FINAL ECONOMIC ANALYSIS OF CRITICAL HABITAT DESIGNATION FOR THE MEXICAN SPOTTED OWL

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EXECUTIVE SUMMARY

1. The purpose of this report is to identify and analyze the potential economic impacts associated with the proposed critical habitat designation (CHD) for the Mexican spotted owl (MSO) (*Strix occidentalis lucida*). This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service's (Service) Division of Economics.

2. 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.[1] In addition, this analysis provides information to allow 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, when deciding which areas to designate as critical habitat, the economic analysis informing that decision should include "co-extensive" effects.[3]

3. This analysis considers the potential economic effects of efforts to protect MSO and its habitat (hereinafter referred to collectively as "MSO conservation activities") in the proposed CHD. Actions undertaken to meet the requirements of other Federal, State, and local laws and policies may afford protection to the MSO and its habitat, and thus contribute to the efficacy of critical habitat-related conservation and recovery efforts. Thus, the impacts of these activities are relevant for understanding the full impact of the proposed CHD.

[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)).

Types of Economic Impacts Related to MSO Conservation Activities

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).

4. This analysis considers both economic efficiency and distributional effects. In the case of habitat conservation, efficiency effects generally reflect the opportunity costs associated with the commitment of resources to comply with habitat protection measures (e.g., lost economic opportunities associated with restrictions on land use). This analysis also addresses how potential economic impacts are likely to be distributed, including an assessment of any local or regional impacts of MSO conservation and the potential effects of conservation activities on small entities and the energy industry. This information can be used by decision-makers to assess whether the effects of the designation might unduly burden a particular group or economic sector. Finally, this analysis looks retrospectively at costs that have been incurred since the date the species was listed and considers those costs that may occur after the designation is finalized.

5. To conduct the analysis, best available data are gathered from a variety of sources, including public comments on the draft economic analysis, government agencies, public associations, and affected Tribes and counties. Specifically, data was gathered from all of the affected Federal agencies, various State and local governments, Western Wood Products Association, American Forest and Paper Association, Four Corners Forests Sustainable Partnership, the Coalition of New Mexico and Arizona Counties, Bill Barrett Corporation, Conoco Phillips, the Independent Petroleum Association of America, the Mescalero Apache Tribe, Navajo Nation, San Carlos Apache Tribe, and small business entities. Census Bureau and other Department of Commerce data were relied on to characterize the regional economy.

KEY FINDINGS

- **Efficiency Impacts:** Efficiency impacts associated with MSO conservation are forecast to range from $9.5 to $32.9 million over the next 10 years (or $1.0 to $3.3 million per year), including losses in grazing permit value.[4] Approximately 26 percent of these costs will be borne by private parties.
  - **Activities most impacted:** 38 percent of these costs are related to grazing activities, 19 percent to fire management, five percent to timber harvest, and 38 percent to other activities.
  - **Areas most impacted:** The areas with the highest forecast costs related to consultations and project modifications are BLM Utah and Gila National Forest (NF) followed by Coronado NF, Dixie NF, Coconino NF, and Lincoln NF.
  - **Livestock grazing:** Economic efficiency losses resulting from reductions in animal unit months (AUMs) grazed by livestock on U.S. Forest Service (USFS) Region 3 lands (Arizona and New Mexico) and Bureau of Land Management (BLM) lands are forecast to range from $1.7 to $8.7 million over the next 10 years (or $0.2 to $0.9 million per year). This represents lost value of grazing permits to permittees, including impacts such as range condition considerations, which could not be separated from MSO-related impacts. 25 percent of these impacts will fall within Gila NF, 18 percent in Coronado NF and 10 percent in Cibola NF.
  - **Fire management:** MSO conservation efforts are most likely to impact fire management activities where Wildland Urban Interface (WUI) areas overlap with MSO protected activity centers (PACs). This overlap occurs in 134,000 acres of USFS Region 3 National Forests. Lincoln NF has the highest acreage of WUI overlapping with PACs. Forecast administrative and project modifications for these activities range from $3.1 to $6.2 million over 10 years.
  - **Oil and gas:** Economic efficiency losses incurred by oil and gas companies and the Federal Action agencies that oversee oil and gas development include both administrative and project modification costs, are forecast to range from $0.2 to $1.8 million over 10 years. Project modifications may include noise abatement, and/or re-siting access routes or wells. Also, MSO surveys may cause delays to activities resulting in distributional impacts (see below).
- **Distributional Impacts:** While no significant impacts to the national timber, livestock or oil and gas markets are forecast to occur as a result of MSO conservation measures, regional economic impacts are possible.
  - **Timber:** Future regional economic impacts related to reductions in timber harvest opportunities are expected to be as high as $49.7 million in annual lost regional economic output, including the loss of 429 jobs. These impacts represent timber-related economic output and jobs that would have been available if MSO conservation efforts did not occur. Two-thirds of these impacts are associated with three forests: Gila, Apache-Sitgreaves, and Coconino.
  - **Livestock:** Future regional economic impacts related to restrictions on grazing include up to $1.1 million in annual lost regional economic output, as well as the loss of up to 14 jobs. 25 percent of these impacts fall in Gila NF.
  - **Oil and Gas:** Future regional economic impacts related to delays to natural gas development on BLM Utah lands are expected to range from no impact to $8.4 million in annual lost regional economic output, including the loss of 52 jobs. These impacts represent economic output and jobs that would have been available if delays due to MSO conservation efforts did not occur.
- **Tribes:** Socioeconomic data suggest that the three affected Indian Tribes (Mescalero Apache, Navajo, and San Carlos Apache) are economically vulnerable to future impacts from MSO conservation activities. Tribal activities most likely to be affected by MSO conservation activities are timber harvest and fire management efforts.
- **Small businesses:** While small business impacts on existing timber-related are unlikely, ranchers in the region (many of whom are small businesses – less than $750,000 revenues) may experience some impacts. If the total impacts were to affect the smallest number of ranchers, no more than 15 ranchers (less than two percent of grazing permittees in affected states) would be affected. However, if the impacts were evenly distributed MSO conservation could result in a reduction of up to 19 AUMs per rancher (a reduction of less than two percent of AUMs per permittee). Also, one small entity operating a rock quarry may experience impacts related to preparation of a habitat conservation plan for MSO. Impacts to small businesses in the natural gas industry from MSO-related delays are not expected as long as substitute drilling locations are available. However, if gas producers are unable to shift production elsewhere, up to five companies could be impacted per year, assuming each delayed well belonged to an individual company. The impact of the loss of one well would depend on the finances of the company.

[4] All estimates included in the Key Findings section have been discounted to 2003 dollars, assuming a discount rate of seven percent.

Background of MSO Critical Habitat Designation

6. The Service listed the MSO as threatened in 1993. Critical habitat has been designated for the MSO twice before, in 1995 and 2001. The 1995 designation was retracted in 1998 as a result of litigation, and 13.5 million acres of critical habitat were proposed for designation in 2000. Approximately five million acres of this proposed CHD was finalized in 2001 (66 FR 8530). As part of each of these designations, economic analyses were performed focusing solely on the incremental impacts of CHD. In response to ongoing litigation, on November 17, 2003, the Service submitted a notice to the Federal Register reopening comment on the July 21, 2000 Proposed Designation of Critical Habitat for the MSO. Until a final rule is published, the 2001 final CHD remains in effect, which includes all of the proposed critical habitat in Colorado and Utah, except Fort Carson. Additional areas included in the 2000 proposal, and considered in this analysis, include lands in Arizona and New Mexico.

7. Approximately 90 percent of the proposed CHD is under Federal ownership, while the remaining 10 percent is Tribal. Over 60 percent (7.8 million acres) of the proposed designation falls on USFS Region 3 lands, which includes 11 National Forests in Arizona and New Mexico. Exhibit ES-1 indicates the current distribution and ownership of the proposed CHD.

Exhibit ES-1

SUMMARY OF ESTIMATED LAND OWNERSHIP IN PROPOSED MSO CRITICAL HABITAT
(Acres within CHD boundaries)

Landowner	Total
Bureau of Land Management	1,855,947
US Forest Service	8,438,569
Tribal Lands	1,349,447
National Parks Service	2,082,804
Department of Defense	66,023
Bureau of Reclamation	51,178
TOTAL*	**13,843,968**

Note *: The total acreage for this analysis differs by approximately three percent from Service estimates included in the Proposed Rule. This difference is likely due to the use of different land use GIS data sources.

Historical Context for the Analysis

8. Given the history of MSO conservation activities, many of the expected future impacts are continuing impacts resulting from past conservation efforts. Past MSO conservation efforts undertaken prior to this proposed CHD are expected to continue to impact the local and regional economy after the designation. Significant events that have generated impacts include:

- Earlier designations of MSO critical habitat in 1995 and again in 2001;
- The Recovery Plan for the MSO, published in 1995;

- Amendments to USFS Region 3 National Forests' Land and Resource Management Plans incorporating MSO conservation standards were adopted in 1996. At the same time, USFS Region 3 forests adopted amendments for the northern goshawk and old growth. These three amendments simultaneously resulted in changes to USFS management, which affected activities on USFS lands in Region 3.

- An injunction was placed on all timber sales from USFS Region 3 National Forests, from July 1995 through November 1996. This lawsuit was filed against USFS for failure to consult on its existing Land and Resource Management Plans after the listing of the MSO.

- An injunction was placed on the Navajo Nation in 1995, halting all timber sales from their lands. This injunction will continue until the Navajo Nation Forest Management Plan is completed and the Service can formalize its formal consultation on the plan.

Results of the Analysis

9. As noted above, many of the expected future impacts represent ongoing impacts resulting from past conservation efforts. For the most part, this analysis does not anticipate that MSO CHD will result in *additional* economic impacts above and beyond the current regulatory burden. With the exception of some additional administrative costs related to addressing critical habitat in future consultation efforts, future impacts related to section 7 consultations and project modifications are expected to remain largely the same as historical costs associated with these activities. In addition, because future regional economic impacts related to the timber, livestock grazing and oil and gas industries are associated with ongoing management actions, few *additional* impacts to these activities are anticipated in the future.

10. This analysis addresses the impacts of MSO conservation efforts on activities occurring on lands proposed for designation. This analysis uses a number of economic impact measures: lost economic efficiency (measured as the cost of administrative measures and project modifications, as well as reductions in the value of grazing permits), impacts to regional economic output and jobs (associated with lost potential timber harvest, livestock grazing, and oil and gas activity), and estimates of the potential for reduced effectiveness of fire management efforts (measured as the overlap in WUI acres and PACs). In some instances, these impacts could be overstated where impacts related to MSO conservation cannot be separated from impacts related to other factors, such as declines in the timber market, poor range conditions, or alternative Agency management objectives. Limitations of the analysis are discussed in each section of the analysis, and listed at the end of the Executive Summary. The analysis addresses the following economic impacts:

Efficiency Impacts

- ***Administrative and project modification costs borne by the Service and Action agencies associated with MSO conservation activities***. Administrative costs are costs associated with attending meetings, preparing letters and biological assessments, and in the case of formal consultations, the development of a Biological Opinion. Project modifications costs are those costs associated with implementing species and habitat management efforts. Administrative and project modification costs resulting from MSO conservation activities are expected to range from $7.7 to $24.2 million over the next 10 years, excluding grazing permit value losses (discussed below). On an annual basis, this results in costs of $0.8 million to $2.4 million.[5]

- ***Reduced livestock grazing resulting from MSO-related restrictions.*** These effects are measured as lost permit value due to potential reductions in grazing allowed on USFS and Bureau of Land Management (BLM) lands. The potential loss resulting from a reduction in animal unit months (AUMs) grazed in USFS Region 3 ranges from $1.7 to $8.7 million over the next 10 years. On an annual basis, this results in costs of $0.2 to $0.9 million. This range represents the assumption that all AUMs grazed in MSO protected habitat areas may be reduced by 10 percent to 50 percent, and is conservative because multiple factors affect reductions in AUMs other than MSO. Permit value impacts affect ranchers who hold grazing permits on USFS Region 3 National Forests.

- ***Impacts on fire management activities related to MSO conservation activities***. Impacts on fire management activities are likely to be greatest in areas where WUI areas overlap with MSO PACs. In these areas, agencies must avoid treating some acres that contain MSO, must adhere to rules regarding the size of trees that may be thinned, and must conduct intensive surveys on fire impacts. These impacts are measured by estimating the percentage of the total WUI areas acreage that overlaps with MSO PACs. In USFS Region 3 forests, these overlap areas are fairly small, with WUI areas in PACs comprising approximately four percent of the total WUI area. Administrative and project modification costs to the agencies involved in fire management activities are estimated to $3.1 to $6.2 over 10 years.

- ***Impacts to Oil and Gas activities related to MSO conservation activities***. Impacts on oil and gas activities are the greatest on BLM lands in Utah. In this area, potential future project modifications (other than surveying) such as noise abatement, and/or re-siting access routes or wells, are forecast to range from $0.2 to $1.8 million over the next ten years. In addition, there is some potential for directional drilling to be required to protect MSO and its habitat; however, because the frequency of this activity is unknown, these impacts have not been monetized.

Distributional Impacts

- ***Regional economic impacts related to reductions in timber harvest in the area.*** Regional economic contribution is measured using estimates of the area of National Forests made

[5] This is slightly lower than the fiscal year 2000 expenditures for the MSO of $2.8 million reported in the Service's report, Federal and State Endangered and Threatened Species Expenditures (see http://endangered.fws.gov/pubs/expenditurereports.htm).

unavailable for timber harvest due to MSO conservation activities, existing data on the value of lumber production in the area, and a commonly applied input/output model (IMPLAN). The annual regional economic impact of MSO-related impacts on timber harvest from USFS Region 3 forests is estimated to range from no impact to $49.7 million. This limitation on timber harvest could also impact as many as 429 jobs. Because it is not possible to separate MSO-related factors from other factors such as the decline in the timber market, and other forest management changes, the regional economic impact analysis provides a range of estimates for the impact of a reduction in volume of timber harvest due to MSO-related restrictions. The lower-bound estimate assumes no impact from MSO protection efforts, and the upper-bound estimate assumes that all of the area designated as protected MSO habitat and a portion of restricted MSO habitat on USFS Region 3 National Forests would have been harvested in a sustainable manner but for the MSO protection efforts.

- ***Regional economic impacts related to restrictions on grazing activity in the area.*** Regional economic contribution is measured using estimates of lost livestock production that may be lost as a result of MSO conservation activities. MSO-related reductions in livestock production from USFS Region 3 forests results in annual regional economic impact of up to $1.1 million in economic output. Reductions in livestock production may also impact as many as 14 jobs. These estimates are based on the assumption that up to 50 percent of AUMs grazed on MSO critical habitat may be lost as a result of MSO conservation efforts. In fact, reductions are likely to result from a combination of factors in addition to MSO conservation, such as forage availability, competition with other ungulates, and competing management priorities.

- ***Impacts on Tribal activities resulting from MSO-related restrictions***. For each of the affected Tribes, the analysis provides a discussion of the current economic status of these Tribal communities, and discusses potential impacts to Tribal activities occurring in the proposed CHD. The analysis is based on publicly available information as well as information provided by the affected Tribes. Each of the three affected Tribes have expended resources to prepare and implement MSO management plans. In addition, MSO-related impacts on timber harvest on Tribal lands have the potential to affect the economies of these Tribes. The Mescalero estimate that setting aside PACs could result in impacts of $0.7 million annually in the future based on the expected lost lumber production and the average value of lumber production in the region. Due to MSO related litigation, the Navajo Nation has experienced a total shutdown of their timber industry. The San Carlos Apache have set aside approximately eight percent of their commercial timberlands in order to protect the MSO.

- ***Regional economic impacts on oil and gas activities resulting from MSO-related delays***. Impacts may occur to gas developers on BLM lands in Utah due to potential delays resulting from the need to complete MSO surveys or MSO seasonal breeding restrictions. The analysis estimates that these surveys and timing restrictions may delay the development of up to five wells annually by up to two years. The annual regional economic impact of MSO-related delays to natural gas development on BLM Utah lands in Carbon, Emery and Uintah Counties is estimated to range from no impact to $8.4 million in economic output. This analysis assumes that operators are unable to find suitable substitute sites to drill a well within the region, and labor is unable to find other employment during the two-year delay period.

However, because very few leases are located entirely in the MSO CHD, and since the CHD represents a small amount of the local oil and gas industry, these estimates may overstate regional impacts.

- ***Impacts on small businesses associated with MSO-related restrictions.*** Potential impacts from restrictions on grazing on Federal lands are likely to affect some small businesses. Small business impact estimates are based on information provided by affected parties as well as information on small businesses in the region. While small business impacts on existing timber-related small businesses are unlikely, small ranchers in the region may experience some impacts. If the total impacts were to affect the least number of ranchers, no more than 15 ranchers (less than two percent of grazing permittees) would be affected. However, if the impacts were evenly distributed, MSO conservation could result in a reduction of up to 19 AUMs per rancher (a reduction of less than two percent of AUMs per permittee). Impacts to small businesses in the natural gas industry from MSO-related delays are not expected as long as substitute drilling locations are available. However, if gas producers are unable to shift production elsewhere, up to five companies could be impacted per year, assuming each delayed well belonged to an individual company. The impact of the loss of one well would depend on the finances of the company. Also, one small entity operating a rock quarry may experience impacts related to preparation of a habitat conservation plan for MSO.

11. It is important to note that measures of regional economic impact are entirely distinct from the reported efficiency effects. As such these two measures of impact cannot be directly compared and should not be summed.

12. There is a great deal of uncertainty in estimating the impact of MSO-related conservation activities on timber harvest and grazing. For example, it is not possible to estimate the actual reductions in timber harvest that result from MSO-related restrictions as opposed to market conditions. In addition, in USFS Region 3, MSO forest plan amendments were implemented simultaneously with forest plan amendments for the goshawk and old growth. Thus, the analysis estimates annual impacts ranging from no impact to $49.7 million associated with MSO-related timber harvest restrictions. Similarly, some historic reductions in AUMs that have occurred within MSO habitat may not be entirely caused by MSO conservation activities, but the spatial and temporal overlap of these actions with MSO consultation activities makes separating the causes difficult. Thus, this analysis conservatively (i.e., more likely to overstate impacts than understate them) includes impacts associated with reductions in AUMs in CHD areas that were or have the potential to be caused by MSO considerations, even when other factors, such as range condition, may play a role in decisionmaking. Impacts on forestry activities and livestock grazing are mostly occurring in Arizona and New Mexico. Therefore, the analysis of these impacts focuses on USFS Region 3 National Forests.

13. Future economic impacts expected to result from MSO-related conservation activities are summarized in Exhibits ES-2 and ES-3 and discussed below. To illustrate where impacts are expected to occur, the results of the analysis are presented by Action agency and management unit. This summary focuses on areas in the proposed CHD likely to experience the greatest impacts.

Exhibit ES-2

ANALYSIS OF MSO CRITICAL HABITAT DESIGNATION AS PROPOSED*
SUMMARY OF FUTURE EFFICIENCY IMPACTS (2004 – 2013)

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Efficiency Effects		
			Grazing Industry –Estimated Loss in Permit Values** (Annual, 2003$)	All Activities -- Administrative and Project Modification Costs (other than permit value)** (Annual, 2003$)	Fire Management Impacts – Acres of WUI in PACs (percent of Total WUI Acres)
US Forest Service Region 2					
Pike-San Isabel	SRM-C-1 SRM-C-2	Custer, Douglas, El Paso, Jefferson, Teller, CO	$0 - $0	$15,000 - $45,000	Not assessed[a]
US Forest Service Region 3					
Apache Sitgreaves NF	UGM-7 UGM-10	Apache, Navajo, Greenlee, AZ & Catron, NM	$11,000 - $54,000	$32,000 - $85,000	0 (0%)
Carson NF	SRM-NM-9 SRM-NM-10 SRM-NM-11 SRM-NM-12 SRM-NM-13	Colfax, Mora, Rio Arriba, San Juan, Taos, NM	$12,000 - $61,000	$18,000 - $53,000	1,451 (0.2%)
Cibola NF	UGM-1 UGM-2 UGM-3 UGM-4 BR-E-5 CP-2 OP-1 BR-E-7 BR-E-6 UGM-1	Catron, Cibola, McKinley, Socorro, Sierra, Sandoval, Bernalillo, Torrance, Lincoln, Valencia, NM	$18,000 - $89,000	$17,000 - $57,000	725 (0.8%)
Coconino NF	UGM-10 UGM-11 UGM-12 UGM-14 UGM-15	Coconino, Yavapai, AZ	$12,000 - $59,000	$47,000 - $124,000	10,476 (4.4%)
Coronado NF	BR-W-8 BR-W-9 BR-W-10 BR-W-11 BR-W-12 BR-W-13 BR-W-14 BR-W-15 BR-W-16 BR-W-17 BR-W-18	Cochise, Graham, Pima, Pinal, Santa Cruz, AZ & Hidalgo, NM	$32,000 - $158,000	$33,000 - $87,000	16,838 (5.8%)

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Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Efficiency Effects		
			Grazing Industry –Estimated Loss in Permit Values** (Annual, 2003$)	All Activities -- Administrative and Project Modification Costs (other than permit value)** (Annual, 2003$)	Fire Management Impacts – Acres of WUI in PACs (percent of Total WUI Acres)
	BR-W-19				
Gila NF	UGM-5 UG-M-6 UGM-7	Catron, Grant, Hidalgo, Sierra, NM	$43,000 - $213,000	$20,000 - $71,000	15,691 (2.8%)
Kaibab NF	UGM-13 UGM-15 UGM-17	Coconino, AZ	$4,000 - $19,000	$23,000 - $64,000	5,469 (4.8%)
Lincoln NF	BR-E-1 BR-E-2 BR-E-3 BR-E-4	Lincoln, Otero, NM	$16,000 - $81,000	$34,000 - $101,000	42,229 (15.3%)
Prescott NF	BR-W-1 BR-W-2 BR-W-3 UGM-13	Coconino, Yavapai, AZ	$4,000 - $19,000	$20,000 - $57,000	9,103 (3.2%)
Santa Fe NF	SRM-NM-1 SRM-NM-2 SRM-NM-3 SRM-NM-4 SRM-NM-5 SRM-NM-10	Los Alamos, Mora, Rio Arriba, Sandoval, San Miguel, Santa Fe, NM	$12,000 - $58,000	$25,000 - $80,000	5,388 (2.5%)
Tonto NF	BR-W-4 BR-W-5 BR-W-6 UGM-10	Gila, Maricopa, Pinal, Yavapai, AZ	$9,000 - $44,000	$27,000 - $74,000	27,027 (7.8%)
Region wide				$30,000 - $60,000	Not assessed[a]
US Forest Service Region 4					
Dixie NF	CP-12 CP-13	Garfield, Wayne, UT	$0 - $0	$40,000 - $183,000	Not assessed[a]
Fishlake NF	CP-13	Wayne, UT	$0 - $0	$16,000 - $51,000	Not assessed[a]
Manti-La Sal NF	CP-14	San Juan, UT	$0 - $0	$16,000 - $54,000	Not assessed[a]
USFS TOTAL			**$175,000 - $855,000**	**$412,000 - $1,245,000**	**134,397 (4.3%)[b]**
Bureau of Land Management					
BLM/AZ	BR-W-6 BR-W-7 BR-W-9 BR-W-18 UGM-7	Cochise, Gila, Graham, Greenlee, AZ	$0 - $0	$17,000 - $49,000	Not assessed[a]
BLM/CO	SRM-C-1 SRM-C-2	Custer, Douglas, El	$100 - $200	$26,000 - $69,000	Not assessed[a]

