economic analysis.¹⁰⁸ The following summarizes the sources of potential future impacts on small businesses related to the proposed critical habitat rulemaking.

142. Based on the results reported in Section 4 activities undertaken by small businesses that are potentially affected by the rulemaking include:

- **Conservation Strategy.** No costs other than administrative costs associated with the development of the conservation strategy for the butterfly are anticipated. Non-Federal entities anticipated to bear costs of developing the conservation strategy include Otero County (\$7,000) and the Village of Cloudcroft (\$15,000).
- **Residential and Commercial Development.** The administrative costs of the consultation and surveys, and development and implementation of HCPs associated with residential and commercial development may be borne by small entities. The total administrative costs are expected to range from \$1,200 to \$9,700 per project, and project modifications may range from \$2,700 to \$7,000.

Various parties, including developers of existing subdivisions, developers of potential subdivisions, and/or private property owners may be impacted by butterfly conservation measures associated with the 55 to 69 projects that may occur within butterfly habitat over the next 20 years (2.8 to 3.4 annually). This represents between 0.7 percent to 0.9 percent of all homes built in Otero County annually.¹⁰⁹

Exhibit A-1 describes the potential impacts of butterfly conservation measures on various sectors of the development industry. Results are provided for alternative scenarios under which various sectors of the development industry are assumed to bear the costs of species conservation efforts. Since it is impossible to predict which specific sector(s) will bear these costs, a range of scenarios are presented.

- **Existing subdivisions.** There are two large existing subdivisions with developable lots available, Woodlands and Bear Park. Both of these subdivisions may currently own land within the designation and thus be impacted by conservation measures for the butterfly. Both of these subdivisions are owned by Green Mountain Real

¹⁰⁸ This information was gathered in a Dialog search of File 516, Dun and Bradstreet, "Dun's Market Identifiers."

¹⁰⁹ In 2000 Otero County had 29,272 housing units, and 30,026 housing units in 2002. Thus, from 2000 to 2002 the average annual increase in housing units was 377. U.S. Census Bureau, State and County QuickFacts, accessed at: <http://quickfacts.census.gov/qfd/>

Estate, Inc. Green Mountain Real Estate is a small business (NAICS 531210) with sales in 2003 of \$610,000.¹¹⁰ The SBA classifies a real estate business as small if average annual receipts are less than \$1.5 million. Assuming Green Mountain Real Estate owns all of the land that may be impacted in a given year, impacts to this firm would be on the order of 1.8 percent to 9.3 percent of its annual sales. There are 93 businesses in the real estate subsector (NAICS 531--) in Otero County, and 89 of those businesses are small as defined by SBA.¹¹¹ Therefore, under this scenario approximately one percent of small real estate business in Otero County would be impacted.

- **Potential subdivisions.** Assuming each construction firm undertakes development of one housing unit per year, conservation measures for the butterfly could affect 2.8 to 3.4 businesses constructing small subdivisions annually. There are 136 businesses in the construction buildings subsector (NAICS 236--) in Otero County and 131 of those businesses are small as defined by SBA.¹¹² The SBA classifies a construction building business as small if average annual receipts are less than \$28.5 million. Therefore, at most 2.1 percent to 2.6 percent of all small construction companies in Otero County may be impacted by conservation measures for the butterfly (i.e., assuming all of the impacts are borne solely by firms in this sector, and each firm undertakes one home construction project). Assuming each of these construction companies are small, economic impacts equal to 0.08 to 0.4 percent of average annual receipts might result (assuming average annual receipts are the midpoint of the small business threshold and zero). Note that there are seven to eight small construction companies that build homes in the Cloudcroft area.¹¹³

There are also 93 businesses in the real estate subsector (NAICS 531--) in Otero County; 89 of those businesses are small as defined by SBA.¹¹⁴ The SBA defines real estate businesses as small if average annual receipts are less than \$1.5 million. Again, at most, conservation measures for the butterfly could affect 2.8 to 3.4 real

¹¹⁰ This information was gathered in a Dialog search of File 516, Dun and Bradstreet, "Dun's Market Identifiers." Size standards based on SBA's Table of Small Business Size Standards based on NAICS 2002, accessed at <http://www.sba.gov/size/indextableofsize.html>.

¹¹¹ This information was gathered in a Dialog search of File 516, Dun and Bradstreet, "Dun's Market Identifiers." Size standards based on SBA's Table of Small Business Size Standards based on NAICS 2002, accessed at <http://www.sba.gov/size/indextableofsize.html>.