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Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Efficiency Effects: Grazing Industry –Estimated Loss in Permit Values** (Annual, 2003$)	Efficiency Effects: All Activities -- Administrative and Project Modification Costs (other than permit value)** (Annual, 2003$)	Fire Management Impacts – Acres of WUI in PACs (percent of Total WUI Acres)
		Paso, Fremont, Huerfano, Jefferson, Pueblo, Teller, CO			
BLM/NM	SRM-NM-10 UGM-5	Catron, Rio Arriba, Socorro, Taos, NM	$0 - $100	$15,000 - $45,000	Not assessed[a]
BLM/UT	CP-11 CP-12 CP-13 CP-14 CP-15	Carbon, San Juan, Garfield, Grand, Emery, Kane, Washington, Wayne, Uintah UT	$2,000 - $10,000	$48,000 - $256,000	Not assessed[a]
BLM Total			**$2,000 - $10,000**	**$106,000 -$419,000**	--
Bureau of Indian Affairs					
BIA/Mescalero	BR-E-1 BR-E-2	Lincoln, Otero, NM	***	$2,000 - $21,000	***
BIA/Navajo	CP-3 CP-4 CP-5 CP-6 CP-7 CP-8 CP-9 CP-10 CP-13	Apache, Coconino, Navajo, AZ; San Juan, McKinley, NM; San Juan, UT	***	$13,000 - $46,000	***
BIA/San Carlos	BR-W-7 UGM-9	Apache, Gila, Graham, Greenlee, AZ	***	$1,000 - $17,000	***
Other Tribes			***	$3,000 - $28,000	***
All Tribes			***	$1,000 - $2,000	***
BIA Total			***	**$20,000 - $114,000**	***
National Park Service					
Bandelier NM	SRM-NM-4	Los Alamos, Sandoval, NM	$0	$12,000 - $20,000	Not assessed[a]
Canyon de Chelly NM	CP-6 CP-7	Apache, AZ	$0	$7,000 - $29,000	Not assessed[a]
Canyonlands NP	CP-14	Garfield, San Juan, Wayne, UT	$0	$9,000 - $16,000	Not assessed[a]

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SUMMARY OF FUTURE EFFICIENCY IMPACTS (2004 – 2013)

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Efficiency Effects		
			Grazing Industry –Estimated Loss in Permit Values** (Annual, 2003$)	All Activities -- Administrative and Project Modification Costs (other than permit value)** (Annual, 2003$)	Fire Management Impacts – Acres of WUI in PACs (percent of Total WUI Acres)
Capitol Reef NP	CP-13	Garfield, Wayne, UT	$0	$9,000 - $27,000	Not assessed[a]
Chiricahua NP	BR-W-18	Cochise, AZ	$0	$13,000 - $22,000	Not assessed[a]
Coronado NM	BR-W-15	Cochise, AZ	$0	$7,000 - $14,000	Not assessed[a]
El Malpais NM	CP-2	Cibola, NM	$0	$8,000 - $30,000	Not assessed[a]
Glen Canyon NRA	CP-13 CP-14	Garfield, San Juan, UT	$0	$7,000 - $14,000	Not assessed[a]
Grand Canyon NP	CP-10	Coconino, Mohave, AZ	$0	$14,000 - $41,000	Not assessed[a]
Navajo NM	CP-9	Coconino, Navajo, AZ	$0	$8,000 - $31,000	Not assessed[a]
Rainbow Bridge NP	CP-13	San Juan, NM	$0	$7,000 - $29,000	Not assessed[a]
Saguaro NP	BR-W-11	Pima, AZ	$0	$23,000 - $39,000	Not assessed[a]
Walnut Canyon NP	UGM-12	Coconino, AZ	$0	$7,000 - $29,000	Not assessed[a]
Zion NP	CP-11	Iron, Kane, Washington, UT	$0	$32,000 - $60,000	Not assessed[a]
NPS Total			**$0**	**$163,000 - $402,000**	**--**
Other Federal Agencies****			$0	$72,000 - $242,000	Not assessed[a]
TOTALS			**$173,000 – $865,000**	**$772,000 - $2,421,000**	**134,397 (4.3%)[b]**
GRAND TOTAL, EFFICIENCY EFFECTS					**$946,000 - $3,286,000**

Notes: * This table presents analysis of the MSO critical habitat rulemaking as proposed. An analysis of the impacts expected as a result of the final designation is provided at the end of the Executive Summary.

*Loss in permit values, administrative costs and project modification costs are discounted assuming a rate of seven percent. Totals may not sum due to rounding. Efficiency effects are discounted using a rate of three percent in Appendix B of this report.

*** Impacts to Tribal activities are discussed separately.

**** Includes administrative and project modification costs for Federal Agencies (e.g., Department of Defense, Department of Transportation) engaging in consultation for "Other Activities". See Section 7.

[a] Data not available to conduct assessment of acres of WUI in PACs; direct fire management costs are included under "All Activities" column.

[b] Weighted average.

Exhibit ES-3

ANALYSIS OF MSO CRITICAL HABITAT DESIGNATION AS PROPOSED*
SUMMARY OF FUTURE REGIONAL ECONOMIC IMPACTS (Annual, 2004 – 2013)**

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Timber Industry - Regional Economic Impact/ Employment (Annual, 2003$)	Grazing Industry – Regional Economic Impact/ Employment (Annual, 2003$)	Oil & Gas Industry – Regional Economic Impact/ Employment (Annual, 2003$)	Total Regional Economic Impact/ Employment (Annual, 2003$)
US Forest Service Region 2						
Pike-San Isabel	SRM-C-1 SRM-C-2	Custer, Douglas, El Paso, Jefferson, Teller, CO	Minimal	$0 0	$0 0	$0 0
US Forest Service Region 3						
Apache Sitgreaves NF	UGM-7 UGM-10	Apache, Navajo, Greenlee, AZ & Catron, NM	$0 - $8,801,000 0 - 76	$0 - $67,000 0 - 1	$0 0	$0 - $8,868,000 0 – 77
Carson NF	SRM-NM-9 SRM-NM-10 SRM-NM-11 SRM-NM-12 SRM-NM-13	Colfax, Mora, Rio Arriba, San Juan, Taos, NM	$0 - $1,167,000 0 - 10	$0 - $76,000 0 -1	$0 0	$0 - $1,243,000 0 – 11
Cibola NF	UGM-1 UGM-2 UGM-3 UGM-4 BR-E-5 CP-2 OP-1 BR-E-7 BR-E-6 UGM-1	Catron, Cibola, McKinley, Socorro, Sierra, Sandoval, Bernalillo, Torrance, Lincoln, Valencia, NM	$0 - $4,267,000 0 - 37	$0 - $109,000 0 - 1	$0 0	$0 - $4,376,000 0 - 38
Coconino NF	UGM-10 UGM-11 UGM-12 UGM-14 UGM-15	Coconino, Yavapai, AZ	$0 - $8,688,000 0 - 75	$0 - $73,000 0 - 1	$0 0	$0 - $8,761,000 0 - 76
Coronado NF	BR-W-8 BR-W-9 BR-W-10 BR-W-11 BR-W-12 BR-W-13 BR-W-14 BR-W-15 BR-W-16 BR-W-17 BR-W-18 BR-W-19	Cochise, Graham, Pima, Pinal, Santa Cruz, AZ & Hidalgo, NM	Minimal	$0 - $194,000 0 - 3	$0 0	$0 - $194,000 0 -3
Gila NF	UGM-5 UG-M-6 UGM-7	Catron, Grant, Hidalgo, Sierra, NM	$0 - $14,026,000 0 - 121	$0 - $263,000 0 - 4	$0 0	$0 – $14,289,000 0 – 125
Kaibab NF	UGM-13 UGM-15 UGM-17	Coconino, AZ	$0 - $1,331,000 0 - 11	$0 - $23,000 0	$0 0	$0 – $1,354,000 0 – 11

Exhibit ES-3

ANALYSIS OF MSO CRITICAL HABITAT DESIGNATION AS PROPOSED*
SUMMARY OF FUTURE REGIONAL ECONOMIC IMPACTS (Annual, 2004 – 2013)**

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Timber Industry - Regional Economic Impact/ Employment (Annual, 2003$)	Grazing Industry – Regional Economic Impact/ Employment (Annual, 2003$)	Oil & Gas Industry – Regional Economic Impact/ Employment (Annual, 2003$)	Total Regional Economic Impact/ Employment (Annual, 2003$)
Lincoln NF	BR-E-1 BR-E-2 BR-E-3 BR-E-4	Lincoln, Otero, NM	$0 - $4,751,000 0 - 41	$0 - $100,000 0 - 1	$0 0	$0 – $4,851,000 0 – 42
Prescott NF	BR-W-1 BR-W-2 BR-W-3 UGM-13	Coconino, Yavapai, AZ	$0 - $922,000 0 – 8	$0 - $23,000 0	$0 0	$0 - $945,000 0 – 8
Santa Fe NF	SRM-NM-1 SRM-NM-2 SRM-NM-3 SRM-NM-4 SRM-NM-5 SRM-NM-10	Los Alamos, Mora, Rio Arriba, Sandoval, San Miguel, Santa Fe, NM	$0 - $3,025,000 0 - 26	$0 - $71,000 0 - 1	$0 0	$0 – $3,096,000 0 - 27
Tonto NF	BR-W-4 BR-W-5 BR-W-6 UGM-10	Gila, Maricopa, Pinal, Yavapai, AZ	$0 - $2,719,000 0 - 23	$0 - $54,000 0 - 1	$0 0	$0 - $2,773,000 0 - 24
US Forest Service Region 4						
Dixie NF	CP-12 CP-13	Garfield, Wayne, UT	Minimal	$0 0	$0 0	$0 0
Fishlake NF	CP-13	Wayne, UT	Minimal	$0 0	$0 0	$0 0
Manti-La Sal NF	CP-14	San Juan, UT	Minimal	$0 0	$0 0	$0 0
USFS Total			**$0 - $49,697,000 0 - 429**	**$0 - $1,054,000 0 – 14**	**$0 0**	**$0 - $50,751,000 0 - 443**
Bureau of Land Management						
BLM/AZ	BR-W-6 BR-W-7 BR-W-9 BR-W-18 UGM-7	Cochise, Gila, Graham, Greenlee, AZ	Minimal	$0 0	$0 0	$0 0
BLM/CO	SRM-C-1 SRM-C-2	Custer, Douglas, El Paso, Fremont, Huerfano, Jefferson, Pueblo, Teller, CO	Minimal	$0 - $200 0	$0 0	$0 - $200 0
BLM/NM	SRM-NM-10 UGM-5	Catron, Rio Arriba, Socorro, Taos, NM	Minimal	$0 - $100 0	$0 0	$0 - $100 0
BLM/UT	CP-11 CP-12 CP-13 CP-14 CP-15	Carbon, San Juan, Garfield, Grand, Emery, Kane, Washington, Wayne, Uintah UT	Minimal	$11,000 0	$0 - $8,376,000 0 - 52	$0 - $8,387,000 0 - 52

Exhibit ES-3

ANALYSIS OF MSO CRITICAL HABITAT DESIGNATION AS PROPOSED*
SUMMARY OF FUTURE REGIONAL ECONOMIC IMPACTS (Annual, 2004 – 2013)**

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Timber Industry - Regional Economic Impact/ Employment (Annual, 2003$)	Grazing Industry – Regional Economic Impact/ Employment (Annual, 2003$)	Oil & Gas Industry – Regional Economic Impact/ Employment (Annual, 2003$)	Total Regional Economic Impact/ Employment (Annual, 2003$)
BLM Total			--	$11,000 0	$0 - $8,376,000 0 - 52	$0 - $8,387,000 0 – 52
TOTALS			$0 - $49,697,000 0 - 429	$0 - $1,065,000 0 - 14	$0 - $8,376,000 52	$59,138,000 0 - 495

Notes: *: This table presents analysis of the MSO critical habitat rulemaking as proposed. An analysis of the impacts expected as a result of the final designation is provided at the end of the Executive Summary.

**Measures of regional economic impact are entirely distinct from the reported efficiency effects. As such these two measures of impact cannot be directly compared and should not be summed. Regional economic impacts for the timber and grazing industries are based on reductions to these activities in USFS Region 3 forests; impacts to Tribal timber and grazing activities are discussed separately. This exhibit includes only those management units that are impacted.

Summary of Areas Most Likely to Experience Impacts

14. The National Forests with the greatest regional economic impact from reduced timber harvest are the Gila, Apache-Sitgreaves, and Coconino, representing 63 percent of all expected impacts associated with potential lost timber harvest. These forests are most impacted due to the large area of MSO protected and restricted habitat on these forests where timber harvest activities have been limited. A reduction in timber harvest from the Gila NF could result in an annual regional economic impact of up to $14.0 million and 121 jobs. For the Apache-Sitgreaves, expected total impacts range from no impact to $8.8 million and 76 jobs, while for the Coconino NF, the estimated upper bound impact is approximately $8.7 million and 75 jobs.

15. The USFS Region 3 National Forests likely to experience the greatest impacts from livestock grazing permit reductions include the Gila, Coronado, Cibola, and Lincoln, respectively. These forests are most impacted due to the large area of MSO habitat proposed for designation and the overlap of the proposed designation with grazing allotments. Nearly 25 percent of the loss in permit values due to MSO-related reductions in AUMs are expected in the Gila NF, while approximately 18 and 10 percent of these impacts are expected in the Coronado NF and Cibola NF, respectively. Lost permit value from restrictions on grazing on Gila NF are expected to range from $0.5 to $2.3 million over the next 10 years. For the Coronado, these expected impacts range from $0.4 to $1.7 million over 10 years. A reduction in grazing permits on the Cibola and Lincoln each range from approximately $0.2 to $1.0 million in expected impacts over the next 10 years. A reduction in grazing from the Gila NF could result in an annual regional economic impact of $0.3 million in economic output and 4 jobs.

16. With regard to fire management activities, within USFS Region 3, the Lincoln NF has a higher likelihood of impacts related to MSO conservation than the rest. The overlap of WUI areas with PAC acres comprises over 15 percent of WUI areas on the Lincoln. For the remaining USFS Region 3 forests, WUI overlap with PAC areas ranges from no overlap to eight percent. It is possible that these PAC areas may experience a reduction in the effectiveness of fire management activities, primarily due to the avoidance of treating 100-acre areas in the PACs.

17. The areas most likely to experience any potential impacts on oil and gas activities are in New Mexico and Utah. Specifically, of the 235 active or recently-active wells located within the proposed CHD, 207 are spread across four critical habitat units in New Mexico (SRM-NM-10, -11, -12 and -13), all of which are in Rio Arriba County; and 28 are concentrated in three proposed critical habitat units in Utah, in Garfield County (along the northeastern edge of CP-12), San Juan County (on the northernmost tip of CP-14) and Carbon County (in a northwestern section of CP-15). The majority of the impacts on gas development from MSO conservation efforts will fall in the area surrounding Unit CP-15, including Carbon, Emery and Uintah Counties, due to the expected rapid growth of natural gas development in that area. Regional economic impacts in this area are forecast to range from no impact to $8.4 million in economic output and up to 52 jobs. This is equivalent to nearly all of the current jobs in this industry in this area, and about half of the current output

of the oil and gas industry in this area. However, gas development activities are expected to increase dramatically in this region.

18. The areas with the highest forecast efficiency impacts, respectively, include the following management areas: Gila NF, Coronado NF, Dixie NF, Coconino NF, Lincoln NF, and BLM districts within Utah. At the upper end, the analysis estimates that each of these areas will experience over $1.5 million in administrative and project modification costs over the next 10 years (or approximately $0.2 million annually). These six areas account for 45 percent of these impacts. Estimated future efficiency impacts on the Gila NF range from $0.5 million to $2.3 million over the next 10 years, whereas for BLM Utah, future efficiency effects are expected to range from $0.2 million to $0.8 million over 10 years.

Impacts to Tribes

19. Available data demonstrate the economic vulnerability of each of the Tribes analyzed; the economies of these communities are characterized by high unemployment, low income, low education levels and high poverty rates, as illustrated in Exhibit ES-4. As compared with State and national totals, the Tribes unemployment is three to five times higher, while per capita income levels are one-fourth to one-half of State levels. Poverty level on the three reservations ranges from 35 to 48 percent, while the surrounding State poverty levels range from nine to 18 percent.

Exhibit ES-4

2000 SOCIOECONOMIC INFORMATION – AFFECTED TRIBES

Area	Unemployment Rate	Per Capita Income	Poverty Rate[1]	Education Attainment[2]	Population Density[3]
USA	4.2%	$21,587	12.4%	15.1%	79.8
Arizona	5.6%	$20,275	13.9%	15.2%	45.2
New Mexico	7.3%	$17,261	18.4%	13.6%	15.0
Utah	5.0%	$18,185	9.4%	17.9%	27.2
Mescalero Apache	16.1%	$8,118	35.7%	4.5%	4.4
Navajo Nation	25.1%	$7,269	42.9%	4.7%	6.7
San Carlos Apache	35.4%	$5,200	48.2%	1.4%	3.2

Notes:
(1) Poverty rate represents the percent of families or individuals below the applicable poverty threshold level. Poverty thresholds are the same for all parts of the country, but vary depending on the applicable family size, age of householder, and number of related children under 18. Poverty thresholds are shown at http://www.census.gov/hhes/poverty/threshld/thresh99.html.
(2) Educational Attainment indicates percent of population ages 25 and over that hold a Bachelors degree or higher.
(3) Population density on Tribal lands is based on 1992-93 information.
Source: U.S. Census Bureau, Census 2000 and Bureau of Labor Statistics. Population density from Tillers Guide to Indian County, Economic Profiles of American Indian Reservations and Census QuickFacts for US, States, etc.

20. Potentially affected activities on Tribal lands include administrative efforts, timber harvest, fire management, grazing, coal mining and recreation. Each of the three affected Tribes has prepared an MSO conservation plan. The Navajo Nation has been impacted by

an MSO-related injunction on timber harvest on their lands since 1994, which, along with other factors, caused the shutdown of Navajo Forest Products Industries mill. The other two Tribes, the Mescalero Apache and the San Carlos Apache are actively managing their lands for commercial timber harvest and have interests in operating sawmills; therefore, any future reduction in timber harvest could result in fewer jobs and revenues for the Tribes. Exhibit ES-5 summarizes information representing upper-bound estimates of potential timber-related impacts from MSO conservation activities on Tribal land.

Exhibit ES-5

POTENTIAL IMPACTS OF MSO CONSERVATION ACTIVITIES ON TRIBAL TIMBER ACTIVITIES

Tribe	Summary of Activities Potentially Impacted
Mescalero Apache	• Based on expected future PAC set asides of commercial timberland, direct impacts could be $735,000 annually. • Mescalero Forest Products operates two mills that employ 160 employees with payroll of approximately $3.6 million. • The Tribe issues 12 to 35 contracts per year to Tribal employees for logging follow-up work, at an average of $242,000 over the past three years.
Navajo Nation	• Continuing impacts relate to an injunction on timber harvest until the Navajo complete their Forest Management Plan in compliance with MSO conservation standards. In 1992, the Navajo Forest Products Industries mill had a work force of 265, with an additional 200 employees working for various logging contractors. Annual payroll in 1992 was $6.9 million and sales revenues were $21.7 million.
San Carlos Apache	• Approximately 4,200 acres of the San Carlos Apache's 55,120 acres of commercial timberland (or eight percent) has been deferred from harvest as a result of MSO conservation activities.

Small Business Impacts

21. This analysis concludes that it is unlikely that the economic impacts presented in this report will greatly affect small businesses at the National, State, or County level. While some impacts are expected on small businesses involved in livestock grazing, future impacts to existing small businesses in the timber industry are unlikely.[6] The timber industry in the Southwest has declined significantly over the past ten years due to a variety of factors, including MSO conservation activities. Because impacts on timber harvest resulting from MSO conservation efforts are ongoing, the regional timber industry has likely already adjusted to reduced timber sales from National Forests. Thus, future impacts to existing timber-related businesses in the region, all of whom are likely to be small businesses, are unlikely. These impacts would only occur if MSO conservation efforts resulted in additional reductions in timber supply, above the forecast upper bound estimates. Given the current level of timber sales from USFS Region 3 National Forests, it is worth noting that sawmills

[6] Residential development is frequently impacted by critical habitat designation. However, private lands are excluded from this rule. Because residential development is not an issue on Federal lands, no impacts on this industry are anticipated.

operating in the region are likely dependent on either Tribal or private timber sources for their supply.

22. The analysis assumes that all ranchers operating in the proposed CHD are small businesses, based on the SBA size standard and an analysis of businesses classified as Beef Cattle Ranching and Farming (NAICS 11211) in the region.[7] The analysis uses two approaches to estimate impacts on small businesses related to reductions in AUMs. First, this analysis estimates the number of ranchers that could possibly experience a complete reduction in their authorized AUMs. If the total impacts were to affect the smallest number of ranchers, no more than 15 ranchers (less than two percent of grazing permittees) would be affected. Second, the analysis estimates the impact on each rancher in the proposed CHD, if the impacts were evenly distributed. Based on an estimate of approximately 850 permitted ranchers in the proposed CHD, this would result in an annual reduction of 4 to 19 AUMs per rancher (a reduction of less than two percent of AUMs per permittee).

23. Impacts to small businesses in the natural gas industry from MSO-related delays are not expected as long as substitute drilling locations are available. However, if gas producers are unable to shift production elsewhere, up to five companies could be impacted per year, assuming each delayed well belonged to an individual company. The impact of the loss of one well would depend on the finances of the company. While some small oil and gas businesses may experience some impacts from the designation, most of the oil and gas companies that operate in New Mexico and Utah are headquartered outside of the region; therefore, the relevant area for purposes of this small business analysis is the United States. Thus, only a small percentage of oil and gas businesses are likely to be affected. In addition, one rock quarry operator may experience impacts related to administrative costs of preparing a habitat conservation plan for MSO. However, this is the only quarry operation in the region (defined as affected counties in Colorado) likely to experience any impacts.

Energy Industry Impacts

24. Pursuant to Executive order No. 13211, Federal agencies are required to submit a summary of the potential effects of regulatory actions on the supply, distribution and use of energy. This proposed CHD is not expected to generate any “significant adverse effects” as defined by the Office of Management and Budget.

Caveats to Economic Analysis

25. Exhibit ES-6 summarizes the key assumptions underlying the analysis of economic impacts, as well as the potential direction and relative scale of bias introduced by these assumptions on the magnitude of the estimated cost impacts.

[7] Based on a Dialog search of file 516 Dun & Bradstreet, "Dun's Market Identifiers," updated in November 2003, 92 percent of businesses in the affected counties in Arizona and New Mexico in NAICS 112111, 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 (http://www.sba.gov/size/indextableofsize.html.

Exhibit ES-6

CAVEATS TO THE ECONOMIC ANALYSIS

Key Assumption	Effect on Impact Estimate
Analysis does not address other factors that could have affected or could impact future timber sales from impacted NFs, such as the declining timber industry in the region, USFS forest plan amendments un-related to MSO, and changing USFS management priorities.	+/-
Although there are many factors that may result in AUM reductions, historical reductions to grazing (permitted AUMs) in MSO habitat are assumed to result from MSO conservation measures. In addition, all grazed CHD areas are assessed, whether or not areas possess MSO PCEs. As a result, most allotments in MSO CHD on USFS and BLM lands are assumed to experience a reduction in AUMs of 10 to 50 percent.	+
Timber in the PACs and restricted areas would have been harvested sustainably, under a 30-year rotation.	+
Analysis of impacts of MSO conservation on timber markets does not exclude areas with unsuitable stand structure or species type within PAC and restricted habitat areas.	+
The IMPLAN model used to estimate regional economic impacts is a static model and does not account for the fact that the economy will adjust. IMPLAN measures the effects of a specific policy change at one point in time. Over the long-run, the economic losses predicted by the model may be overstated as adjustments such as re-employment of displaced employees occurs.	+
The IMPLAN model used to estimate regional economic impacts relies on 1998 data. If significant changes have occurred in the structure of the affected counties economies, the results may be sensitive to this assumption. The direction of any bias is unknown.	+/-
The timber analysis does not calculate and exclude the area within restricted habitat that is designated as wilderness. Therefore, the analysis may overstate impacted acres by as much as 20 percent in restricted areas.	+
Other than regional impacts of reduced timber harvest, which is the primary impact of Recovery Plan implementation on timber sales, project modifications to timber sale projects have not been quantified in this analysis.	-
The number of AUMs grazed in MSO CHD is estimated proportional by acreage to the total number of AUMs grazed in that forest. Because MSO habitat tends to be on steep slopes and densely forested areas, this may overstate the actual number of AUMs grazed in CHD.	+
Every allotment that contains MSO habitat in USFS Region 3 will or did have reductions in AUMs after undergoing NEPA assessment.	+
The livestock grazing permit value is $78/AUM on USFS lands, and $85/AUM on BLM lands.	+/-
Potential reductions in fire management project efficiency are not quantified.	-
The analysis assumes that a portion of the forecast development of the Book Cliffs Play located in CHD unit CP-15 represents the likely oil and gas projects likely to experience delays in the future.	+/-
The analysis assumes that oil and gas operators are unable to find suitable substitute sites to drill a well within the region, and that labor is not re-employed within the region.	+
The analysis assumes that oil and gas operators are unable to plan ahead for survey requirements for MSO.	+
Historic administrative consultation costs and project modifications are good predictors of future consultation costs and modifications.	+/-

- : This assumption may result in an underestimate of real costs.
+ : This assumption may result in an overestimate of real costs.
+/- : This assumption has an unknown effect on the magnitude of cost estimates.

Estimated Cost of the Final Designation

26. The body of this report presents an analysis of this rulemaking as proposed. This section of the Executive Summary provides information related to the impacts expected as a result of the final designation.

27. Since the publication of the draft economic analysis, the Service has excluded various areas from the critical habitat designation. These changes are described in the final rule. These exclusions are summarized below:

- Under section 4(b)(2) of the Act, the Service has excluded areas associated with 158 WUI projects, as well as Tribal lands of the Mescalero Apache, Navajo, and San Carlos Apache Tribes, and Canyon de Chelly and Navajo National Monuments.

- Under section 4(a)(3) of the Act, the Service has excluded lands associated with Fort Carson, Fort Huachuca and the U.S. Naval Observatory Flagstaff Station.

- Based on additional information, various areas have been excluded because they are no longer considered essential to the conservation of the species and thus do not meet the definition of critical habitat.

Exhibit ES-7 provides a summary of the areas excluded by management unit.

Exhibit ES-7

SUMMARY OF AREAS EXCLUDED FROM MSO CRITICAL HABITAT DESIGNATION AS PROPOSED

Agency/Management Unit	Percent of Area Excluded from CHD as Proposed		
	Under Section 4(b)(2)	Under Section 4(a)(3)	Non-Essential Areas
US Forest Service Region 2			
Pike-San Isabel			64%
US Forest Service Region 3			
Apache Sitgreaves NF	12%		0%
Carson NF	6%		93%
Cibola NF			48%
Coconino NF	5%		1%
Coronado NF	8%		4%
Gila NF	2%		48%
Kaibab NF	2%		6%
Lincoln NF	30%		3%
Prescott NF	18%		17%
Santa Fe NF	3%		70%
Tonto NF	9%		1%
US Forest Service Region 4			
Dixie NF			38%
Fishlake NF			98%
Manti-La Sal NF			7%
Bureau of Land Management			
BLM/AZ			93%
BLM/CO			62%
BLM/NM			76%
BLM/UT			6%
Bureau of Indian Affairs			
BIA/Mescalero	100%		
BIA/Navajo	100%		
BIA/San Carlos	100%		
National Park Service			
Bandelier NM			5%
Canyon de Chelly NM	100%		
Canyonlands NP			
Capitol Reef NP			
Chiricahua NP			5%
Coronado NM			2%
El Malpais NM			100%
Glen Canyon NRA			
Grand Canyon NP			2%
Navajo NM	100%		
Rainbow Bridge NP			100%
Saguaro NP			
Walnut Canyon NP			
Zion NP			
Other Federal Agencies			
Fort Carson		100%	
Fort Huachuca		100%	
Fort Wingate			100%
U.S. Naval Observatory		100%	

* Based on analysis of GIS data illustrating final designation provided by U.S. Fish and Wildlife Service on July 29, 2004.

28. Exhibit ES-8 presents the annualized efficiency effects related to MSO conservation efforts associated with the final designation. Future administrative and project modification costs resulting from MSO conservation activities, discounted to present value using a rate of seven percent, are forecast to range from $5.4 to $16.2 million over the next 10 years, or $0.5 to $1.6 million annually, excluding grazing permit value losses. These costs will be incurred primarily by Federal agencies responsible for section 7 consultations, and the Service. Future impacts related to grazing permit value losses are forecast to be $1.1 to $5.5 million over the next ten years, or $0.1 to $0.6 million annually; these costs are expected to be borne by private ranchers. As WUI areas are not included in the final designation, impacts related to the risk of catastrophic fire are not expected. Similarly, for Tribal lands and the majority of military lands, impacts related to CHD are not expected to occur as these lands are excluded from the final designation.

29. Exhibit ES-9 presents the regional economic impacts expected to occur as a result of the final MSO CHD. The annual regional economic impact of MSO-related impacts on timber harvest from USFS Region 3 forests is estimated to range from no impact to $33.6 million. This limitation on timber harvest could also impact as many as 290 jobs. MSO-related reductions in livestock production from USFS Region 3 forests are forecast to result in changes in annual regional economic impact of up to $0.7 million. Reductions in livestock production may also impact as many as 9 jobs. The annual regional economic impact of MSO-related delays to natural gas development on BLM Utah lands in Carbon, Emery and Uintah Counties is estimated to range from no impact to $8.4 million. MSO-related delays to oil and gas production could also impact as many as 52 jobs.[8]

30. The main text of the report discusses impacts to small businesses expected under the rulemaking as proposed. Impacts to small businesses are primarily related to grazing permit losses. Under the final designation, the reduction in small business impacts would parallel the extent to which grazing permit losses are reduced.

[8] While the Service has excluded certain BLM UT lands, including a small portion of CHD unit CP-15; this analysis assumes that affected gas development activity would likely occur on lands not excluded from the final designation; thus these impacts may be overstated.

Exhibit ES-8

MSO FINAL CRITICAL HABITAT DESIGNATION
SUMMARY OF FUTURE EFFICIENCY IMPACTS (2004 – 2013)

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Efficiency Effects	
			Grazing Industry Estimated Loss in Permit Values* (Annual, 2003$)	All Activities Administrative and Project Modification Costs (other than permit value)* (Annual, 2003$)
US Forest Service Region 2				
Pike-San Isabel	SRM-C-1 SRM-C-2	Custer, Douglas, El Paso, Jefferson, Teller, CO	$0	$10,000 - $29,000
US Forest Service Region 3				
Apache Sitgreaves NF	UGM-7 UGM-10	Apache, Navajo, Greenlee, AZ & Catron, NM	$10,000 - $48,000	$28,000 - $74,000
Cibola NF	UGM-1 UGM-2 UGM-3 UGM-4 BR-E-5 CP-2 OP-1 BR-E-7 BR-E-6 UGM-1	Catron, Cibola, McKinley, Socorro, Sierra, Sandoval, Bernalillo, Torrance, Lincoln, Valencia, NM	$9,000 - $46,000	$9,000 - $29,000
Coconino NF	UGM-10 UGM-11 UGM-12 UGM-14 UGM-15	Coconino, Yavapai, AZ	$11,000 - $56,000	$44,000 - $117,000
Coronado NF	BR-W-8 BR-W-9 BR-W-10 BR-W-11 BR-W-12 BR-W-13 BR-W-14 BR-W-15 BR-W-16 BR-W-17 BR-W-18 BR-W-19	Cochise, Graham, Pima, Pinal, Santa Cruz, AZ & Hidalgo, NM	$28,000 - $139,000	$29,000 - $77,000
Gila NF	UGM-5 UG-M-6 UGM-7	Catron, Grant, Hidalgo, Sierra, NM	$22,000 - $108,000	$10,000 - $36,000
Kaibab NF	UGM-13 UGM-15 UGM-17	Coconino, AZ	$3,000 - $17,000	$21,000 - $59,000
Lincoln NF	BR-E-1 BR-E-2 BR-E-3 BR-E-4	Lincoln, Otero, NM	$11,000 - $55,000	$23,000 - $68,000
Prescott NF	BR-W-1 BR-W-2 BR-W-3 UGM-13	Coconino, Yavapai, AZ	$2,000 - $12,000	$13,000 - $37,000

Exhibit ES-8

MSO FINAL CRITICAL HABITAT DESIGNATION
SUMMARY OF FUTURE EFFICIENCY IMPACTS (2004 – 2013)

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Efficiency Effects: Grazing Industry Estimated Loss in Permit Values* (Annual, 2003$)	Efficiency Effects: All Activities Administrative and Project Modification Costs (other than permit value)* (Annual, 2003$)
Santa Fe NF	SRM-NM-1 SRM-NM-2 SRM-NM-3 SRM-NM-4 SRM-NM-5 SRM-NM-10	Los Alamos, Mora, Rio Arriba, Sandoval, San Miguel, Santa Fe, NM	$3,000 - $16,000	$7,000 - $22,000
Tonto NF	BR-W-4 BR-W-5 BR-W-6 UGM-10	Gila, Maricopa, Pinal, Yavapai, AZ	$8,000 - $40,000	$24,000 - $67,000
Region wide			$0	$28,000 - $55,000
US Forest Service Region 4				
Dixie NF	CP-12 CP-13	Garfield, Wayne, UT	$0	$25,000 -$113,000
Fishlake NF	CP-13	Wayne, UT	$0	$0 - $1,000
Manti-La Sal NF	CP-14	San Juan, UT	$0	$15,000 - $51,000
USFS TOTAL			**$107,000 - $537,000**	**$286,000 - $836,000**
Bureau of Land Management				
BLM/AZ	BR-W-6 BR-W-7 BR-W-9 BR-W-18 UGM-7	Cochise, Gila, Graham, Greenlee, AZ	$0	$1,000 - $3,000
BLM/CO	SRM-C-1 SRM-C-2	Custer, Douglas, El Paso, Fremont, Huerfano, Jefferson, Pueblo, Teller, CO	$0	$10,000 -$26,000
BLM/NM	SRM-NM-10 UGM-5	Catron, Rio Arriba, Socorro, Taos, NM	$0	$4,000 - $11,000
BLM/UT	CP-11 CP-12 CP-13 CP-14 CP-15	Carbon, San Juan, Garfield, Grand, Emery, Kane, Washington, Wayne, Uintah UT	$2,000 - $9,000	$45,000 - $241,000
BLM Total			**$2,000 - $9,000**	**$60,000 - $282,000**
National Park Service				
Bandelier NM	SRM-NM-4	Los Alamos, Sandoval, NM	$0	$11,000 - $19,000
Canyonlands NP	CP-14	Garfield, San Juan, Wayne, UT	$0	$9,000 - $16,000
Capitol Reef NP	CP-13	Garfield, Wayne, UT	$0	$9,000 - $27,000
Chiricahua NP	BR-W-18	Cochise, AZ	$0	$12,000 - $21,000
Coronado NM	BR-W-15	Cochise, AZ	$0	$7,000 - $14,000
Glen Canyon NRA	CP-13 CP-14	Garfield, San Juan, UT	$0	$7,000 - $14,000

Exhibit ES-8

MSO FINAL CRITICAL HABITAT DESIGNATION
SUMMARY OF FUTURE EFFICIENCY IMPACTS (2004 – 2013)

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Efficiency Effects	
			Grazing Industry Estimated Loss in Permit Values* (Annual, 2003$)	All Activities Administrative and Project Modification Costs (other than permit value)* (Annual, 2003$)
Grand Canyon NP	CP-10	Coconino, Mohave, AZ	$0	$14,000 - $40,000
Saguaro NP	BR-W-11	Pima, AZ	$0	$23,000 - $39,000
Walnut Canyon NP	UGM-12	Coconino, AZ	$0	$7,000 - $29,000
Zion NP	CP-11	Iron, Kane, Washington, UT	$0	$32,000 - $60,000
NPS Total			**$0**	**$131,000 - $279,000**
Other Federal Agencies**			**$0**	**$65,000 -$225,000**
TOTALS			**$109,000 - $546,000**	**$542,000 - $1,622,000**
GRAND TOTAL, EFFICIENCY EFFECTS				**$650,000 - $2,168,000**

Notes: * Loss in permit values, administrative costs and project modification costs are discounted assuming a rate of seven percent. Totals may not sum due to rounding. This exhibit includes only those management units where impacts occur under the final designation.

** Includes administrative and project modification costs for Federal Agencies (e.g., Department of Defense, Department of Transportation) engaging in consultation for "Other Activities", with the exception of DOD facilities that have been excluded from the final designation including Fort Carson, Fort Huachuca, Fort Wingate, and U.S. Naval Observatory at Flagstaff.

Exhibit ES-9

MSO FINAL CRITICAL HABITAT DESIGNATION
SUMMARY OF FUTURE REGIONAL ECONOMIC IMPACTS* (Annual, 2004 – 2013)

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Timber Industry - Regional Economic Impact/ Employment (Annual, 2003$)	Grazing Industry – Regional Economic Impact/ Employment (Annual, 2003$)	Oil & Gas Industry – Regional Economic Impact/ Employment (Annual, 2003$)	Total Regional Economic Impact/ Employment (Annual, 2003$)
US Forest Service Region 2						
Pike-San Isabel	SRM-C-1 SRM-C-2	Custer, Douglas, El Paso, Jefferson, Teller, CO	Minimal	$0 0	$0 0	$0 0
US Forest Service Region 3						
Apache Sitgreaves NF	UGM-7 UGM-10	Apache, Navajo, Greenlee, AZ & Catron, NM	$0 - $7,731,000 0 - 67	$0 - $59,000 0 - 1	$0 0	$0 - $7,790,000 0 – 68
Cibola NF	UGM-1 UGM-2 UGM-3 UGM-4 BR-E-5 CP-2 OP-1 BR-E-7 BR-E-6 UGM-1	Catron, Cibola, McKinley, Socorro, Sierra, Sandoval, Bernalillo, Torrance, Lincoln, Valencia, NM	$0 - $2,192,000 0 - 19	$0 - $56,000 0 - 1	$0 0	$0 - $2,248,000 0 - 20
Coconino NF	UGM-10 UGM-11 UGM-12 UGM-14 UGM-15	Coconino, Yavapai, AZ	$0 - $8,237,000 0 - 71	$0 - $69,000 0 - 1	$0 0	$0 - $8,306,000 0 - 72
Coronado NF	BR-W-8 BR-W-9 BR-W-10 BR-W-11 BR-W-12 BR-W-13 BR-W-14 BR-W-15 BR-W-16 BR-W-17 BR-W-18 BR-W-19	Cochise, Graham, Pima, Pinal, Santa Cruz, AZ & Hidalgo, NM	Minimal	$0 - $171,000 0 - 2	$0 0	$0 - $171,000 0 - 2
Gila NF	UGM-5 UG-M-6 UGM-7	Catron, Grant, Hidalgo, Sierra, NM	$0 - $7,121,000 0 - 61	$0 - $133,000 0 - 2	$0 0	$0 – $7,254,000 0 – 63
Kaibab NF	UGM-13 UGM-15 UGM-17	Coconino, AZ	$0 - $1,226,000 11	$0 - $21,000 0	$0 0	$0 - $1,247,000 0 - 11
Lincoln NF	BR-E-1 BR-E-2 BR-E-3 BR-E-4	Lincoln, Otero, NM	$0 - $3,214,000 0 - 28	$0 - $68,000 0 - 1	$0 0	$0 – $3,282,000 0 – 29
Prescott NF	BR-W-1 BR-W-2	Coconino, Yavapai, AZ	$0 - $596,000 0 – 5	$0 - $15,000 0	$0 0	$0 - $611,000 0 – 5

Exhibit ES-9

MSO FINAL CRITICAL HABITAT DESIGNATION
SUMMARY OF FUTURE REGIONAL ECONOMIC IMPACTS* (Annual, 2004 – 2013)

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Timber Industry - Regional Economic Impact/ Employment (Annual, 2003$)	Grazing Industry – Regional Economic Impact/ Employment (Annual, 2003$)	Oil & Gas Industry – Regional Economic Impact/ Employment (Annual, 2003$)	Total Regional Economic Impact/ Employment (Annual, 2003$)
	BR-W-3 UGM-13					
Santa Fe NF	SRM-NM-1 SRM-NM-2 SRM-NM-3 SRM-NM-4 SRM-NM-5 SRM-NM-10	Los Alamos, Mora, Rio Arriba, Sandoval, San Miguel, Santa Fe, NM	$0 - $833,000 0 - 7	$0 - $20,000 0	$0 0	$0 – $853,000 0 – 7
Tonto NF	BR-W-4 BR-W-5 BR-W-6 UGM-10	Gila, Maricopa, Pinal, Yavapai, AZ	$0 - $2,457,000 0 - 21	$0 - $49,000 0 - 1	$0 0	$0 - $2,596,000 0 – 22
US Forest Service Region 4						
Dixie NF	CP-12 CP-13	Garfield, Wayne, UT	Minimal	$0 0	$0 0	$0 0
Fishlake NF	CP-13	Wayne, UT	Minimal	$0 0	$0 0	$0 0
Manti-La Sal NF	CP-14	San Juan, UT	Minimal	$0 0	$0 0	$0 0
USFS Total			**$0 - $33,608,000 0 - 290**	**$0 - $661,000 0 – 9**	**$0 0**	**$0 - $34,269,000 0 – 299**
Bureau of Land Management						
BLM/AZ	BR-W-6 BR-W-7 BR-W-9 BR-W-18 UGM-7	Cochise, Gila, Graham, Greenlee, AZ	Minimal	$0 0	$0 0	$0 0
BLM/CO	SRM-C-1 SRM-C-2	Custer, Douglas, El Paso, Fremont, Huerfano, Jefferson, Pueblo, Teller, CO	Minimal	$0 - $100 0	$0 0	$0 - $100 0
BLM/NM	SRM-NM-10 UGM-5	Catron, Rio Arriba, Socorro, Taos, NM	Minimal	$0 0	$0 0	$0 0
BLM/UT	CP-11 CP-12 CP-13 CP-14 CP-15	Carbon, San Juan, Garfield, Grand, Emery, Kane, Washington, Wayne, Uintah UT	Minimal	$0 - $10,000 0	$0 - $8,376,000 0 - 52	$0 - $8,386,000 0 - 52
BLM Total			**--**	**$0 - $10,000 0**	**$0 - $8,376,000 0 - 52**	**$0 - $8,386,000 0 – 52**
TOTALS			**$0 - $33,608,000 0 - 290**	**$0 - $672,000 0 - 9**	**$0 - $8,376,000 0 - 52**	**$0 - $42,656,000 0 - 351**

Notes: * Measures of regional economic impact are entirely distinct from the reported efficiency effects. As such these two measures of impact cannot be directly compared and should not be summed. Regional economic impacts for the timber and grazing industries are based on reductions to these activities in USFS Region 3 forests. This exhibit includes only those management units where impacts occur under the final designation. Totals may not sum due to rounding.