¹¹² This information was gathered in a Dialog search of File 516, Dun and Bradstreet, "Dun's Market Identifiers." Size standards based on SBA's Table of Small Business Size Standards based on NAICS 2002, accessed at <http://www.sba.gov/size/indextableofsize.html>.

¹¹³ Personal communication with Michael Nivison, September 10, 2004.

¹¹⁴ This information was gathered in a Dialog search of File 516, Dun and Bradstreet, "Dun's Market Identifiers." Size standards based on SBA's Table of Small Business Size Standards based on NAICS 2002, accessed at <http://www.sba.gov/size/indextableofsize.html>.

estate businesses constructing small subdivisions annually (again, assuming all impacts are borne by this sector). Thus, at most 3.1 percent to 3.8 percent of all small real estate companies in Otero County may be impacted by conservation measures for the butterfly. If a real estate business is impacted by conservation measures for the butterfly, and that entity is small, it may experience impacts equal to 1.4 to 7.6 percent of annual receipts, assuming average annual receipts are the midpoint of the small business threshold and zero.

- **Individual property owners.** Potential impacts may be born by individual private entities who currently own, or may come to own the developed land. These private property owners are not considered small businesses.

Because the entities who will ultimately bear the costs of critical habitat are unknown, this analysis estimates the upper bound of the economic impact of butterfly conservation measures associated with development on each category of small business that could be affected. Note, these impacts cannot be summed, as this analysis considers scenarios under which the impacts are borne separately by each type of landowner.

Exhibit A-1		
POTENTIAL IMPACTS OF BUTTERFLY CONSERVATION MEASURES ON THE DEVELOPMENT INDUSTRY		
	Low	High
Projects Potentially Impacted Annually	2.8	3.4
Per Project Cost of Butterfly Conservation Measures		
Development Administrative Costs	\$1,200	\$9,700
Development Project Modification Costs	\$2,700	\$7,000
Development Total Costs	\$3,900	\$16,700
SCENARIOS		
1. Impact Borne by Existing Subdivisions		
<i>1A. Impacts borne by "Green Mountain Real Estate, Inc."</i>		
Annual Sales	\$610,000	\$610,000
Potential Impact (Percent of Annual Sales)*	1.8%	9.3%
<i>1B. Impacts borne by the "Other Real Estate (NAICS 531--)" sector</i>		
Number of Entities in Otero County	93	93
Number of Small Entities in Otero County	89	89
Number of Impacted Entities (Percent of Small Businesses In Otero County)	1.1%	1.1%
2. Impact Borne by Potential Subdivisions		
<i>2A. Impacts borne by the "Construction buildings (NAICS 236--)" sector</i>		
Annual Receipts	\$28,500,000	\$28,500,000
Potential Impact (Percent of Annual Receipts)*	0.04%	0.20%
Number of Entities in Otero County	136	136
Number of Small Entities in Otero County	131	131
Number of Impacted Entities (Percent of Small Businesses In Otero County)	2.1%	2.6%
<i>2B. Impacts borne by the "Real Estate (NAICS 531--)" sector</i>		
Annual Receipts	\$1,500,000	\$1,500,000
Potential Impact (Percent of Annual Receipts)*	0.7%	3.8%
Number of Entities in Otero County	93	93
Number of Small Entities in Otero County	89	89
Number of Impacted Entities (Percent of Small Businesses In Otero County)	3.1%	3.8%
*Assuming conservation measures are completed in one year, and all are borne by this entity or sector.		
Source: Industry information was gathered in a Dialog search of File 516, Dun and Bradstreet, "Dun's Market Identifiers." Size standards based on SBA's Table of Small Business Size Standards based on NAICS 2002, accessed at http://www.sba.gov/size/indexableofsize.html .		

- **USFS Activities.** The costs of conservation measures associated with the butterfly for USFS activities are not expected to be borne by small entities, except for livestock grazing on range allotments (below). While private access roads may be constructed by individual private landowners across Forest Service lands, the cost of conservation measures associated with these roads are expected to be modest. The total administrative costs of livestock grazing allotment and private access road consultations are expected to be \$1,200 to \$4,100 per consultation.