31. The purpose of this report is to estimate the economic impact of actions taken to protect the Federally listed Mexican spotted owl (MSO) (*Strix occidentalis lucida*) and its habitat. It attempts to quantify the economic effects of the critical habitat designation (CHD), as well as any protective measures taken that aid habitat conservation in the areas proposed for designation. The analysis looks retrospectively at costs incurred since the MSO was listed, and it attempts to predict future costs likely to occur after the 2003 proposed CHD is finalized. This report was prepared by Industrial Economics, Incorporated (IEc), under contract to the U.S. Fish and Wildlife Service's (Service) Division of Economics.

32. 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 CHD when the benefits of exclusion outweigh the benefits of including the areas within the CHD, provided the exclusion will not result in extinction of the species.

33. This analysis 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.[9] 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).[10] This report also complies with direction from the U.S. 10th Circuit Court of Appeals that, when deciding which areas to designate as critical habitat, the economic analysis informing that decision should include "co-extensive" effects.[11]

[9] 16 U.S.C. §1533(b)(2).

[10] 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.

[11] 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 CHD, 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)).

34. This section describes the framework for analyzing the economic impact of actions taken to protect the MSO. This section first describes the general analytic approach to estimating economic effects, including a discussion of both efficiency and distributional effects. Next, this section discusses the scope of the analysis, including a discussion of the link between existing and critical habitat-related protection efforts and economic impacts. Third, this section presents the analytic time frame used in the report.

1.1 Approach to Estimating Economic Effects

35. This economic analysis considers both the economic efficiency and distributional effects that may result from efforts to protect MSO and its habitat (hereinafter referred to collectively as "MSO conservation activities"). Economic efficiency effects generally reflect "opportunity costs" associated with the commitment of resources required to accomplish species and habitat conservation. For example, if activities that can take place on a parcel of land 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 MSO conservation activities.

36. This analysis also addresses how the impacts of the designation are distributed, including an assessment of any local or regional impacts of habitat conservation and the potential effects of conservation activities on small entities and the energy industry. This information can be used by decision-makers to assess whether the effects of MSO conservation activities might unduly burden a particular group or economic sector. For example, while conservation activities may have a relatively small impact when measured in terms of changes in national economic efficiency, individuals employed in a particular sector of the economy in the geographic area of the designation may experience relatively greater impacts. The difference between economic efficiency effects and distributional effects, as well as their application in this analysis, are discussed in greater detail below.

37. Where data are available, this analysis attempts to capture the *net* economic impact imposed on regulated entities and the regional economy of MSO conservation actions. That is, the economic impact of MSO conservation net of any direct off-setting benefit to impacted entities. For example, the analysis recognizes that the net efficiency impact of reduced timber harvest on Forest Service land is likely to be modest, since the Forest Service will likely avoid certain costs associated with administering the affected timber sales (e.g., reduced road maintenance costs). By doing so, this analysis attempts to recognize these off-setting effects.

1.1.1 Efficiency Effects

38. Under 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 understand how society, as a

whole, will be affected by a regulatory action.[12] In the context of regulations that protect MSO habitat, these 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 surpluses in affected markets.[13]

39. In some instances, compliance costs may provide a reasonable approximation for the efficiency effects associated with a regulatory action. For example, a Federal 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 represents an economic opportunity cost, because the landowner or manager's time and effort would have been spent in an alternative activity had the parcel not been included in the designation. When 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 can provide a reasonable estimate of the change in economic efficiency.

40. 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 harvest of large areas of timber land may shift the price and quantity of timber 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 timber market.

41. This analysis begins by measuring costs associated with measures taken to protect MSO and its habitat. As noted above, in some cases, compliance costs can provide a reasonable estimate of changes in economic efficiency. However, if the cost of conservation measures is expected to significantly impact markets, the analysis will consider potential changes in consumer and/or producer surplus in affected markets.

[12] Executive Order 12866, "Regulatory Planning and Review," September 30, 1993; 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.

[13] 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.

1.1.2 Distributional and Regional Economic Effects

42. Measurements of changes in economic efficiency focus on the net impact of conservation activities, without consideration of how certain economic sectors of 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.[14] 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.

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).

[14] 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.

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

43. This analysis considers how small entities, including small businesses, organizations, and governments, as defined by the Regulatory Flexibility Act, might be affected by future MSO conservation activities.[15] In addition, in response to Executive Order 13211 "Actions Concerning Regulations That Significantly Affect Energy Supply, Distribution, or Use," this analysis considers the future impacts of conservation activities on the energy industry and its customers.[16]

Regional Economic Effects

44. Regional economic impact analysis can provide an assessment of the potential localized effects of conservation activities. 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 regional input/output models. These models rely on multipliers that mathematically 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.

45. 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 impacted 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.

46. 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.

[15] 5 U.S.C. § 601 *et seq.*

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

1.2 Scope of the Analysis

47. This analysis attempts to quantify economic effects of the CHD, 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 conservation 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 conservation efforts affording protection to the MSO likely contribute to the efficacy of the proposed CHD efforts, the impacts of these actions are considered relevant for understanding the full impact of proposed CHD.

1.2.1 Sections of the Act Relevant to the Analysis

48. The analysis begins by looking retrospectively at the costs incurred since the time that the MSO was first listed. 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 in the foreseeable future, and quantifies the effects that sections 4, 7, 9, and 10 of the Act may have on those activities.

49. Section 4 of the Act focuses on the listing and recovery of endangered and threatened species, as well as the CHD. In this section, the Secretary is required to designate species as endangered or threatened "solely on the basis of the best available scientific and commercial data."[17] Under section 4(d), the Service may write regulations to provide for the conservation of threatened species. The implementation of these regulations may have economic impacts on resource managers, landowners, and other relevant parties. However, there is no 4(d) rule for the MSO, and thus Section 4 issues are not relevant to this analysis.

50. The non-species specific protections afforded to threatened and endangered species and their designated 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 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 CHD.

- 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

[17] 16 U.S.C. 1533.

collect, or to attempt to engage in any such conduct."[18] 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 an endangered animal species in order to meet the conditions for issuance of an incidental take permit in connection with the development and management of a property.[19] 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. In the case of the MSO, HCPs may be an issue in the case of one rock quarry operation on private land near proposed CHD (discussed in Section 7.3). However, the vast majority of land ownership for the proposed CHD area is Federally owned, and Federal agencies do not develop HCPs. Federal entities obtain permission for incidental take through the section 7 consultation process.

1.2.2 Other Relevant Protection Efforts

51. 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.[20] Often, these conservation activities are pursued in conjunction with section 7 consultations or section 10 permitting activities. To the extent that other Federal, State, and local laws and policies result in conservation activities that might have otherwise been requested by the Service, the effects of these activities are included in this analysis. In addition, under certain circumstances, the CHD 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 would not have been triggered "but for" the designation of critical habitat, they are included in this economic analysis.

1.2.3 Additional Analytic Considerations

52. This analysis also considers other types of economic impacts that can be related to section 7 consultations in general and CHD in particular, including time delay, regulatory uncertainty, and stigma impacts. The potential for these types of impacts is considered in this analysis.

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[18] 16 U.S.C. 1538 and 16 U.S.C. 1532.

[19] U.S. Fish and Wildlife Service, "Endangered Species and Habitat Conservation Planning. "From: http://endangered.fws.gov/hcp/, as viewed on August 6, 2002. Sections 9 and 10 of the Act do not apply to plants.

[20] For example, the Sikes Act Improvement Act (Sikes Act) of 1997 requires Department of Defense (DoD) military installations to develop Integrated Natural Resources Management Plans (INRMPs) that provide for the conservation, protection, and management of wildlife resources (16 U.S.C. §§ 670a - 670o). These plans must integrate natural resource management with the other activities, such as training exercises, taking place at the facility.

Time Delay and Regulatory Uncertainty Impacts

53. 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 CHD).

Stigma Impacts

54. Changes to private property values associated with public attitudes about the limits and costs of CHD are known as "stigma" impacts. Because the proposed CHD specifically excludes private property, no significant stigma impacts are expected to occur.

1.2.4 Benefits

55. 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.

56. In Executive Order 12866, OMB directs Federal agencies to provide an assessment of costs and benefits of a proposed regulatory action.[21] 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.[22] 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 CHD, the Service believes that the benefits of proposed CHD are best expressed in biological terms that can be weighed against the expected cost impacts of the rulemaking.*

1.3 Analytic Time Frame

57. The analysis estimates impacts 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. Accordingly, the analysis bases estimates on activities that span the 1993 to 2013 time frame, beginning when the

[21] Executive Order 12866, "Regulatory Planning and Review, " September 30, 1993.

[22] 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.

listing of the MSO was finalized. Forecasts of economic conditions and other factors beyond the next 10 years would be subject to a high degree of uncertainty.

1.4 Information Sources

58. The primary sources of information for this report were communications with and data provided by personnel from the Service, Federal action agencies within the four corners States (Arizona, Colorado, New Mexico and Utah), affected private parties and local and State governments. Specifically, the analysis relies on data collected in communication with personnel from the following entities:

- U.S. Bureau of Land Management (BLM);
- Bureau of Indian Affairs (BIA);
- U.S. Fish and Wildlife Service (Service);
- U.S. Forest Service (USFS);
- National Park Service (NPS);
- Department of Energy (DOE);
- Mescalero Apache Tribe;
- Navajo Nation;
- San Carlos Apache Tribe;
- Dine Care;
- Various county and city governments;
- Fort Huachuca;
- New Mexico Forestry;
- New Mexico Department of Agriculture;
- New Mexico State University Agricultural Extension;
- Utah Department of Natural Resources;
- Western Wood Products Association;

- Four Corners Forests Sustainable Partnership;
- Various oil and gas development companies; and,
- Coalition of New Mexico and Arizona Counties.

59. Publicly available data from the Census Bureau and other Department of Commerce data were relied on to characterize the regional economy. In addition, this analysis relies upon the Service's section 7 consultation records, public comments, and published journal sources. The reference section at the end of this document provides a full list of information sources.

1.5 Structure of Report

60. The remainder of the report is organized as follows:

- Section 2: Background and Socioeconomic Profiles
- Section 3: Potential Impacts on Timber Industry
- Section 4: Potential Impacts on Livestock Industry
- Section 5: Potential Impacts on Fire Management Activities
- Section 6: Potential Impacts on Tribal Activities
- Section 7: Potential Impacts on Other Activities: Oil and Gas Development, Recreation, Military Operations, Rock Quarry Activities
- Section 8: Potential Impacts on Small Business
- Section 9: Potential Impacts on the Energy Industry
- Appendix A: GIS Maps
- Appendix B: Potential Impacts Presented at 3 percent Discount Rate
- References

Sections 3 through 7 are organized by affected activity. For each of these activities, the analysis discusses impacts by landowner/manager.

61. This section provides information on the history of MSO listing and CHD, describes the current proposed CHD, and describes the socioeconomic characteristics of proposed CHD areas. A detailed discussion of affected Tribal economies is presented in Section 6. A discussion of the affected oil and gas industry is presented in Section 7.

2.1 Background of MSO Critical Habitat Designation

62. The Service proposed listing the MSO as threatened in 1991. This listing was finalized on March 16, 1993. Critical habitat has been designated for the MSO twice before now, in 1995 and 2001. In 1995, 4.7 million acres of critical habitat were designated for the MSO. As part of that rulemaking, an economic analysis was performed which focused solely on incremental impacts to the timber industry. Under development from 1993 to 1995, the Recovery Plan for the Mexican Spotted Owl (Recovery Plan) was finalized soon after the designation of critical habitat in the fall of 1995.[23] Due to a pair of court rulings requiring National Environmental Policy Act analysis, the Service retracted CHD for the MSO on March 25, 1998.[24] In response to a third court case, the Service again proposed CHD for the MSO on July 21, 2000.[25] This 2000 proposal included 13.5 million acres of CHD for the MSO. A second economic analysis was completed, which focused solely on the incremental impacts of CHD based on expected section 7 consultations. Approximately five million acres of this proposed CHD was finalized in February 2001 (66 FR 8530). In response to ongoing litigation, on November 17, 2003, the Service submitted a notice to the Federal Register reopening comment on the July 21, 2000 Proposed Designation of Critical Habitat for the MSO. Until a final rule is published, the 2001 finalized CHD remains in effect.

[23] U.S. Fish and Wildlife Service. 1995. Recovery Plan for the Mexican spotted owl: Vol. I. Albuquerque, New Mexico. 172 pp.

[24] *Catron County Board of Commissioners v. United States Fish and Wildlife Service*, 75 F.3d 1429, 1439 and *Coalition of Arizona-New Mexico Counties for Stable Economic Growth v. U.S. Fish and Wildlife Service*, No. 95-1285-M Civil.

[25] *Southwest Center for Biological Diversity and Silver v. Babbit and Clark*, CIV 99-519 LFG/LCS-ACE.

2.2 Proposed Critical Habitat Designation

63. The Service has re-proposed designation of approximately 14 million acres of land within 72 proposed critical habitat units in the States of Arizona, Colorado, New Mexico, and Utah. Within this proposed area, only land exhibiting the primary constituent elements (PCEs) 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.

64. Currently, about 1.3 million acres of Tribal land have been proposed for designation, while the remaining approximately 12 million acres of the proposed CHD are federally owned. Exhibit 2-1 presents land ownership within the proposed CHD.

Exhibit 2-1

SUMMARY OF ESTIMATED LAND OWNERSHIP ACREAGE IN MSO CRITICAL HABITAT

Landowner	Arizona	Colorado	New Mexico	Utah	Total
Bureau of Land Management	*9,085*	*155,279*	*10,272*	*1,681,312*	**1,855,947**
US Forest Service	*2,366,880*	*416,595*	*5,378,687*	*276,407*	**8,438,569**
Coconino	572,069				
Prescott	109,945				
Tonto	449,245				
Kaibab	411,850				
Coronado	823,772				
Pike-San Isabel		416,595			
Apache-Sitgreaves			1,006,324		
Carson			317,460		
Cibola			838,928		
Gila			2,139,821		
Lincoln			377,402		
Santa Fe			698,751		
Dixie				57,029	
Fishlake				250	
Manti-La Sal				219,129	
Tribal Lands	*838,299*	*0*	*407,261*	*103,887*	**1,349,447**
San Carlos Indian Reservation	146,457				
Navajo Indian Reservation**	682,092		234,058	102,981	
Mescalero Apache Indian Reservation			172,054		
Other Tribes***	9,750		1,149	906	
National Parks Service	*1,406,224*	*0*	*30,002*	*646,578*	**2,082,804**
Canyon de Chelly National Monument	44,997				
Chiricahua National Monument	11,753				
Coronado National Memorial	4,635				
Grand Canyon National Park	687,737				
Saguaro Wilderness	48,415				
Walnut Canyon National Monument	3,235				
Glen Canyon National Recreation Area	603,665				

Exhibit 2-1

SUMMARY OF ESTIMATED LAND OWNERSHIP ACREAGE IN MSO CRITICAL HABITAT

Landowner	Arizona	Colorado	New Mexico	Utah	Total
Navajo National Monument	1,787				
Bandelier National Monument			6,007		
Bandelier Wilderness			23,995		
El Malpais National Monument				10	
Canyonlands National Park				329,775	
Capitol Reef National Park				169,373	
Rainbow Bridge National Monument				47	
Zion National Park				147,373	
Department of Defense	*21654*	*41423*	*2947*	*0*	**66,023**
Fort Huachuca	21,654				
Fort Carson Military Reserve		41,122			
NORAD COC Center		300			
Fort Wingate Depot Activities			2,944		
Sandia Military Reservation			2		
Los Alamos National Labor			1		
Bureau of Reclamation	*0*	*0*	*0*	*51,178*	**51,178**
Lake Powell				51,178	
TOTAL	**4,642,141**	**613,296**	**5,829,169**	**2,759,362**	**13,843,968**
(Proposed Rule acreage)	4,965,686	569,125	4,630,281	3,322,452	13,487,544
(% variance)	-6.52%	7.76%	25.89%	-16.95%	2.64%

Notes: 1) The total acreage used for GIS analysis in this report is approximately three percent higher than Service estimates included in the Proposed Rule. This discrepancy is likely due to the use of different land use GIS data sources. In some cases, acreage differences may stem from matching errors, where land ownership boundaries are drawn differently across GIS layers. As a result, the acreages included in this analysis should be used for illustrative purposes only. 2) Tribes whose land occurs within CHD, but which are not proposed to be designated are listed as "Other Tribes." This category includes: Isleta, Havasupai, Hualasupai, Jemez, Laguna, Picuris, Santa Clara, and Uintah. 3) Lake Powell acreage here is significantly smaller than the acreage cited by the Service (200,000 ac). It is likely due to Service GIS layers including a large acreage of water that is not included in the GIS data used for this analysis.
Source: "Fedlands" National GIS layer of Federal lands, provided by Service GIS technicians, December, 2003; Data for Region 3 forests was replaced with "National Forest Boundaries in USDA FS Southwestern Region" layer, downloaded from http://www.fs.fed.us/r3/maps/gis/datasets.shtml#regional, December 2003. Sliver polygons < 0.1 acre were removed from the analysis.

65. Certain types of activities occurring within the proposed CHD are likely to be impacted by efforts to protect the MSO. Exhibit 2-2 identifies potentially affected activities by Federal land management agency. These activities are discussed further below, and in detail in the following sections.

Exhibit 2-2

POTENTIALLY AFFECTED ACTIVITIES WITHIN PROPOSED CRITICAL HABITAT FOR THE MSO

Federal Agency/Affected Party	Potentially Affected Activities
Bureau of Indian Affairs/Tribes	Timber harvesting, fire management, grazing, road work, coal mining
Forest Service	Timber harvesting, fire management, recreation activities, road work, construction and maintenance, restoration projects, grazing, vegetation management, oil and gas leasing
Bureau of Land Management	Oil and gas leasing, grazing, recreation activities, road construction, land sales, fire management
National Park Service	Fire management, recreation activities, trail and site maintenance, construction activities
Department of Defense	Troop training, timber thinning, fire management, munitions exercises
Bureau of Reclamation	Pipeline construction and maintenance
Sources: Review of consultation history and personal communication with Service personnel at Albuquerque, New Mexico, Grand Junction, Colorado, Flagstaff, Arizona, Salt Lake City, Utah Offices and with personnel from USFS, BLM, NPS, and DOD.	

2.3 Description of Species and Habitat[26]

66. The MSO, one of three subspecies of spotted owl found in the western U.S., is among the largest owls in North America. On average, males weigh about 19 ounces while females weigh around 21 ounces. The subspecies has a historical range that encompasses significant portions of northwestern Mexico, Arizona and New Mexico, and smaller areas in Utah and Colorado. The MSO has a mottled appearance with irregular white and brown spots on its abdomen, back, and head. Due to larger and more numerous spots, the MSO has a lighter appearance than the other two subspecies.

67. Because MSOs live almost exclusively in canyons and mountainous forests, the subspecies maintains a fragmented population distribution across its range in the southwestern U.S. Nesting habitat can typically be found in complex, old-growth forest structures or rocky canyons. However, MSOs in Colorado, Utah, and portions of north central and southern New Mexico tend to nest in very steep rocky canyons. Roosting may occur in numerous tree species, but the MSO primarily uses uneven-aged, multi-storied stands with closed canopies in mountainous regions. The MSO preys on smaller rodents as well as birds, bats, and reptiles, all of which can be found in a wide variety of geographical ranges. MSOs tend to remain in the same territory from year to year.

68. Considering these attributes, habitat requirements, and population biology, the Service has identified primary constituent elements for MSO critical habitat.[27] Within the boundaries of the areas that the Service is proposing for designation, the proposed CHD is

[26] The information on the MSO and its habitat included in this section was obtained from the *Proposed Determination of Critical Habitat for the Mexican Spotted Owl*, July 21, 2000 (65 FR 45336) and the *Recovery Plan for the Mexican Spotted Owl*, U.S. Fish and Wildlife Service, December 1995.

[27] Primary constituent elements are described in the final MSO critical habitat designation rulemaking.

limited to areas that meet the definition of protected and restricted habitat, as described in the Recovery Plan.

2.4 Socioeconomic Profile of the Critical Habitat Area

69. This sub-section summarizes key economic and demographic information for the counties containing proposed CHD for the MSO, including population characteristics and general economic activity. County level data are presented to provide context for the discussion of potential economic impacts, and to illuminate trends that may influence these impacts. Although county level data may not precisely reflect the socioeconomic characteristics of the areas immediately surrounding the proposed CHD for the MSO, these data provide context for the broader analysis.

2.4.1 Population Characteristics

70. The proposed CHD spans an array of urban and rural areas within Arizona, Colorado, New Mexico, and Utah. Exhibit 2-3 presents the population size, change in population from 1990 to 2000, per capita income, and poverty rates for the 52 counties that have CHD within their boundaries and for the States as a whole.

71. In Arizona, all counties containing CHD, with the exception of Maricopa, have a lower per capita income than Arizona's average of $20,275. Nine out of the thirteen counties have higher poverty rates than the State average of 14 percent. Within Apache County, 38 percent of all residents live below the poverty threshold.

72. Counties containing CHD in Colorado each represent less than five percent of total state population, with the exception of El Paso and Jefferson Counties which collectively represent 24 percent of total population. Douglas and Jefferson Counties both have higher per capita incomes than Colorado's average of $24,049. Custer, Fremont, Huerfano, and Pueblo Counties are characterized by higher poverty rates than Colorado's average. At 18 percent, Huerfano's poverty rate is twice the State average.

73. Within New Mexico, the majority of counties containing CHD each represent approximately four percent or less of the State's population. Bernalillo accounts for nearly 31 percent of total State population while San Juan and Santa Fe respectively represent six and seven percent of total State population. At $9,872, McKinley County's per capita income is 57 percent below the State average and the lowest of the 21 New Mexico counties in the study area.

74. Utah counties containing CHD have lower per capita incomes than Utah's average of $18,185. All counties individually represent less than four percent of Utah's population.