- **Livestock Grazing.** Three ranching operations are anticipated to be impacted by conservation measures for the butterfly as a result of their involvement in livestock grazing on Lincoln National Forest range allotments. As shown in Exhibit 4-12 below, total annual costs to these three ranches may be \$1,151, or about \$4 to \$573 per ranch. These potential losses represent between 0.01 percent and 1.6 percent of each ranch's estimated annual sales, and between 0.02 percent of the annual cattle and calf sales for Otero County. Assumptions used to estimate annual sales of the average ranch include:
 - Total cattle and calf sales in Otero County in 1997 was \$5,163,000.¹¹⁵
 - Total revenues are evenly distributed to the 143 ranches within Otero County to estimate average revenue of a ranch in Otero County.¹¹⁶
 - Average revenues of a ranch in Otero County are \$36,105.

All beef cattle ranches in Otero County are considered small.¹¹⁷ Therefore, three small entities may experience a reduction in revenues of up to 1.6 percent annually, representing two percent of small ranches in Otero County. The extent to which these impacts are significant to any of these ranching operations will depend on their access to substitute grazing areas, and the individual financial condition of the ranch.

¹¹⁵ Otero County cattle and calf sales are based upon 1997 data (National Agricultural Statistics Service. National Agricultural Statistics Service. 1997 Census of Agriculture, Table 14: Cattle and Calves Inventory & Sales: New Mexico, Otero County, accessed at: <http://agcensus.mannlib.cornell.edu/show2.php>). These are the most recent data available for comparison.

¹¹⁶ National Agricultural Statistics Service. 2002 Census of Agriculture Volume 1, Chapter 2: New Mexico County Level Data, Table 51: Farms by North American Industry Classification System, 2002, accessed at: http://www.nass.usda.gov/census/census02/volume1/nm/st35_2_051_051.pdf.

¹¹⁷ Approximately 100 percent of livestock grazing businesses in Otero County are considered small businesses. Based on a Dialog search of file 516 Dun and Bradstreet, "Dun's Market Identifiers," updated in November 2003, 100 percent of businesses in Otero County in NAICS 12111, Beef Cattle Ranching and Farming, are small (less than \$750,000 sales). Size standards based on SBA's Table of Small Business Size Standards based on NAICS 2002, accessed at <http://www.sba.gov/size/indehtableofsize.html>.

Exhibit A-2 FORECAST ANNUAL IMPACTS TO RANCHERS			
Rancher	Allotment	Annual Loss	Percent of Annual Revenues for an Otero County Ranch ^a
A	Pumphouse	\$4	0.01%
B	James Canyon	\$573	1.59%
C	James Canyon	\$573	1.59%
Total		\$1,151	0.02%^b
^a National Agricultural Statistics Service. 1997 Census of Agriculture, Table 14: Cattle and Calves Inventory & Sales: New Mexico, Otero County, accessed at: http://agcensus.mannlib.cornell.edu/show2.php . ^b Percent of annual cattle and calf sales for all Otero County ranches. Note: The 1997 Census data for cattle and calf sales is the most recent data available.			

- This analysis assumes that the three ranches potentially impacted are all equal in size to the average small ranch, the value an AUM is \$78 in perpetuity, and AUM reductions are those discussed in Section 4.2.3.2.
- **Road Construction and Maintenance.** All road construction and maintenance activities within the critical habitat designation are anticipated to be undertaken by NMDOT. NMDOT is expected to bear the administrative costs for the 12 projects potentially impacted, and thus no impacts on small entities are anticipated by this analysis.
- **Agriculture and Ranching.** Administrative costs are anticipated to be associated with NRCS EQIP project and may be borne by small entities. The total administrative costs of these agriculture and ranching consultations potentially borne by small entities may be \$1,200 to \$9,700 per project.
- **Utilities Construction and Maintenance.** The Village of Cloudcroft is scheduled to undertake one utility construction project within the critical habitat designation. The total administrative costs of this consultation are expected to range from \$1,200 to \$6,900.

The Otero County Electric Cooperative anticipates undertaking one programmatic consultation for utility line and road maintenance projects over the next 10 years. The Otero County Electric Cooperative is a small business. In 2003 total sales were 138,197 megawatt-hours. The SBA defines other electric power generation businesses (NAICS 221119) as small if they produce less than four million megawatt-hours annually.¹¹⁸

¹¹⁸ Size standards based on SBA's Table of Small Business Size Standards based on NAICS 2002, accessed at <http://www.sba.gov/size/indextableofsize.html>. Tri-State Generation and Transmission Association. 2003 Annual Report, Accessed at <http://www.tristategt.org/>, on August 11, 2004.