Exhibit 2-3

SOCIOECONOMIC PROFILE OF COUNTIES CONTAINING CRITICAL HABITAT FOR THE MEXICAN SPOTTED OWL (2000)

State	County	Population*	Percent of State	Percent change 1990-2000	Per Capita Income	Poverty Rate
Arizona	**State Total**	**5,307,331**	**100%**	**40.0%**	**$20,275**	**13.9%**
	Apache	68,610	1.3%	12.7%	$8,986	37.8%
	Cochise	119,281	2.3%	20.6%	$15,988	17.7%
	Coconino	117,916	2.2%	20.4%	$17,139	18.2%
	Gila	51,419	1.0%	27.6%	$16,315	17.4%
	Graham	33,390	0.6%	26.1%	$12,139	23.0%
	Greenlee	8,547	0.2%	6.7%	$15,814	9.9%
	Maricopa	3,194,798	60.2%	44.8%	$22,251	11.7%
	Mohave	161,788	3.1%	65.8%	$16,788	13.9%
	Navajo	100,135	1.9%	25.5%	$11,609	29.5%
	Pima	863,049	16.3%	26.5%	$19,785	14.7%
	Pinal	188,846	3.6%	54.4%	$16,025	16.9%
	Santa Cruz	39,590	0.8%	29.3%	$13,278	24.5%
	Yavapai	175,507	3.3%	55.5%	$19,727	11.9%
Colorado	**State Total**	**4,417,714**	**100%**	**30.6%**	**$24,049**	**9.3%**
	Custer	3,693	0.1%	81.9%	$19,817	13.3%
	Douglas	199,753	4.5%	191.0%	$34,848	2.1%
	El Paso	533,428	12.1%	30.2%	$22,005	8.0%
	Fremont	47,209	1.1%	43.0%	$17,420	11.7%
	Huerfano	7,845	0.2%	30.8%	$15,242	18.0%
	Jefferson	530,966	12.0%	20.2%	$28,066	5.2%
	Pueblo	144,955	3.3%	15.0%	$17,163	14.9%
	Teller	21,425	0.5%	64.9%	$23,412	5.4%
New Mexico	**State Total**	**1,829,146**	**100%**	**20.1%**	**$17,261**	**18.4%**
	Bernalillo	562,458	30.7%	15.8%	$20,790	13.7%
	Catron	3,512	0.2%	38.2%	$13,951	24.5%
	Cibola	25,888	1.4%	7.6%	$11,731	24.8%
	Colfax	14,140	0.8%	9.8%	$16,418	14.8%
	Grant	30,722	1.7%	12.0%	$14,597	18.7%
	Hidalgo	5,612	0.3%	-0.4%	$12,431	27.3%
	Lincoln	19,730	1.1%	58.9%	$19,338	14.9%
	Los Alamos	17,798	1.0%	1.3%	$34,646	2.9%
	McKinley	75,032	4.1%	23.3%	$9,872	36.1%
	Mora	5,236	0.3%	21.5%	$12,340	25.4%

Exhibit 2-3

SOCIOECONOMIC PROFILE OF COUNTIES CONTAINING CRITICAL HABITAT FOR THE MEXICAN SPOTTED OWL (2000)

State	County	Population*	Percent of State	Percent change 1990-2000	Per Capita Income	Poverty Rate
	Otero	60,747	3.3%	20.0%	$14,345	19.3%
	Rio Arriba	40,772	2.2%	19.9%	$14,263	20.3%
	Sandoval	93,883	5.1%	42.0%	$19,174	12.1%
	San Juan	115,380	6.3%	24.2%	$14,282	21.5%
	San Miguel	30,156	1.6%	17.0%	$13,268	24.4%
	Santa Fe	130,915	7.2%	30.7%	$23,594	12.0%
	Sierra	13,188	0.7%	33.9%	$15,023	20.9%
	Socorro	17,856	1.0%	22.4%	$12,826	31.7%
	Taos	30,353	1.7%	29.7%	$16,103	20.9%
	Torrance	16,792	0.9%	64.4%	$14,134	19.0%
	Valencia	66,955	3.7%	46.2%	$14,747	16.8%
Utah	**State Total**	**2,269,789**	**100%**	**29.6%**	**$18,185**	**9.4%**
	Carbon	19,703	0.87%	1.0%	$15,325	13.4%
	Emery	10,609	0.47%	5.1%	$14,243	11.5%
	Garfield	4,724	0.21%	19.0%	$13,439	8.1%
	Grand	8,633	0.38%	28.2%	$17,356	14.8%
	Iron	34,448	1.52%	62.5%	$13,568	19.2%
	Kane	6,058	0.27%	17.0%	$15,455	7.9%
	San Juan	13,836	0.61%	14.2%	$10,229	31.4%
	Uintah	25,926	1.14%	13.6%	$13,571	14.5%
	Washington	95,590	4.21%	86.1%	$15,873	11.2%
	Wayne	2,554	0.11%	15.3%	$15,392	15.4%

Source: U.S. Census Bureau, *Census 2000 and State & County QuickFacts*, accessed at http://quickfacts.census.gov/qfd. * Population figures are 2001 estimates based on 1999 Census data.

75. Of the 52 counties, 44 have a lower per capita income and 40 have fewer persons per square mile than their respective statewide averages. Although these measures vary considerably across States, the data suggest that overall the counties are less densely populated, and have a lower than average income per capita, than respective statewide averages.

2.4.2 Economic Activity

76. Understanding the extent of the various economic activities in areas in or around CHD underscores the activities most likely to experience potential impacts. Exhibit 2-4 highlights the annual payroll for various industries in the 52 counties containing CHD. The

principal industries, in terms of annual payroll, include services, retail trade, manufacturing and construction.[28]

Exhibit 2-4

ECONOMIC ACTIVITY WITHIN COUNTIES CONTAINING MSO CRITICAL HABITAT: ANNUAL PAYROLL BY INDUSTRY (2001)

Industry	Annual Payroll (Thousands)			
	Arizona	Colorado	New Mexico	Utah
Agriculture, Forestry, Hunting, and Fishing	$16,339	$2,535	$260	$325
Mining	$212,428	$73,609	$209,803	$98,257
Utilities	$632,835	$109,370	$32,580	$11,947
Construction	$5,421,265	$1,635,241	$1,186,364	$140,150
Manufacturing	$7,792,197	$1,953,984	$1,075,803	$128,885
Wholesale Trade	$3,754,230	$862,520	$650,487	$54,453
Retail Trade	$5,929,879	$1,778,168	$1,455,825	$213,206
Transportation and Warehousing	$2,393,142	$284,768	$269,398	$71,862
Information	$2,461,980	$1,159,776	$419,071	$24,356
Finance and Insurance	$4,814,553	$913,559	$695,310	$39,245
Real Estate	$1,233,206	$238,562	$190,631	$17,055
Services	$23,328,984	$6,946,131	$5,298,401	$433,876
Auxiliaries	$656,621	$108,911	$14,153	$0
Unclassified	$26,137	$11,082	$1,724	$1,122
TOTAL	**$58,673,796**	**$16,078,216**	**$11,499,810**	**$1,234,739**

Source: U.S. Census Bureau, *2001 County Business Patterns*, accessed at http://censtats.census.gov/cbpnaic/cbpnaic.shtml.
Notes: Payroll estimates are in 2001 dollars. These values reflect the combined value of the counties containing CHD within these states, and are not statewide totals.

[28] Services sectors include Professional, scientific & technical services; Management of companies & enterprises; Admin, support, waste management, remediation services; Educational services; Health care and social assistance; Arts, entertainment & recreation; Accommodation & food services; and Other services (excluding public administration).

77. Exhibit 2-5 provides industry and employment data for all 52 counties that contain portions of the designation. The "Number of Establishments" column displays the total number of physical locations at which business activities are conducted with one or more paid employee in the year 2001. Over 190,000 business establishments operate and employ over 2.9 million individuals in the 52 counties containing proposed CHD for the MSO. These figures provide a measure of the average density of commercial and industrial establishments in the region.

78. The largest employment sectors within the counties containing CHD are services, retail trade, and manufacturing. Employment within the services sector represented approximately 44 percent of the job base while employment within the retail trade constituted 13 percent of all jobs in the counties. Manufacturing employment accounted for nearly nine percent of all jobs. Exhibit 2-3 summarizes the employment by industry for all counties in 2001.

Exhibit 2-5

ECONOMIC ACTIVITY WITHIN COUNTIES CONTAINING MSO CRITICAL HABITAT:NUMBER OF ESTABLISHMENTS AND EMPLOYEES BY INDUSTRY (2000)

Industry	Arizona		Colorado		New Mexico		Utah	
	Employees	Establish-ments	Employees	Establish-ments	Employees	Establish-ments	Employees	Establish-ments
Agriculture, Forestry, Hunting, and Fishing	1,772	192	167	44	579	45	120	10
Mining	11,397	189	1,517	144	7,293	234	3,190	129
Utilities	10,056	251	1,783	79	6,896	128	1,195	42
Construction	165,364	12,366	44,293	5,467	38,275	3,751	5,659	975
Manufacturing	192,545	4,848	45,313	1,362	29,903	1,278	5,029	226
Wholesale Trade	85,973	6,469	18,120	1,693	18,063	1,643	1,851	264
Retail Trade	258,033	16,631	80,600	5,477	70,232	5,520	12,031	1,049
Transportation and Warehousing	72,938	2,508	7,833	669	9,608	752	2,314	216
Information	57,605	2,153	22,697	801	14,474	678	1,335	113
Finance and Insurance	111,724	7,254	22,493	2,466	20,672	1,957	1,819	299
Real Estate	41,122	6,100	8,899	2,214	8,195	1,551	962	258
Services	873,425	52,833	242,760	18,427	228,513	15,127	26,847	2,357
Auxiliaries	17,538	262	2,839	41	1,861	45	1,056	13
Unclassified	2,245	1,302	618	441	820	271	169	71
TOTAL	1,901,737	113,358	499,932	39,325	455,384	32,980	63,577	8,379

Source: U.S. Census Bureau, *2001 County Business Patterns*, accessed at http://censtats.census.gov/cbpnaic/cbpnaic.shtml
Notes: Numbers may not sum due to rounding. These values reflect the combined value of the counties containing CHD within these states, and are not statewide totals.

79. Despite the fact that the services, retail trade and manufacturing sectors account for the greatest economic activity, these industries are not as likely to be directly affected by CHD for the MSO, as they are not typically dependent on forest-related resources.

80. Industries most affected by MSO conservation measures include timber and livestock grazing. The following sections provide an overview of each of these industries within the region.

2.5 Overview of Regional Timber Industry

81. The timber industry in the Four Corners states (Arizona, Colorado, New Mexico, and Utah) represents only a very small portion of the national industry. Within affected counties in the Four Corners region, earnings and employment related to forestry represent no more than five percent of total earnings or employment (Exhibit 2-8).[29] However, the timber industry is the industry most directly affected by MSO protection efforts. A significant portion of timberland in the Four Corners region is on public lands potentially affected by the proposed CHD.

82. Out of over 503 million acres of timberland in the U.S., only 24 million (about five percent) occur in the Four Corners region.[30] The majority (80 percent in 1997) of timber harvest occurs in the Eastern United States.[31] As shown in Exhibit 2-6, in 1996 (the latest year for which data is available), timber removals from the Four Corners region made up less than one percent of U.S. timber removals.

Exhibit 2-6

TIMBER REMOVALS: ALL SPECIES

Area	1996 Timber Removals (Thousand cubic feet)
Arizona	15,442
Colorado	20,598
New Mexico	13,097
Utah	8,311
Four Corners States Total	57,448
USA	16,020,745

Source: Smith, Brad W. et. al. 2001. "Forest Resources of the United States 1997." USDA, Forest Service.

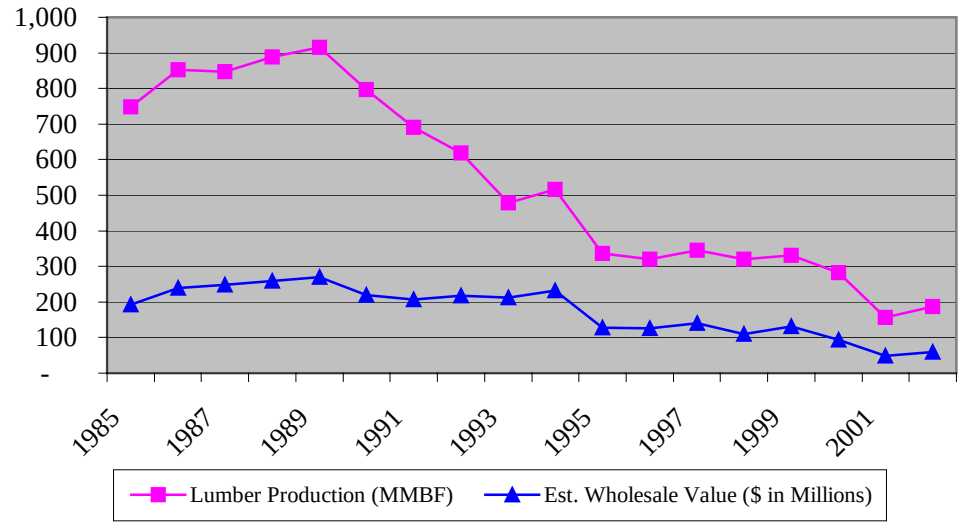
[29] Forestry-related industries include Forestry and Logging (NAIC code 113) and Agriculture and Forestry Support (NAIC code 115).

[30] Western Wood Products Association. 2002. *2002 Statistical Yearbook of the Western Lumber Industry.*

[31] Haynes, Richard W. 2003. "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.

83. In 2002, there were 24 million acres of timberland in the Four Corners States, of which 64 percent was USFS land. A total of 74 percent was publicly owned.[32] As one measure of the timber industry, the following chart presents an overview of the lumber market in the Four Corners States over the past 18 years. As demonstrated in Exhibit 2-7, lumber production in the region peaked in 1989, with production of over 900 million board feet (MMBF). Over the past five years (1998-2002) average lumber production was 255 MMBF. Estimated wholesale value (based on mill receipts for all products shipped) has declined from a peak of $269 million in 1989 to an average of $88 million over the past five years.

Exhibit 2-7
Four Corners Lumber Production



Source: Western Wood Products Association, 1993 and 2002 Statistical Yearbooks.

84. At the State level, in 2002, the forestry sector in the Four Corners States is not a major source of employment and earnings. As illustrated in Exhibit 2-8, forest related employment and earnings in each State represent less than 0.25 percent of State totals.

85. As illustrated by Exhibit 2-8, for several counties within the proposed CHD, forestry related earnings play a greater role than at the State level. Within Arizona, 2001 forestry-related earning in Navajo County represented 0.64 percent of total county earnings. In New Mexico, forestry-related earnings represent 0.7 percent of total earnings within Mora County. Forestry-related earnings within Colorado and Utah counties containing CHD represent a small percentage of county totals.

[32] Western Wood Products Association. 2002. *2002 Statistical Yearbook of the Western Lumber Industry.*

Exhibit 2-8

FORESTRY-RELATED EARNINGS WITHIN COUNTIES CONTAINING CRITICAL HABITAT FOR THE MSO
(where available for 2001)

State	County	Total Industry Earnings (1,000$)	Forestry Related Earnings (1,000$)	% Total	Forestry Related Employment (1998)	Percent of Total State Employment
Arizona	**State Total**	**$97,001,206**	**$239,743**	**0.25%**	**13,864**	**0.5%**
	Apache	$636,341	$409	0.06%		
	Cochise	$1,488,578	$2,547	0.17%		
	Coconino	$1,827,048	$3,356	0.18%		
	Gila	$486,826	(n/a)	-		
	Graham	$223,760	(n/a)	-		
	Greenlee	$177,945	(n/a)	-		
	Maricopa	$70,641,189	$195,893	0.28%		
	Mohave	$1,424,711	$8,314	0.58%		
	Navajo	$882,617	$5,654	0.64%		
	Pima	$13,371,022	$15,655	0.12%		
	Pinal	$1,526,004	(n/a)	0.00%		
	Santa Cruz	$465,161	$346	0.07%		
	Yavapai	$1,684,772	(n/a)	-		
Colorado	**State Total**	**$114,684,737**	**$191,933**	**0.17%**	**10,509**	**0.4%**
	Custer	$33,312	$71	0.21%		
	Douglas	$2,843,322	$3,180	0.11%		
	El Paso	$12,057,320	$16,577	0.14%		
	Fremont	$526,565	$1,110	0.21%		
	Huerfano	$63,685	(n/a)	-		
	Jefferson	$10,952,667	$4,200	0.04%		
	Pueblo	$1,957,295	$2,835	0.14%		
	Teller	$229,260	(n/a)	-		
New Mexico	**State Total**	**$29,404,755**	**$37,970**	**0.13%**	**3,566**	**0.4%**
	Bernalillo	$13,007,494	$23,666	0.18%		
	Catron	$18,932	(n/a)	-		
	Cibola	$206,251	(n/a)	-		
	Colfax	$177,685	(n/a)	-		
	Grant	$335,574	(n/a)	-		
	Hidalgo	$51,540	(n/a)	-		
	Lincoln	$183,221	(n/a)	-		
	Los Alamos	$1,095,293	(n/a)	-		
	McKinley	$680,885	(n/a)	-		
	Mora	$24,668	$169	0.69%		
	Otero	$753,827	$224	0.03%		
	Rio Arriba	$338,750	$374	0.11%		
	Sandoval	$1,159,606	$1,342	0.12%		
	San Juan	$1,758,147	(n/a)	-		
	San Miguel	$257,752	(n/a)	-		
	Santa Fe	$2,405,530	$2,268	0.09%		
	Sierra	$94,587	(n/a)	-		
	Socorro	$177,160	(n/a)	-		
	Taos	$333,574	$480	0.14%		
	Torrance	$106,138	$113	0.11%		
	Valencia	$396,988	(n/a)	-		

Exhibit 2-8

FORESTRY-RELATED EARNINGS WITHIN COUNTIES CONTAINING CRITICAL HABITAT FOR THE MSO (where available for 2001)

State	County	Total Industry Earnings (1,000$)	Forestry Related Earnings (1,000$)	% Total	Forestry Related Employment (1998)	Percent of Total State Employment
Utah	**State Total**	**$42,234,478**	**$72,636**	**0.17%**	**8,077**	**0.6%**
	Carbon	$301,219	(n/a)	-		
	Emery	$159,032	(n/a)	-		
	Garfield	$56,679	$314	0.55%		
	Grand	$117,019	(n/a)	-		
	Iron	$396,591	$530	0.13%		
	Kane	$80,877	$196	0.24%		
	San Juan	$116,788	(n/a)	-		
	Uintah	$367,072	$918	0.25%		
	Washington	$1,101,875	$5,085	0.46%		
	Wayne	$34,784	(n/a)	-		

Notes: Forestry-related industries include Forestry and Logging (NAIC code 113) and Wood Product Manufacturing (NAIC code 321). "N/a" represents data not reported in the Bureau of Economic Analysis. Forestry related employment data at the county level are not available from the Bureau of Economic Analysis.
Source: Bureau of Economic Analysis, Regional Economic Accounts, http://www.bea.doc.gov/bea/regional/data.htm.

86. Limited data are available on the number of sawmills operating in the region. Since 1992, there have been 15 sawmills closed in New Mexico and Arizona, representing a loss of capacity of 368 MMBF of sawtimber plus pulp. The larger mills in the region had all closed as of 1999. Exhibit 2-9 illustrates the location of currently operating mills within Arizona and New Mexico. Currently, there are 14 non-Tribal mills operating in Arizona and New Mexico, with a capacity of 54 MMBF. All of the open mills are small businesses.

Exhibit 2-9

LOCATION AND CAPACITY OF CURRENTLY OPERATING MILLS

Name	Location	County	State	Capacity (MMBF)
Southwest Forest Products	Phoenix	Maricopa	AZ	14
Precision Pine	Heber	Navajo	AZ	12
Reidhead Bros.	Nutrioso	Apache	AZ	7
Zellner	Camp Verde	Yavapai	AZ	5
Reidhead/Peterson	Fredonia	Coconino	AZ	2
Perkins pole plant	Williams	Coconino	AZ	1
Satterwhite Log Homes	Pecos	San Miguel	NM	5
Chippaway	Sacramento	Otero	NM	2
Kukyendahl Lumber	Tres Piedras	Taos	NM	1
Conneley	Espanola	Santa Fe	NM	1
Walatowa	Jemez	Sandoval	NM	1
Hansens	Santa Fe	Santa Fe	NM	1
Spotted Owl	Santa Fe	Santa Fe	NM	1
Unknown	Costilla	Costilla	NM	1
Total capacity				54

Source: Major Mill Closure Summary, Arizona and New Mexico, August 2003. Email communication from Paul Fink, Region 3, USFS. This exhibit does not include Tribally owned mills.

87. Various factors have simultaneously affected the timber industry in the Southwest since the MSO was listed in 1993. These factors include changes in the timber market, changes in USFS management unrelated to conservation of the MSO or other species, and changes directly related to the MSO and other species.

- *Changes in the U.S. timber market* including 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 supply shift, although consumption was not significantly affected. Consumers were willing to pay higher prices and substitute supply sources from other regions of the U.S. and other countries became available quickly.[33]

- *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 amount 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

[33] 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.

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."[34]

- *Changes in USFS forest management at the regional level*. Since the MSO was listed, USFS Region 3 has undergone a major shift in its forest management regime, from even-age to uneven age silvicultural practices. In addition, in 1996 USFS Region 3 enacted three forest plan amendments affecting National Forests in Arizona and New Mexico. The amendments related to old growth, MSO, and the northern goshawk.[35]

- *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 LRMPs in November 1996.[36] Another injunction in 1997 halted timber harvest in Region 3 for six months; however, this was related to other species in addition to the MSO.

88. Limited historical data are available for the timber industry within the proposed CHD. The best available data source is a draft document provided by the USFS Region 3, providing historical data on timber harvest from National Forests in Arizona and New Mexico. Data for timber harvest within USFS Region 3 shown in Exhibit 2-10, indicate that harvest has been declining over the past fifteen years. Over fifteen years, the annual harvest cut on Region 3 forests averaged 148 MMBF, while over the past five years, the average harvest cut was 34 MMBF per year.

89. In addition to declining harvest volume, a comparison of timber sales offered and sold indicates that not all timber offered for sale on NFs in the Four Corners area was sold in fiscal year 1998, the only year for which these data were readily available. In fiscal year 1998 timber sales were offered on four forests for which no bids were received, indicating logging contractors and mills did not believe that the harvest would be economical. Within Region 3, the total timber offered for sale was 148,528 thousand board feet (MBF); the total for which there were no bids received 22,413 MBF.[37] Thus, in fiscal year 1998,

[34] 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.shtm.

[35] Personal communication with Keith Menasco, Region 3, USFS, November 7, 2003.

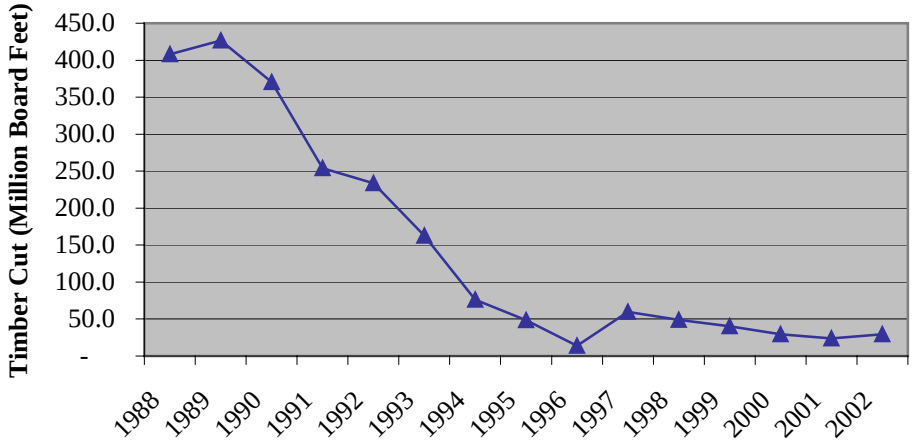
[36] Discussed in Court Order, January 13, 2003, United States District Court, District of Arizona, CV 01-409 TUC DCB.

[37] USFS. 1998. Periodic Timber Sale Activity Report (PTSAR) of the Sales Tracking and Reporting System (STARS). Available at web site: www.fs.fed.us/forestmanagement/reports/saledata/1998/r03.shtml

approximately 15 percent of timber harvest offered for sale in USFS Region 3 was not purchased.

90. Limited data are available on timber prices in the Four Corners region. Available data indicate that timber prices (stumpage) for timber sales from National Forests averaged $48/ MBF from 1975 to 1990, before doubling to approximately $103/MBF (in 1993 dollars) in 1993.[38] Region 3 estimates that a reasonable average price over past 10 years would be $40/MBF (in 2003 dollars), and current prices are about $20/MBF.[39]

Exhibit 2-10
USFS Region 3 Total Harvest by Year



Source: USFS Region 3 Biological Assessment.

91. Another measure of price is the estimated wholesale value of lumber production in the region. This figure is estimated on an annual basis by the Western Wood Products Association. The value of lumber production in the Four Corners region has averaged approximately $375/MBF over the ten year period from 1993-2002.[40]

92. The following section describes the livestock grazing industry in the region, another important contributor to the regional economy.

[38] Ekstrand, Earl et al. "Economic Analysis of Critical Habitat Designation for the Mexican Spotted Owl, May 1995." Prepared for the U.S. Fish and Wildlife Service, New Mexico State Ecological Services Office, Albuquerque, New Mexico,1995.

[39] Personal communication with Paul Fink, Region 3, USFS, January 22, 2004. These prices represent the price paid at the mill for timber.

[40] Western Wood Products Association. 2002. *2002 Statistical Yearbook of the Western Lumber Industry.*

2.6 Overview of Regional Livestock Grazing Industry

93. Out of approximately 110 million cattle raised in the U.S., more than 40 million are raised in the States of Arizona, New Mexico, Colorado, and Utah.[41] This represents approximately 36 percent of U.S. livestock production. Despite its national importance, the livestock grazing sector is not a dominant source of employment or earnings in the Four Corners states. Earnings for livestock commodities represent less than two percent of total earnings in the four states; employment within the livestock sector accounts for less than one percent of total employment.[42] Nonetheless, as shown in Exhibit 2-11, livestock production dominates the agricultural receipts for many counties in this area. The dependence of each area on Federally permitted livestock production will depend on multiple factors, including the amount of private grazing in local areas, and the amount of substitute forage available.[43]

Exhibit 2-11

LIVESTOCK CASH RECEIPTS AND INVENTORIES IN COUNTIES CONTAINING MSO CRITICAL HABITAT (2002)

State	County	Livestock Cash Receipts (Thousands $)	Total Commodity Receipts (Thousands $)	Share of Crops Receipts	Number of Cattle & Calves
Arizona	**State Total**	**$1,094,056**	**$3,008,035**	**36.4%**	**840,000**
	Apache	$31,036	$32,973	94.1%	35,000
	Cochise	$38,733	$84,511	45.8%	50,000
	Coconino	$18,773	$20,032	93.7%	20,000
	Gila	$7,748	$8,447	91.0%	10,000
	Graham	$14,998	$35,531	42.2%	19,000
	Greenlee	$6,695	$7,812	85.7%	5,000
	Maricopa	$499,238	$792,307	63.0%	205,000
	Mohave	$11,678	$18,186	64.2%	15,000
	Navajo	$49,475	$51,413	96.2%	30,000
	Pima	$25,542	$51,983	49.1%	29,000
	Pinal	$252,139	$448,324	56.2%	23,000
	Santa Cruz	$9,291	$9,501	97.8%	12,000
	Yavapai	$49,900	$52,889	94.3%	40,000
Colorado	**State Total**	**$3,207,269**	**$4,534,213**	**70.7%**	**3,050,000**
	Custer	$2,861	$4,815	59.4%	10,000
	Douglas	$7,441	$17,119	43.5%	5,000
	El Paso	$17,750	$30,330	58.5%	35,000
	Fremont	$8,647	$12,126	71.3%	15,000
	Huerfano	$8,807	$9,681	91.0%	20,000

[41] National Agricultural Statistics Service, State Office Websites, http://www.usda.gov/nass/sso-rpts.htm, Accessed February 6, 2004.

[42] Earnings data are based on livestock receipts as a share of total commodity receipts based on: 2001 Data: USDA National Agricultural Statistics Service for AZ, CO, NM, and UT, accessed at http://www.usda.gov/nass/sso-rpts.htm. Employment data is based on U.S. Census Bureau, *2001 County Business Patterns*, accessed at http://censtats.census.gov/cbpnaic/cbpnaic.shtml.

[43] Peer review comments by Dr. Delworth Gardner, Brigham Young University, February 27, 2004.

Exhibit 2-11

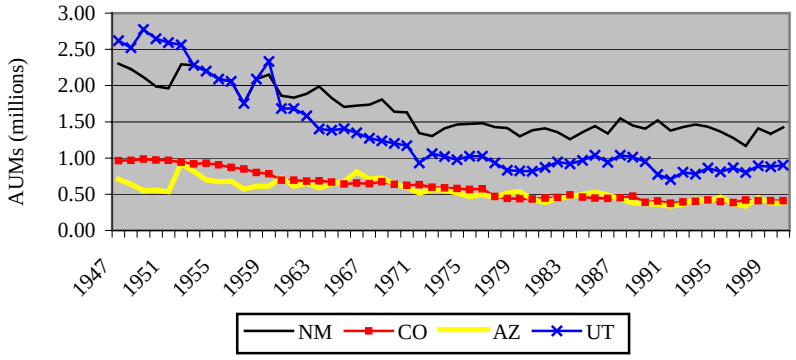
LIVESTOCK CASH RECEIPTS AND INVENTORIES IN COUNTIES CONTAINING MSO CRITICAL HABITAT (2002)

State	County	Livestock Cash Receipts (Thousands $)	Total Commodity Receipts (Thousands $)	Share of Crops Receipts	Number of Cattle & Calves
	Jefferson	$2,079	$19,474	10.7%	5,000
	Pueblo	$19,395	$33,642	57.7%	45,000
	Teller	$1,001	$1,277	78.4%	3,500
New Mexico	**State Total**	**$1,382,052**	**$1,956,977**	**70.6%**	**1,580,000**
	Bernalillo	$20,107	$31,257	64.3%	10,500
	Catron	$7,303	$7,755	94.2%	22,000
	Cibola	$5,952	$6,691	89.0%	19,000
	Colfax	$14,129	$16,658	84.8%	44,000
	Grant	$9,224	$9,899	93.2%	31,000
	Hidalgo	$7,563	$22,291	33.9%	25,000
	Lincoln	$12,151	$12,397	98.0%	33,000
	Los Alamos	n/a	n/a	-	n/a
	McKinley	$10,046	$13,020	77.2%	31,000
	Mora	$5,176	$8,150	63.5%	17,000
	Otero	$7,316	$11,335	64.5%	21,000
	Rio Arriba	$6,691	$14,013	47.7%	23,000
	Sandoval	$5,209	$11,540	45.1%	19,000
	San Juan	$23,898	$74,334	32.1%	33,000
	San Miguel	$14,421	$15,993	90.2%	41,000
	Santa Fe	$9,792	$21,190	46.2%	19,500
	Sierra	$25,765	$36,487	70.6%	25,000
	Socorro	$33,157	$41,286	80.3%	37,000
	Taos	$2,184	$9,810	22.3%	6,000
	Torrance	$14,459	$29,044	49.8%	42,000
	Valencia	$21,945	$30,759	71.3%	26,000
Utah	**State Total**	**$807,800**	**$1,055,600**	**76.5%**	**n/a**
	Carbon	$5,000	$6,100	82.0%	n/a
	Emery	$12,300	$15,700	78.3%	n/a
	Garfield	$7,300	$9,200	79.3%	n/a
	Grand	$3,700	$4,900	75.5%	n/a
	Iron	$29,000	$45,100	64.3%	n/a
	Kane	$3,900	$4,500	86.7%	n/a
	San Juan	$7,300	$10,400	70.2%	n/a
	Uintah	$22,300	$29,000	76.9%	n/a
	Washington	$8,600	$12,400	69.4%	n/a
	Wayne	$13,000	$15,500	83.9%	n/a

Source: USDA National Agricultural Statistics Service, State Office websites, accessed at http://www.usda.gov/nass/sso-rpts.htm.

94. Across the U.S., the amount of livestock grazing on Federal land has been slowly declining since the 1950's. In the Four Corners states, this trend can be observed by examining trends in authorized animal unit months (AUMs) on BLM lands over time. As shown in Exhibit 2-12, the most dramatic decline occurred in Utah.

Exhibit 2-12
Authorized AUMs on BLM Lands (1947-2002)



95. Nearly 30 percent of permitted livestock grazing on Federal lands occurs in the States of Arizona, New Mexico, Colorado, and Utah, as shown in Exhibit 2-13. In 2002, New Mexico had both the largest numbers of operators grazing on Federal lands, as well as the most overall AUMs grazed of the Four Corners States.

Exhibit 2-13

FEDERAL GRAZING STATISTICS FOR FOUR CORNERS AREA (2001 AND 2002)

Number of Authorized Operators/Permittees

	USFS Total Permittees	BLM Total Operators	Total BLM and USFS	Percent of Total U.S.
Arizona	349	611	960	3.2%
Colorado	758	1,357	2,115	7.1%
New Mexico	941	1,965	2,906	9.7%
Utah	951	1,356	2,307	7.7%
Total	**2,999**	**5,289**	**8,288**	**27.7%**

AUMs Authorized

	USFS Total	BLM Total	Total BLM and USFS	Percent of Total U.S.
Arizona	706,856	469,833	1,176,689	5.4%
Colorado	888,458	389,314	1,277,772	5.9%
New Mexico	779,788	1,463,818	2,243,606	10.4%
Utah	560,370	758,984	1,319,354	6.1%
Total	**2,935,472**	**3,081,949**	**6,017,421**	**27.9%**

Notes: USFS Data is for FY2002. BLM Data is for billing year 2001. BLM data includes count of operators, thus may double count operators that graze more than one type of animal. Sources: Grazing Statistical Summary, FY2002, USDA, Forest Service Range Management, January 2003; Public Land Statistics, Bureau of Land Management, Department of Interior, 2002; Gentner, Bradley J. and John Tanaka. "Classifying Federal public land grazing permittees," Journal of Range Management 55(1), January 2002. Total Operators in State present figures reported in respective State Agricultural Statistics Annual Bulletins, 2002.

96. Limited historical data are available for the grazing industry within the proposed CHD. The best available data source is a draft document provided by the USFS Region 3, providing historical data on authorized AUMs from National Forests since the mid 1980's. Data for authorized AUM use within USFS Region 3 shown in Exhibit 2-13, indicate that, overall, the number of AUMs has declined over the past fifteen years. However, some forests have had far more dramatic changes in AUM production than other forests. Multiple factors influence agencies in determining what levels of grazing to permit or authorize. For example, physical factors such as range condition and forage availability play an important role in decision making. Since the mid-1990's, there has been a drought in the Four Corners region, and central Arizona has been hit the hardest. As a result, range conditions have worsened and forage is less available. In Tonto National Forest in central Arizona, substantial reductions in authorized AUMs have resulted.

97. A common complaint is that Federal agencies fail to consider the social and cultural implications of changes to permitted livestock practice on Federal lands.[44] The Four Corners States have a long tradition of ranching as a way of life. Ranching is culturally important in all of these states, particularly in New Mexico. In particular, many ranchers in these states depend on Federal lands for a source of forage for their cattle. Indeed, several studies suggest that profit maximization is not the primary goal of public land ranchers.[45] Instead, ranchers "love the land, the lifestyle, and the opportunity to raise a family in a safe environment where they can instill positive values."[46] These considerations are important elements of the decision making process, but are not easily quantifiable.

[44] For example, see "Report to the Governor of New Mexico from the Public Land Grazing Task Force," prepared by George A. Douds, New Mexico Department of Agriculture, 2002 (p.13).

[45] Gentner, Bradley J. and John Tanaka. "Classifying Federal public land grazing permittees," Journal of Range Management 55(1), January 2002.

[46] Rowe, Helen I. et al., Change on the Range, Rangelands 23(2), April 2001.

3.1 Scope of the Timber Industry Analysis

98. One of the primary activities affected by MSO conservation efforts has been timber harvest on USFS lands. The importance of the timber industry in the region where MSO critical habitat is proposed is discussed in Section 2 (Socioeconomic Profiles). This chapter considers economic impacts to the timber industry resulting from MSO conservation activities.

99. This section focuses on the economic impacts of changes in commercial timber harvest resulting from MSO conservation measures. Potential impacts on forest health projects such as fuels reduction and thinning are discussed in Section 5. Commercial timber harvest activities are primarily impacted by MSO conservation due to restrictions placed on USFS lands. In addition:

- This section focuses on activities on non-Tribal lands; activities on Tribal lands are addressed separately in Section 6.

- This section focuses on the economic impact of restrictions on timber harvest related to MSO protection measures in New Mexico and Arizona. Only limited timber harvest occurs on the proposed CHD in Utah and Colorado, and this activity is not significantly affected by MSO conservation. In Utah and Colorado, MSOs tend to nest in steep rocky canyons that are largely inaccessible, and thus timber activity in these habitat areas is limited.[47]

100. Because the proposed CHD excludes non-Tribal private lands, timber harvest restrictions on non-Tribal private lands have not been considered in the analysis. However, the analysis does consider potential regional economic impacts resulting from limitations on commercial timber harvest on Federal lands, which includes impacts to private parties.

[47] Personal communications with BLM, USFS, and FWS. (Erik Brekke, Colorado BLM, January 14, 2004; Ron Bolander, Utah BLM, January 15, 2004; Biologist, FWS Colorado Field Office January 5, 2004; Heather Musclow, USFS, Manti LaSal National Forest, January 6, 2004; Mike Wrigley, USFS, Pike-San Isabel National Forest, January 8, 2004; and Mike Smith, USFS, Pike-San Isabel National Forest, January 21, 2004. Based on available information, only one timber sale in the Pike National Forest was affected by MSO related restrictions in the past; this sale is discussed later in this section. No sales in Manti LaSal NF have been impacted due to MSO considerations in the past (Greg Montgomery, USFS, Manti La Sal National Forest, January 29, 2004).

3.1.1 Economic Impacts Considered

101. The impacts associated with past, ongoing, and potential future MSO conservation activities are manifested in economic efficiency effects (i.e., social welfare) and distributional and regional impacts, as outlined below.

Economic Impacts Related to a Reduction in Timber Harvest

Economists measure economic impacts in terms of both efficiency effects and equity effects. Efficiency effects describe net changes in national social welfare, based upon the idea that social welfare can be maximized by using resources in ways that yield the greatest benefits to society. Equity effects incorporate what are referred to as distributional effects, often expressed in terms of measures of "regional economic impact" (e.g., jobs, lost output). Both of these measures of economic impact are valid, and should be considered in assessing the impact of MSO conservation activities.

Efficiency effects associated with limitations on timber resources include: reductions in consumer surplus related to increased wood product prices, reductions in producer surplus associated with higher marginal costs to wood products producers, and reductions in producer surplus related to reduced revenues from timber sales. The analysis concludes that:

- Reductions in the supply of wood products or increases in the price of wood products is unlikely given the relatively small role the southwest plays in the total supply of timber (less than one percent of national totals) and the availability of substitute sources of supply.
- Reductions in producer surplus accrued by producers of wood products are unlikely given the relatively small area precluded from harvest as a result of MSO conservation efforts (i.e., substitute sources of timber exist), and the highly competitive nature of this industry.
- For many timber sales from National Forests, the cost of these sales for the government have historically exceeded revenues, and thus no producer surplus loss would be expected to result from a change in the volume of sales.

Thus, efficiency effects related to a reduction in timber sales are not calculated in the analysis.

While changes in national economic efficiency are not expected, regional economic impacts, including shifts in employment, tax revenues, and local and regional economic output are associated with MSO conservation, and are described in detail in this report.

Efficiency Effects

- **Reduced Timber Harvest Opportunities**: Limitations resulting from the implementation of MSO Recovery Plan guidance may have resulted in a reduction in the supply of timber.

- **Administrative Costs**: Since the listing of the MSO, USFS has undertaken a variety of management actions to protect the MSO and its habitat. These activities are in large part related to the MSO Recovery Plan, which was published in 1995. In addition, 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 primarily as the cost of labor.

- **Other Project Modification Costs**: Species and habitat management efforts that involve section 7 project consultation may result in project modifications to comply with measures set forth by the Service. Costs associated with such project modifications can arise from changes in labor or material requirements, which can occur at a single point in time and/or be ongoing. In the case of USFS lands and the MSO, typical project modifications have included restrictions on the boundaries of the sale in order to avoid MSO nesting habitat and changes to the timing of activities to avoid breeding season.

Distributional and Regional Effects

- **Reduced Timber Harvest Opportunities**: Limitations resulting from an injunction on timber sales in USFS Region 3 may have resulted in a reduction in past timber sales, affecting localized areas and sawmill operations. In addition, counties may have received smaller payments from the USFS as a result of limitations on timber sales in the region.

- **Regional Economic Impacts in Timber-Related Industries**: A reduction in forest area available for commercial timber harvest may result in reduced commercial timber harvest from NFs within the region. Reduced timber harvest in the region is likely to affect income and employment in various timber-related industries. Impacts to these industries will, in turn, result in indirect effects on the broader economy.

102. This section first provides an estimate of impacts associated with MSO conservation activities from the time of listing. Impacts associated with certain MSO conservation efforts are ongoing and expected to continue, and thus are referred to in this analysis as "past and ongoing impacts." Second, this section provides estimates of potential future impacts associated with MSO conservation activities. For past and ongoing impacts and for future impacts, the analysis evaluates economic efficiency and distributional and regional economic

effects. In addition, these impacts are further categorized by Action agency and administrative unit (e.g., by NF for the USFS).

3.1.2 Limitations of Analysis of Timber Impacts

103. As discussed in Section 2.2, Overview of Regional Timber Industry, various factors have affected the regional timber industry since the MSO was listed in 1993. For example, in 1996, USFS Region 3 adopted three amendments to its forest plans, all of which simultaneously affected commercial harvest. These amendments were related to MSO, the northern goshawk and old growth. It is not possible to segregate the impacts of MSO conservation efforts from the other factors.

104. In addition, the market for timber sales at any given time is unknown. Over the past 10 years, there have been timber sales offered on the affected forests for which no bids were received, indicating that there has not always been a ready market for timber harvested from Region 3 National Forests. Based on available information, these forests include the Coconino, Gila, Kaibab, Lincoln and Tonto.[48] To calculate potential regional economic impacts, this analysis assumes that additional timber sales will occur (i.e., that there would be a market for these sales).

105. Because it is not possible to separate MSO-related factors from other factors such as the decline in the timber market, and other forest management changes, the regional economic impact analysis provides a range of estimates for the impact of a reduction in volume of timber harvest due to MSO-related restrictions. The lower-bound estimate assumes no impact from MSO protection efforts, and the upper-bound estimate assumes that all of the area designated as protected MSO habitat and a portion of restricted MSO habitat on USFS Region 3 National Forests would have been harvested in a sustainable manner but for the MSO protection efforts. The analysis does not account for any available substitutes for this supply. Thus, all else equal, this factor may lead the analysis to overstate the impacts. Additional caveats are discussed at the end of this chapter.

3.2 Past and Ongoing Economic Impacts

106. This section presents an assessment of the past and ongoing economic impacts to timber activities in the proposed CHD area. Unless otherwise noted, all of the impacts discussed below relate to USFS Region 3 activities.

[48] Personal communication with George Garcia, Biologist, Lincoln National Forest, USFS, January 29, 2004. Also, see timber sale data from the Periodic Timber Sale Activity Report for FY 1998 (available on the web at http://fs.fed.us/forestmanagement/reports/ saledata/1998/f03.shtml).

3.2.1 Past and Ongoing Efficiency Effects

107. Efforts to conserve the MSO have resulted in economic efficiency effects with regard to timber-related activities. Three types of economic efficiency effects are discussed below; reduced timber harvest opportunities, administrative costs, and project modifications.

Reduced Timber Harvest Opportunities

108. While the MSO Recovery Plan was in draft form, USFS began developing amendments for its Land and Resource Management Plans (LRMPs). In May 1995, it was decided that the USFS would, in cooperation with the Service and with input from the MSO Recovery Team, amend the standards and guidelines (S&Gs) of the existing LRMPs to conform to the management recommendations in the Recovery Plan. The amended S&Gs were incorporated into Region 3's 11 LRMPs on June 5, 1996. After consultation, the Service issued a non-jeopardy/no adverse modification biological opinion on the Region-wide amendment on November 25, 1997.[49] The implementation of the MSO amendment occurred simultaneously with amendments related to the northern goshawk and old growth forest management.