Total administrative costs expected to be borne by the Otero County Electric Cooperative are \$9,700. The conservation measure associated with the Otero County Electric Cooperative projects is a work window constraint. Project modification costs are forecast to be \$5,760,000, or \$576,000 annually (using seven or three percent discount rates). See Section 4.2.6 for a more detailed discussion of potential impacts to the Otero County Electric Cooperative. This increase in annual maintenance costs represents approximately four percent of Otero County Electric Cooperative's sales in 2003.¹¹⁹ Otero County Electric Cooperative serves 16,117 meters in four counties (Otero, Lincoln, Chaves, and Socorro).¹²⁰ Assuming one meter per household, the Otero County Electric Cooperative services about 27 percent of the 60,422 households in Otero, Lincoln, Chavez, and Socorro Counties.¹²¹ In 2002 there were 34 electric utilities in the State of New Mexico, including 14 cooperatives.¹²² Thus, the Otero County Electric Cooperative represents three percent of electric utilities and seven percent of electric cooperatives in the State of New Mexico.

A.2 Potential Impacts to the Energy Industry

143. Pursuant to Executive Order No. 13211, "Actions Concerning Regulations that Significantly Affect Energy Supply, Distribution, or Use," issued May 18, 2001, Federal agencies must prepare and submit a "Statement of Energy Effects" for all "significant energy actions." The purpose of this requirement is to ensure that all Federal agencies "appropriately weigh and consider the effects of the Federal Government's regulations on the supply, distribution, and use of energy."¹²³ The Office of Management and Budget has provided guidance for implementing this Executive Order that outlines nine outcomes that may constitute "a significant adverse effect" when compared without the regulatory action under consideration:

- Reductions in crude oil supply in excess of 10,000 barrels per day (bbls);
- Reductions in fuel production in excess of 4,000 barrels per day;
- Reductions in coal production in excess of 5 million tons per year;
- Reductions in natural gas production in excess of 25 million Mcf per year;

¹¹⁹ Based on a Dialog search of file 516 Dun and Bradstreet, "Dun's Market Identifiers," updated in November 2003, for Otero County Electric Cooperative.

¹²⁰ Otero County Electric Cooperative, Inc. About Us, Accessed at <http://www.ocec-inc.com/aboutus/aboutus.cfm>, on August 2, 2004.

¹²¹ U.S. Census Bureau, *State and County QuickFacts*, accessed at <http://quickfacts.census.gov/qfd/>

¹²² Energy Information Administration, *State Electricity Profiles 2002: New Mexico*, accessed at http://www.eia.doe.gov/cneaf/electricity/st_profiles/toc.html

¹²³ U.S. Office of Management and Budget, The Executive Office of the President, "Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing E.O. 13211, M-01-27," July 13, 2001. From: <http://www.whitehouse.gov/omb/memoranda/m01-27.html>, as viewed on June 30, 2004.

- Reductions in electricity production in excess of 1 billion kilowatts-hours per year or in excess of 500 megawatts of installed capacity;
- Increases in energy use required by the regulatory action that exceed the thresholds above;
- Increases in the cost of energy production in excess of one percent;
- Increases in the cost of energy distribution in excess of one percent; or
- Other similarly adverse outcomes.¹²⁴

One of these criteria is relevant to this analysis: increases in the cost of energy distribution in excess of one percent. Conservation measures associated with the butterfly, estimated in Section 4.2.6, represent approximately four percent of Otero County Electric Cooperative's sales in 2003; distribution costs represent only a fraction of total revenues. Otero County Electric Cooperative services all residents of the Village of Cloudcroft and most of Otero County.¹²⁵ Note that Otero County Electric Cooperative's total sales represent 0.7 percent of total electricity sales in the State of New Mexico.¹²⁶

¹²⁴ U.S. Office of Management and Budget, The Executive Office of the President, "Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance For Implementing E.O. 13211, M-01-27," July 13, 2001. From: <http://www.whitehouse.gov/omb/memoranda/m01-27.html>, as viewed on June 30, 2004.

¹²⁵ Plumb, 2004.

¹²⁶ In 2002 the total energy sales in the State of New Mexico were 19,207,000 megawatt hours. Energy Information Administration, *State Electricity Profiles 2002: New Mexico*, accessed at http://www.eia.doe.gov/cneaf/electricity/st_profiles/toc.html