109. To the extent that USFS Region 3 forests undertook efforts to comply with the MSO Recovery Plan guidance in their MSO forest plan amendments when planning timber sales, those efforts may have resulted in reduced timber sale volume. This analysis does not calculate economic efficiency effects related to this timber harvest reduction for the following reasons:

- First, prices for wood products are generally determined in a national, (if not international) market. There is an ample supply of substitute sources for a small change in harvest in a given region. Thus, a change in harvest levels in the southwestern U.S. of the magnitude estimated in this report would not be expected to result in a measurable change in the price or quantity of national wood product markets.[50]

- Second, the level of producer surplus generated in the case of timber sales from National Forests in the southwest region is unclear. Stumpage prices paid to USFS for timber sales do not reflect costs of building roads, sales prep, or post-harvest regeneration. While revenues to USFS may be lower due to MSO-related restrictions, during the past

[49] Draft Biological Assessment of 11 Land & Resource Management Plans, USDA Forest Service Southwestern Region. Submitted to the U.S. Fish and Wildlife Service in November 2003.

[50] The amount of timber harvested in the southwest region (Arizona, Colorado, New Mexico and Utah) has historically made up a very small percentage (less than one percent) of the national market (see Section 2.2 Overview of Regional Timber Industry). In addition, the analysis estimates that upper-bound impacts on annual timber harvested from Region 3 forests related to MSO restrictions could be approximately 40 percent of the average annual timber harvest over the last 15 years (see Section 3.1.2 Past and Ongoing Regional Economic Impacts).

10 years, the costs of timber operations may have exceeded revenues.[51] Below cost timber sales have been studied and documented in this region.[52]

- Third, because the MSO forest plan amendments were enacted at a time when the timber industry in the region was already in decline and because it was enacted simultaneously with the goshawk amendment, lost timber harvest resulting specifically from MSO protections cannot be estimated.

However, changes in timber harvest in the southwest do result in regional economic impacts to the timber industry; as appropriate, these impacts are modeled later in this chapter (see Section 3.2.2).

110. In addition to USFS Region 3, National Forests in Utah and Colorado may have experienced some impact from complying with Recovery Plan guidance. Discussion with USFS staff indicates that there has been little timber sale activity in the proposed designation areas in those states. USFS personnel in Colorado provided one example where MSO conservation efforts impacted a timber sale in Pike-San Isabel National Forest. Specifically, in planning the Meade timber sale in 1999, USFS chose an alternative based on harvesting 130 MBF, rather than 400 MBF. This alternative was chosen in part to provide protection for the MSO. The sale was a small one, resulting in payments of approximately $4,200 to USFS. Because the sale was reduced by approximately two-thirds, there was an impact of approximately $8,700 lost revenue to the USFS.[53]

Administrative Costs

111. The economic efficiency effects of MSO conservation efforts include costs incurred by Action agencies that oversee timber harvest activities. These management activities result in opportunity costs because the resources used for MSO conservation activities are not available for other activities. Past USFS management activities that may have resulted in administrative costs include complying with the MSO Recovery Plan, enacting Forest Plan amendments, and undergoing section 7 consultations.

[51] Personal communication with Marlin Johnson, Region 3, USFS, February 9, 2004. In Region 3, timber sales were profitable prior to the early 1990's. However in the early 1990s, USFS shifted its emphasis to achieve different management goals, meaning less volume was cut per acre. At the same time, the cost of planning and approval of timber sales increased, resulting in timber sales no longer being profitable.

[52] Ekstrand, Earl et al. 1995. Economic Analysis of Critical Habitat Designation for the Mexican Spotted Owl, May 1995. Prepared for the U.S. Fish and Wildlife Service, New Mexico State Ecological Services Office, Albuquerque, New Mexico. Appendix D of this document provides a discussion of below cost timber harvest on National Forests in the MSO region.

[53] Personal communication with Mike Smith, Pike and San Isabel National Forest, USFS, January 21, 2004.

Administrative Costs of Management Actions

112. After the MSO was proposed for listing in 1991, USFS began conferencing with the Service on site-specific projects.[54] Since then, the USFS has made efforts to ensure that its actions do not jeopardize the existence of the MSO. For example, monitoring for the MSO has been occurring on USFS lands since the listing of the MSO in March 1993. Rough estimates of USFS spending for the MSO are available from the Wildlife, Fish & Rare Plants Report, as shown in Exhibit 3-1. These estimates may not include all spending in any given year, and do not include spending by USFS research stations.[55] Based on this data, USFS Region 4 greatly increased its efforts related to the MSO in 2003. These figures are rough estimates and may overlap with estimates of USFS spending for recovery planning efforts and consultations.

Exhibit 3-1

USFS SPENDING FOR MSO ON MANAGEMENT ACTIONS

	2000	2001	2002	2003	Total
Region 2	$6,275	$7,335	$40,000	$9,300	$62,910
Region 3	$83,939	$47,381	$171,262	$152,320	$454,902
Region 4	$300	$300	$500	$354,605	$355,705
Total	$90,514	$55,016	$211,762	$516,225	$873,517
				Average:	$218,379

Source: USFS Wildlife, Fish & Rare Plants Report, provided in an email communication from Larry Cosper, Region 3, USFS, February 5, 2004.

Notes: Region 2-Rocky Mountain region contains Colorado as well as South Dakota, Kansas, portions of Idaho and Wyoming. Region 3-Southwest region contains Arizona and New Mexico. Region 4-Intermountain region contains Utah, Nevada, and portions of Idaho, Wyoming, and California.

113. Both USFS and the Service have participated extensively on the MSO Recovery team and in the development of the MSO Recovery Plan. USFS estimates it has spent over $1.1 million (in 2003 dollars) on these efforts since the listing of the MSO in 1993 to the present. These figures represent labor costs for USFS team members from Rocky Mountain Research Station and Region 3. These costs are likely understated since they do not include any travel costs. In addition, USFS estimates it has expended up to $600,000 for data collection efforts to support recovery planning prior to 1996.[56] These recovery planning costs are included in the administrative costs shown for USFS Region 3 in Exhibit 3-3.

[54] Draft Biological Assessment of 11 Land & Resource Management Plans, USDA Forest Service Southwestern Region. Submitted to the U.S. Fish and Wildlife Service in November 2003.

[55] Personal communication with Larry Cosper, Region 3, USFS, February 5, 2004.

[56] Personal communication with William Block, Rocky Mountain Research Station, USFS, February 3, 2004.

Administrative Costs of Section 7 Consultations

114. Section 7 consultation costs include the administrative costs associated with conducting the consultation, such as the cost of time spent in meetings, preparing letters, and in some cases, developing a biological opinion. Estimates of per-effort costs associated with informal and formal consultations are presented in Exhibit 3-2. Unless otherwise stated, this table is used throughout the analysis to develop administrative costs for consultations associated with all types of activities within the proposed CHD.

Exhibit 3-2

ESTIMATED ADMINISTRATIVE COSTS OF FORMAL AND INFORMAL CONSULTATION EFFORTS FOR MSO (PER EFFORT)[a]

Critical Habitat Impact	Scenario	Service	Action Agency	Total
Informal Consultation	Low	$1,000	$1,300	$2,300
	High	$3,100	$9,500	$12,600
Formal Consultation	Low	$3,100	$9,500	$12,600
	High	$6,100	$15,300	$21,400

[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, and communications with Biologists in the Service and personnel from the USFS Region 3.

115. With regard to commercial timber sales, USFS Region 3 and the individual forests in Region 3 have consulted with the Service frequently in the past. A summary of the past 156 informal and 19 formal consultations related to timber sales and all Federal agencies is shown in Exhibit 3-3. The costs associated with these consultations are also shown in this exhibit. Included in the eight formal consultations by USFS Region 3 are seven batch consultations that included more than 160 projects; only a portion of these projects are timber sales. To expedite the consultation process, USFS Region 3 has grouped these projects for consultation with the Service.

Exhibit 3-3

SUMMARY OF PAST ADMINISTRATIVE COSTS RELATED TO TIMBER SALES (1993-2003)

Agency	Management Unit	Consultations		Total Administrative (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Informal	Formal	Low	High	Low	High	Low	High
USFS Region 2	Pike-San Isabel	1	0	$2,300	$12,600	$3,000	$18,000	$300	$2,000
USFS Region 3	Apache Sitgreaves	10	2	$48,200	$168,800	$69,000	$242,000	$6,000	$22,000
	Carson	3	0	$6,900	$37,800	$10,000	$54,000	$900	$5,000
	Cibola	4	0	$9,200	$50,400	$13,000	$72,000	$1,000	$7,000
	Coconino	21	3	$86,100	$328,800	$124,000	$472,000	$11,000	$43,000
	Coronado	0	0	$0	$0	$0	$0	$0	$0
	Gila	15	0	$34,500	$189,000	$50,000	$271,000	$5,000	$25,000
	Kaibab	7	0	$16,100	$88,200	$23,000	$127,000	$2,000	$12,000
	Lincoln	14	0	$32,200	$176,400	$46,000	$253,000	$4,000	$23,000
	Prescott	0	1	$12,600	$21,400	$18,000	$31,000	$2,000	$3,000
	Santa Fe	9	2	$45,900	$156,200	$66,000	$224,000	$6,000	$20,000
	Tonto	9	2	$45,900	$156,200	$66,000	$224,000	$6,000	$20,000
	Region wide	9	8	$1,956,500	$2,119,600	$2,807,000	$3,041,000	$255,000	$276,000
USFS Region 4	Dixie	28	0	$64,400	$352,800	$92,000	$506,000	$8,000	$46,000
	Fishlake	2	0	$4,600	$25,200	$7,000	$36,000	$600	$3,000
	Manti-La Sal	0	0	$0	$0	$0	$0	$0	$0
USFS TOTAL		132	18	$2,365,400	$3,883,400	$3,394,000	$5,572,000	$309,000	$507,000
BLM		1	0	$2,300	$12,600	$3,000	$18,000	$300	$2,000
BIA		22	1	$63,200	$298,600	$91,000	$428,000	$8,000	$39,000
DOD- Navy		1	0	$2,300	$12,600	$3,000	$18,000	$300	$2,000
TOTAL		**156**	**19**	**$2,433,200**	**$4,207,200**	**$3,491,000**	**$6,037,000**	**$317,000**	**$549,000**

Sources: IEc analysis based on data from the Federal Government General Schedule Rates, Office of Personnel Management, 2002, a review of consultation records from Service field offices, and communications with Biologists in the Albuquerque, New Mexico and Flagstaff, Colorado FWS Field Offices.

Notes: * USFS Region 3 includes costs associated with past recovery planning efforts and estimated costs for the Service associated with reviewing the current LRMPs Biological Assessment. This exhibit does not include spending tracked in USFS' Wildlife, Fish and Rare Plants Report because it likely overlaps with other USFS administrative costs.

** Administrative costs and project modification costs are discounted assuming a rate of seven percent.

116. The Service has engaged in several programmatic/formal consultations with USFS that have dealt with timber harvest as well as other activities and species, including consultation on the USFS Region 3 LRMPs and amendments to the LRMPs in 1996. The Service has indicated that these efforts involved a higher than average level of administrative effort. No specific estimate of these efforts is available for the Service or USFS. However, since April 2003, USFS has been working with the Service to draft a Biological Assessment on its current LRMPs. While the biological assessment covers more than sixty species and a wide range of USFS activities, some of this effort is related to the MSO and timber harvest activities. The Service provided estimates of its involvement in this effort, amounting to approximately $135,000 (2003 dollars) in labor costs to the present.[57] These costs are included in Exhibit 3-3.

117. Total historical costs associated with administrative efforts discussed in this section are estimated to range from approximately $3.5 to $6.0 million in 2003 dollars (Exhibit 3-3). These administrative costs were incurred during the period between 1993 and 2003 and include costs of timber sale consultations, recovery planning efforts and preparation of USFS Region 3's current LRMP biological assessment.

Project Modifications

118. Since 1996, USFS Region 3 has been planning its timber sales based on Recovery Plan guidance. The primary impact of adhering to Recovery Plan standards has been a reduction in timber harvest volume. Other than reductions in timber volume, modifications to timber sale projects have not resulted in any significant project modifications.

119. During the period from 1993 through 1997, based on formal consultation records, approximately 25 timber sales resulted in project modifications for the MSO.[58] Typical project modifications related to formal timber sale consultations during this time period (prior to Recovery Plan implementation) are summarized in Exhibit 3-4. Potential costs associated with project modifications have varied substantially from project to project, and no estimates of these costs incurred in the early 1990s were available. Since 1997, no formal timber sale consultations have occurred. This is likely due to several factors (discussed in detail in Section 2.2):

- Changes in USFS timber sales program;
- USFS implementation of Recovery Plan guidance and LRMP amendments; and,
- Injunctions against timber sales in much of the proposed CHD.

120. Since 1997, only informal consultations have occurred related to timber sale projects. While project modification costs may have been incurred as part of the planning process for timber sales, rather than as a result of consultations with the Service, these costs are likely

[57] Personal communication with Biologist, Albuquerque Field Office, FWS, February 5, 2004.

[58] Email communication from Biologist, Flagstaff, Arizona Field Office, FWS, December 2003.

related to MSO surveys and reductions in timber harvest area. Project modification costs related to MSO surveys have been estimated for each management unit in Section 7. Impacts related to limiting timber harvest in protected and restricted MSO habitat are calculated as regional economic impacts as discussed below in Section 3.2.2.

Exhibit 3-4

TYPICAL TIMBER SALE PROJECT MODIFICATIONS PRIOR TO RECOVERY PLAN IMPLEMENTATION (1993 – 1997)

Restrictions on harvest within breeding season

- No silvicultural treatments will be conducted within 0.25 miles of a known nest site, within 0.25 miles of a core area when the nest site is undetermined, or within 0.25 miles of unsurveyed suitable habitat during the breeding seasons, March 1 to August 31.

Restrictions on harvest boundaries

- Reductions in area included in timber sale boundary
- Substitution of different areas, requiring additional sale preparation efforts (e.g., marking new area)
- Exclusion of threshold habitat from all treatment

Conduct MSO monitoring

- One year of MSO monitoring consisting of four visits

Summary of Past Economic Efficiency Effects Related to Timber Harvest

121. The economic efficiency effects on timber activities from past MSO conservation efforts are illustrated in Exhibit 3-5. These past impacts represent costs of administrative efforts related to timber activities. These costs range from $3.5 to $6.0 million for the time period 1993-2003. On an annual basis, these impacts range from $317,000 to $549,000 per year, annualized using a seven percent discount rate.

Exhibit 3-5

PAST EFFICIENCY EFFECTS ASSOCIATED WITH MSO CONSERVATION EFFORTS: 1993 – 2003 (Millions of 2003 dollars)

Administrative Costs	Project Modification Costs	Total
$3.5 - $6.0	None	$3.5 - $6.0
	Annualized @ 7% (1993-2003):	$0.3 - $0.5

Note: This exhibit does not include spending tracked in USFS' Wildlife, Fish and Rare Plants Report because it likely overlaps with other USFS administrative costs.

3.2.2 Past and Ongoing Distributional and Regional Effects

122. A reduction in timber harvest in the proposed CHD area has likely had several distributional economic effects. First, distributional impacts have likely resulted from injunctions on timber harvest. Second, limitations on timber harvest have likely affected counties' shares of receipts from USFS timber sales. Finally, reduced timber harvest has likely impacted timber-related industries in the area and the broader regional economy. Based on standards and guidelines included in the 1996 MSO amendment to their LRMPs, USFS Region 3 National Forests have limited the area available for commercial timber harvest. Reductions in timber harvested affects employment and earnings in the forestry industry, which in turn impacts the regional economy.

Reduced Timber Sales Due to Injunctions

123. In August 1994, after the MSO was listed, USFS was sued for continuing to harvest timber under existing forest plans prior to completing formal consultation with the Service regarding the MSO. 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 LRMPs in November 1996.[59] Based on the historical annual average timber harvest cut from USFS Region 3 in the five years prior to the injunction (i.e., 1990 through 1994), the injunction may have resulted in a delayed timber harvest of up to 330 MMBF for the 18-month period.

124. While data are not available to estimate the actual impact related to this injunction, this lost harvest likely contributed to mill closures in the region, resulting in lost jobs. A list of mill closures in Arizona and New Mexico is included in Exhibit 3-6. As shown in Exhibit 3-6, mill closures in the region were occurring prior to the injunction, as well as after. The injunction in July 1995 hit the region at a time when the industry was already feeling the impact of other factors.[60] From 1992 to 1995, seven mills in the area closed. In the time period during and after the injunction, until the present, an additional eight mills have closed their operations. In total, the mills closed since 1992 have represented 368 MMBF in sawtimber capacity and 640 M tons in pulp capacity.

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

[60] Personal communication with Dick Stevens, Coconino National Forest, USFS, February 10, 2004.

Exhibit 3-6

MILL CLOSURES IN ARIZONA AND NEW MEXICO

Mill	Location (County, St)	Capacity (MMBF)	Closure Date
Stone Forest Ind.*.	Flagstaff (Coconino, AZ)	75	1992
Stone Forest Ind.*	Reserve (Catron, NM)	20	1992
Duke City Lumber	Cuba (Sandoval, NM)	25	1992
Kaibab Forest Ind.*	Payson (Gila, AZ)	12	1993
Precision Pine	Williams (Coconino, AZ)	10	1993
Bates Lumber	Albuquerque (Bernalillo, NM)	22	1993
Kaibab Forest Ind.*	Fredonia (Coconino, AZ)	65	1994
Precision Pine	Eager (Apache, AZ)	8	1996
Precision Pine	Winslow (Navajo, AZ)	22	1998
Stone Forest Ind.*	Eagar (Apache, AZ)	65	1998
**Vallecitos	Vallecitos (Taos, NM)	5	1998
Stone Forest Ind.*	Snowflake (Navajo, NM)	640 M Tons	1999
Tri-Con Timber	Cimarron (Colfax, NM)	9	2000
NE-I-GHI Lumber	Milan (Cibola, NM)	5	2001
Rio Grande F. Pdcts	Espanola (Santa Fe, NM)	25	2003
TOTAL		**368 MMBF + 640 M tons pulp**	

* These mills were part of large businesses; all others are small businesses based on SBA standards.
** This may be a temporary closure.
Source: "Major Mill Closure Summary, Arizona and New Mexico, August 2003." Provided in email communication from Paul Fink, Region 3 Forestry, USFS, January 8, 2004.

125. In addition, because the USFS had entered into timber sale contracts that were delayed as a result of the injunction (and some sales were ultimately modified), USFS was sued for damages by timber sale purchasers.[61]

126. Another injunction halting timber harvest in USFS Region 3 occurred in 1997; however, while this lawsuit was in part related to USFS compliance with MSO amendments, it was related to other species as well. This injunction lasted approximately six months. USFS has indicated that the impacts on timber harvest from this injunction were much less severe than from the earlier injunction.[62] Data are not available to estimate the actual impact related to this injunction.

Reduced Payments to Counties

127. To the extent that the USFS has reduced timber sales from National Forests in the 52 counties containing lands in the proposed MSO CHD, this may have affected funds those

[61] Ibid.

[62] Personal communication with Marlin Johnson, Region 3, USFS, February 6, 2004. A news article indicates that 20 timber sales were affected ("Injunction shakes Forests," by Greg Hanscom, High Country News, September 1, 1997).

counties receive from the Federal government prior to 2001. To compensate local governments for lost property tax revenues from Federal lands, the USFS returned 25 percent of its gross receipts from timber sales, grazing, fees, and other revenue-producing activities to the States in which the sales occurred. States then redistributed the returns to local counties containing NFs to fund schools and road projects. Reductions in USFS timber sales receipts likely impact counties that are dependent on these revenues.

128. The level of USFS payments to counties in Arizona and New Mexico declined significantly during the period from 1996 to 2000 as compared to earlier years. Because USFS receipts were declining due to a variety of factors, the USFS changed the way this payment was made. As of 2001, most counties in Arizona and New Mexico opted to receive a set payment reflecting an average of the highest payments to the county historically.[63] The most recent payment for counties in Arizona and New Mexico is generally higher than the overall historical average, reflecting this new payment method.

129. Exhibit 3-7 summarizes the average payments received by counties from Forest Service revenues for all years for which data are available. Figures for Arizona and New Mexico represent averages from 1982-2003. As limited data were available for Colorado and Utah, figures presented for these states represent averages from 1986 to 1997.

130. Within Arizona, Coconino County has received a significant amount of Forest Service payments, with average annual payments totaling $2.5 million from 1982 to 2003. Other counties within Arizona that have received substantial average payments from Forest Service receipts include Yavapai ($543,000), Navajo ($456,000), and Greenlee ($382,000). Within New Mexico, payments to Catron County have averaged around $456,000 per year. This represents nearly 30 percent of total average annual USFS payments within the state. Rio Arriba and Sandoval counties in New Mexico also receive large payments. Within Utah, Garfield County has an average of $243,000 per year in payments from the USFS.

131. The ability of these counties to fund schools and road projects may have been impacted by a decrease in revenues from the USFS. For example, 2003 payments received by Coconino County, Arizona, represented 14 percent of the county's total budget of $27.7 million for Education and Highways and Streets projects.[64] In 2003, payments to Yavapai County accounted for 2 percent of total General Operations funds ($53.3 million), which include funds allotted for education and roads.[65]

[63] Personal communication with Michael Ray, Region 3, USFS, February 9, 2004.

[64] Coconino County FY04 Annual Adopted Budget, p. 30, at http://co.coconino.az.us/planningandbudget/index.asp.

[65] Yavapai County FY04 Adopted Budget, p. 4, at http://www.co.yavapai.az.us/departments/bos/Budget/03-04/Budget03-04.pdf.

Exhibit 3-7

PAYMENTS TO STATES FROM NATIONAL FOREST RECEIPTS

State	County	Average Annual Payments for all Available Years*	Most Recent Payment
Arizona	State Total	$4,671,742	$7,141,763
	Apache	$267,825	$374,706
	Cochise	$61,162	$94,242
	Coconino	$2,456,350	$3,901,647
	Gila	$231,035	$315,065
	Graham	$49,466	$76,262
	Greenlee	$382,010	$537,552
	Maricopa	$91,212	$141,673
	Mohave	$2,988	$836
	Navajo	$455,797	$617,131
	Pima	$47,889	$73,782
	Pinal	$30,503	$47,431
	Santa Cruz	$52,313	$80,602
	Yavapai	$543,193	$880,834
Colorado	State Total	$4,454,757	$4,590,864
	Custer	$20,647	$17,429
	Douglas	$14,711	$11,828
	El Paso	$10,440	$8,388
	Fremont	$12,665	$10,735
	Huerfano	$17,762	$15,089
	Jefferson	$12,591	$10,901
	Pueblo	$4,151	$3,522
	Teller	$12,974	$10,426
New	State Total	$1,527,097	$2,253,028
	Bernalillo	$8,652	$12,710
	Catron	$455,752	$702,166
	Cibola	$5,077	$7,233
	Colfax	$36,652	$53,321
	Grant	$13,480	$20,254
	Hidalgo	$69,909	$114,289
	Lincoln	$9,169	$13,434
	Los Alamos	$49,844	$71,198
	McKinley	$7,149	$10,024
	Mora	$21,835	$31,827
	Otero	$23,201	$32,861
	Rio Arriba	$66,857	$101,269
	Sandoval	$298,961	$432,460
	San Juan	$86,212	$120,593

Exhibit 3-7

PAYMENTS TO STATES FROM NATIONAL FOREST RECEIPTS

State	County	Average Annual Payments for all Available Years*	Most Recent Payment
	San Miguel	$80,971	$113,566
	Santa Fe	$58,471	$81,842
	Sierra	$34,277	$50,428
	Socorro	$71,254	$103,852
	Taos	$97,156	$151,180
	Torrance	$17,713	$25,834
	Valencia	$1,828	$2,687
Utah	State Total	$1,546,694	$1,598,865
	Carbon	$2,540	$2,806
	Emery	$17,906	$19,783
	Garfield	$243,379	$216,788
	Grand	$4,839	$5,346
	Iron	$56,473	$50,358
	Kane	$28,978	$25,796
	San Juan	$37,909	$41,883
	Uintah	$47,158	$31,303
	Washington	$91,995	$81,893
	Wayne	$27,070	$27,236

* Payment figures for Arizona and New Mexico represent averages from 1982-2003. For Colorado and Utah limited data are available; thus these figures represent averages from 1986-1997.

Source: Data provided by Michael Ray, Resource Accountant, USFS Region 3, from the USDA Forest Service All Service Receipts - ASR-10-3 Report. Utah and Colorado data accessed at Forest Service website, available at http://www.fs.fed.us/institute/economic_center/spatialdata4.html.

Regional Economic Impacts

132. For the purposes of this regional economic impact analysis, the study area includes 31 counties in Arizona and New Mexico. As discussed at the beginning of this chapter, proposed CHD areas in Utah and Colorado have not experienced much impact to timber harvesting activities as a result of MSO conservation efforts and are therefore not included in the regional economic impact analysis. The study area includes all of the counties in Arizona and New Mexico in which MSO critical habitat is proposed, with the exception of three counties containing large urban areas: Maricopa County Arizona (Phoenix), Pima County Arizona (Tucson), and Bernalillo County New Mexico (Albuquerque). These three counties are excluded from the analysis because including their large economies would likely mask impacts within the region's rural areas likely to be significantly affected by a reduction

in timber harvest.[66] The affected counties and their socioeconomic characteristics are discussed in Section 2.

133. The reduction in timber harvest would primarily affect logging contractors and sawmill operations. 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 associated with the timber industry, such as maintenance and repair; while others may be less closely associated with the timber industry, such as the eating and drinking sector.

134. 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 forestry-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.

135. 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.

136. These categories are calculated for all industries and aggregated to determine the regional economic impact of reduced timber harvest resulting from MSO related management actions.

137. 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

[66] Previous analysis of MSO critical habitat utilized a similar methodology and excluded the same three counties (Ekstrand 1995).

caveat suggests that the long-run net output and employment effects resulting from changes in timber harvest 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 relationships derived from 1998 data. Thus, this analysis assumes that this historical characterization of the affected counties' economies are a reasonable approximation of current conditions. If significant changes have occurred since 1998 in the structure of the economies of the counties in the study area, the results may be sensitive to this assumption. The magnitude and direction of any such bias are unknown.

138. To estimate the regional economic impact of reduced timber harvest, the analysis first estimates the total number of acres where timber harvest has been potentially limited by MSO conservation efforts within the proposed designation. Direct effects are calculated by converting this acreage estimate to lumber production, which is then valued using an average wholesale lumber price for the region. Next, the analysis utilizes IMPLAN to estimate indirect and induced impacts on the region in terms of output and jobs.

Estimated Impact on Timber Harvest

139. The proposed CHD includes 7.8 million acres of MSO habitat within 11 NFs in USFS Region 3 (Arizona and New Mexico).[67] Timber harvest has occurred to varying degrees in these areas since the listing of the MSO. As discussed previously, the amount of timber harvest that has been reduced due to MSO protection efforts versus other factors is unknown, and it is not possible to separate the impacts of MSO conservation efforts from those resulting from other factors. Because it is not possible to estimate the volume of timber harvest actually lost due to MSO restrictions, the regional economic impact analysis provides a lower-bound estimate assuming that MSO protection would have no impact on timber harvest, and an upper-bound estimate assuming that all of the area designated as protected MSO habitat and a portion of restricted MSO habitat on National Forests would have been harvested in a sustainable manner.

140. As discussed earlier, USFS Region 3 National Forests amended their LRMPs in 1996 to incorporate guidelines for MSO protection based on the Recovery Plan. The 1996 MSO Amendment establishes three levels of habitat management: protected, restricted and other forest and woodland types. Impacts to commercial timber activities from MSO protection efforts are associated with protected and restricted areas, based on the standards and guidelines enacted for these habitat types.

141. In particular, the guidelines for protected areas require the establishment of PACs of not less than 600 acres around a nest site.[68] For a graphic presentation of PACs within USFS Region 3, see Appendix A. There are certain standards for treatments allowed within a PAC, including the following:

[67] This acreage figure is based on GIS mapping from Region 3, provided December 2003.

[68] For each MSO site located during surveys since 1989, PACs are established around known nest sites. In the absence of a known nest, the PAC centers on a roost grove commonly used during breeding or the best nest/roost habitat.

- Allow no timber harvest except for fuelwood and fire risk abatement in PACs;

- Establish a 100 acre "no treatment" area around each nest site; and,

- Use combinations of thinning trees less than nine inches in diameter, mechanical fuel treatment and prescribed fire to abate fire risk outside "no treatment" areas.

142. Standards and guidelines for restricted habitat areas are less restrictive than those for protected areas. For a graphic representation of restricted areas in the CHD that are outside of wilderness areas or areas with slope greater than 40 percent, see Appendix A. Within restricted habitat, USFS establishes a minimum of 25 percent as "threshold" habitat, which will meet certain criteria based on Recovery Plan recommendations.[69] Threshold conditions are minimum levels that must be met within 25 percent of restricted habitat. These threshold conditions are defined for variables such as tree basal area, large tree density, and tree size-class distribution. Based on discussion with a USFS regional silviculturist, the creation of restricted habitat may have resulted in some limitations on treatments on USFS Region 3 forests.[70]

- Within the 25 percent of restricted habitat considered threshold habitat, USFS estimates that limitations associated with management of threshold areas may affect timber harvest by 30 to 40 percent. For the purposes of estimating the upper-bound impacts, the analysis assumes a 40 percent reduction in threshold areas.

- In the 75 percent of restricted habitat outside of threshold areas, there has likely been about a five to 10 percent impact. For the purposes of estimating the upper-bound impacts, the analysis assumes a 10-percent reduction in non-threshold restricted habitat.

143. To estimate the acreage within the proposed CHD where timber harvest is potentially impacted by MSO protection efforts, GIS mapping was used.[71] Estimates of acreage by NF potentially impacted by MSO protection efforts are shown in Exhibit 3-8. The following explains how the potentially impacted acreage was calculated:

- Forests which have not historically had commercial timber sales were excluded. This resulted in excluding Coronado National Forest.[72]

[69] For all forests except for Coconino, 25 percent of restricted habitat must be maintained as threshold habitat; for Coconino the percentage is only 20 percent because of their large MSO population. For the purposes of this analysis, 25 percent of restricted habitat was considered threshold for all forests. Personal communication with Regis Cassidy, Region 3, USFS, January 26, 2004.

[70] Personal communication with Regis Cassidy, Region 3 Regional Silviculturist, USFS, January 26, 2004.

[71] IEc analysis of USFS Region 3 GIS data provided by USFS Region 3 GIS technicians, December 2003.

[72] Personal communication with Paul Fink Region 3, USFS, January 29, 2004.

- PAC acreage within the CHD boundary, excluding designated wilderness areas and areas with slope greater than 40 percent, was determined.[73]

- Restricted area acreage within the CHD boundary was determined; this acreage was assumed to already exclude areas with greater than 40 percent slope.[74] Due to data processing constraints, wilderness acreages within restricted habitat could not be precisely determined; thus, the analysis does not exclude wilderness areas within restricted acreage. As a result, estimated acreages of impacted restricted habitat could be overstated by as much as 20 percent.[75]

- The restricted habitat acreage was reduced to represent the following assumptions:

  - 40 percent of "threshold" habitat (25 percent of restricted habitat) is considered potentially impacted acreage.

  - 10 percent of non-"threshold" habitat (75 percent of restricted habitat) is considered potentially impacted acreage.

144. Available data does not provide detailed information on the stand structure or vegetation cover type within the PAC and restricted areas. Therefore, the analysis does not account for these factors.

145. As shown in Exhibit 3-8, the analysis estimates that approximately 904,000 acres of USFS Region 3 lands would be impacted by MSO conservation activities. This represents approximately 12 percent of the total 7.8 million acres of USFS Region 3 lands included in the proposed CHD boundary.

[73] Based on personal communication with USFS Regional Silviculturist, January 7, 2004, commercial timber harvest is not allowed in designated wilderness areas and it is not feasible in areas with slopes greater than 40 percent.

[74] USFS Region 3 GIS technicians provided data on restricted acreage in USFS Region 3. This analysis assumes that this is the same data used for the Wildland and Urban Interface biological assessment (see Section 5 of this report). In this biological assessment, creation of restricted habitat was described as: "Restricted habitat was determined by combining mixed conifer and ponderosa pine/oak vegetation on slopes less than 40 percent within riparian vegetation."

[75] IEc GIS analysis, February 2004.

Exhibit 3-8

POTENTIALLY IMPACTED TIMBER HARVEST FROM REGION 3 NATIONAL FORESTS

National Forest	Potentially Impacted PAC Acreage (Acres)		Potentially Impacted Restricted Acreage (Acres)		Total Potentially Impacted Timber Harvest (Acres)	
	Low	High	Low	High	Low	High
Apache Sitgreaves (AZ/NM)	0	62,828	0	97,344	0	160,172
Carson (NM)	0	1,388	0	19,850	0	21,238
Cibola (NM)	0	13,035	0	64,615	0	77,651
Coconino (AZ)	0	83,423	0	74,702	0	158,125
Gila (NM)	0	77,200	0	178,074	0	255,274
Kaibab (AZ)	0	923	0	23,304	0	24,227
Lincoln (NM)	0	59,670	0	26,794	0	86,465
Prescott (AZ)	0	6,314	0	10,470	0	16,784
Santa Fe (NM)	0	18,968	0	36,081	0	55,049
Tonto (AZ)	0	22,614	0	26,868	0	49,481
TOTAL	0	346,363	0	558,102	0	904,466

Source: MSO PACs, Restricted Access 40% Slope Areas provided by Region 3 USFS GIS data technicians, December 2003/January 2004. (For a graphic representation of this data, see Appendix A.)

Estimated Impact on Lumber Production

146. The calculation of the direct effect of reduced timber harvest on Region 3 National Forests is illustrated in Exhibit 3-9. The following assumptions are used in this calculation:

- To convert total impacted acreage to potential annual reduction in timber harvest:
  - Timber would be harvested sustainably, using uneven age management, assuming a 30 year rotation (e.g., total potentially impacted acreage is divided by 30);[76] and
  - For every acre of timberland, timber harvest would be approximately 2,000 board feet (BF) per acre, reflecting a partial cut method.[77]

[76] Personal communication with Regis Cassidy, Region 3, USFS, January 22, 2004.

[77] Personal communication with Paul Fink, Region 3, USFS, January 29, 2004.

- To convert timber harvest in thousand board feet scribner (MBF scribner) to lumber production in MBF, the analysis uses a conversion factor of 1.3.[78]

- To calculate the value of potential reduction in lumber production, the analysis applies the average estimated wholesale price for lumber in the region from 1996 to 2002 of $356/MBF.[79]

Exhibit 3-9

CALCULATION OF DIRECT EFFECT OF REDUCTION IN TIMBER HARVEST

National Forest	Total Potentially Impacted Timber Harvest (Acres)		Annual Potential Reduction in Timber Harvest (MBF scribner)		Annual Potential Reduction in Lumber Production (MBF)		Direct Impact: Annual Value of Reduced Lumber Production (2003$ in millions)	
	Low	High	Low	High	Low	High	Low	High
Apache Sitgreaves (AZ/NM)	0	160,172	0	10,678	0	13,882	$0	$4.9
Carson (NM)	0	21,238	0	1,416	0	1,841	$0	$0.7
Cibola (NM)	0	77,651	0	5,177	0	6,730	$0	$2.4
Coconino (AZ)	0	158,125	0	10,542	0	13,704	$0	$4.9
Gila (NM)	0	255,274	0	17,018	0	22,124	$0	$7.9
Kaibab (AZ)	0	24,227	0	1,615	0	2,100	$0	$0.7
Lincoln (NM)	0	86,465	0	5,764	0	7,494	$0	$2.7
Prescott (AZ)	0	16,784	0	1,119	0	1,455	$0	$0.5
Santa Fe (NM)	0	55,049	0	3,670	0	4,771	$0	$1.7
Tonto (AZ)	0	49,481	0	3,299	0	4,288	$0	$1.5
TOTAL	0	904,466	0	60,298	0	78,387	$0	$27.9

[78] The accepted measure for timber harvest is thousand board feet scribner (MBF), which is not an accurate measure for lumber production. The scribner scale is based on the small end diameter of the log, while additional lumber volume can be recovered from the cone end. Thus, a conversion factor is needed to translate the harvested volume into lumber production volume. For the four corners region, a conversion factor of 1.3 is reasonable based on personal communication with Paul Fink, Region 3, USFS, January 29, 2004 with Kevin Binan, Western Wood Products Association, February 10, 2004.

[79] Western Wood Products Association. 2002 Statistical Yearbook of the Western Lumber Industry.

147. Based on these assumptions, the potential direct effect of a reduction in timber harvest on approximately 904,000 acres due to MSO-related restrictions ranges from no impact to $27.9 million, annually, as illustrated in Exhibit 3-9. The annual potential reduction in timber harvest of approximately 60,000 MBF represents 41 percent of the annual average volume harvest cut of 148,000 MBF from USFS Region 3 forests.[80]

Results of Regional Economic Impact Model (IMPLAN)

148. As illustrated in Exhibit 3-9, the past and ongoing direct impact of MSO conservation efforts on lumber production in USFS Region 3 is $27.9 million. This figure is input into the IMPLAN model to determine the past and ongoing regional economic impact resulting from a reduction in lumber production.

149. The total estimated regional economic impact of a limiting timber harvest on approximately 904,000 acres of NF land in Arizona and New Mexico ranges from no impact to $49.7 million (Exhibit 3-10). This limitation on timber harvest could also impact as many as 429 jobs, in total. In addition, the reduction in timber harvest may also reduce state and local taxes by as much as $1.1 million in the study area. The upper-bound impact figures represent annual impacts associated with reduced lumber production in each year since 1996. This impact would be ongoing as long as sustainable timber harvest in these areas is restricted in a similar manner due to MSO protection efforts.

150. The NFs with the greatest potential regional economic impact are the Gila, Coconino and Apache-Sitgreaves. A reduction in timber harvest from the Gila NF could result in a total regional economic impact of up to $14.0 million and 121 jobs. For each of the Coconino and Apache-Sitgreaves, the estimated upper-bound impact is approximately $8.7 million and 75 jobs.

[80] U.S. Department of Agriculture, Forest Service Southwestern Region. 2003. "Draft Biological Assessment of 11 Land & Resource Management Plans," submitted to the U.S. Fish and Wildlife Service, November.

Exhibit 3-10

PAST & ONGOING REGIONAL ECONOMIC IMPACT OF REDUCED TIMBER HARVEST*
(Millions of 2003 dollars)

National Forest	Direct Effect (Output/ Employment)		Indirect Effect (Output/ Employment)		Induced Effect (Output/ Employment)		Total Impact (Output/ Employment)	
	Low	High	Low	High	Low	High	Low	High
Apache Sitgreaves (AZ/NM)	0 (0)	$4.9 (31)	0 (0)	$2.9 (28)	0 (0)	$1.0 (17)	0 (0)	$8.8 (76)
Carson (NM)	0 (0)	$0.7 (4)	0 (0)	$0.4 (4)	0 (0)	$0.1 (2)	0 (0)	$1.2 (10)
Cibola (NM)	0 (0)	$2.4 (15)	0 (0)	$1.4 (14)	0 (0)	$0.5 (8)	0 (0)	$4.3 (37)
Coconino (AZ)	0 (0)	$4.9 (31)	0 (0)	$2.8 (28)	0 (0)	$1.0 (17)	0 (0)	$8.7 (75)
Gila (NM)	0 (0)	$7.9 (49)	0 (0)	$4.6 (45)	0 (0)	$1.6 (27)	0 (0)	$14.0 (121)
Kaibab (AZ)	0 (0)	$0.7 (5)	0 (0)	$0.4 (4)	0 (0)	$0.2 (3)	0 (0)	$1.3 (11)
Lincoln (NM)	0 (0)	$2.7 (17)	0 (0)	$1.5 (15)	0 (0)	$0.5 (9)	0 (0)	$4.8 (41)
Prescott (AZ)	0 (0)	$0.5 (3)	0 (0)	$0.3 (3)	0 (0)	$0.1 (2)	0 (0)	$0.9 (8)
Santa Fe (NM)	0 (0)	$1.7 (11)	0 (0)	$1.0 (10)	0 (0)	$0.3 (6)	0 (0)	$3.0 (26)
Tonto (AZ)	0 (0)	$1.5 (10)	0 (0)	$0.9 (9)	0 (0)	$0.3 (5)	0 (0)	$2.7 (23)
TOTAL	0 (0)	$27.9 (175)	0 (0)	$16.1 (159)	0 (0)	$5.6 (95)	0 (0)	$49.7 (429)

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

3.3 Potential Future Impacts of MSO Conservation

151. This section attempts to forecast economic impacts associated with MSO protections that could occur after the designation is finalized. Specifically, it discusses future costs of administrative efforts to protect the MSO and its habitat, as a result of the listing and CHD, as well as future regional economic impacts resulting from a potential continued reduction in timber harvest.

3.3.1 Future Economic Efficiency Effects

152. Expected future economic efficiency effects are related to administrative costs, as discussed below.

Reduced Timber Harvest Opportunities

153. For the same reasons stated above, a change in harvest levels in the southwest region of the magnitude estimated in this report would not be expected to result in a measurable change in the price or quantity of national wood product markets. Thus, no efficiency effects related to the impact of reduced timber sales on USFS revenues are calculated.

Administrative Costs

154. Future USFS management activities that may result in administrative costs include continued MSO Recovery Plan efforts and undergoing section 7 consultations.

Administrative Costs of Management Actions

155. Both USFS and the Service continue to participate extensively on the MSO Recovery team and in the current revision of the MSO Recovery Plan. USFS estimates it will spend approximately $50,000 (2003$) on these efforts in the future. These figures represent labor costs for USFS team members from Rocky Mountain Research Station and Region 3. These costs are likely understated since they do not include any travel costs.[81] These costs are included in Exhibit 3-11. No estimate is available for the Service's MSO Recovery planning efforts.

156. Because USFS Region 3 has already implemented its MSO amendment, is managing its forests using uneven age silvicultural practices, and has shifted its forest management focus away from timber sales, no additional management actions are expected in this area in the foreseeable future.

[81] Personal communication with William Block, Rocky Mountain Research Station, USFS, February 3, 2004.

Administrative Costs of Section 7 Consultation

157. In November 2003, USFS Region 3 produced a draft biological assessment of its LRMPs for consultation with the Service. Efforts to complete this consultation and finalize the biological assessment are expected to continue over the next year. Some of this effort is related to the MSO and timber harvest activities, although it covers more than 60 species and a wide range of USFS activities. The Service expects this effort to cost approximately $100,000 in labor costs.[82] These costs are included in Exhibit 3-12.

158. With regard to future timber sales, there is a great deal of uncertainty regarding how much activity will occur within the proposed MSO CHD. There is some potential that timber harvest may increase as USFS increases fuels reduction projects. In January 2004, an agreement to expedite consultations with agencies conducting activities under the national fire plan took effect.[83] This could result in an increase in fuels reduction and thinning projects on USFS lands which could provide a supply of small diameter logs.[84] Whether such timber sales would occur would depend on such factors as investment in small diameter saw mills in the region, and the success of economic development efforts in the region.[85]

159. In the absence of specific information, this analysis estimates the number of future timber sale consultations based on past consultation history. Specifically, over the next 10 years (2004 to 2013), the analysis forecasts that there will be approximately 17 formal and 156 informal consultations related to timber sales involving the MSO (Exhibit 3-11). Future administrative costs are expected to range from $0.5 million to $1.8 million (2003$).

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[82] Personal communication with Biologist, Albuquerque Field Office, FWS, February 3, 2004.

[83] Joint counterpart Endangered Species Act section 7 consultation regulations. 68 FR 68254. December 8, 2003.

[84] Personal communication with Paul Fink, Region 3, USFS, January 22, 2004. For example, on the Apache Sitgreaves, National Forest there is a large fire management project being considered that could result in treatment of 150,000 acres and could involve building a new small diameter mill.

[85] For example, the Four Corners Sustainability Partnership has funded a variety of demonstration projects in the region over the past four years in an attempt "to encourage the development of sustainable economic endeavors like private business, public/private partnerships, and trade associations to process small diameter wood throughout the Four Corners area." See, USDA 2002. Economic Effects of the Four Corners Sustainability Partnership Demonstration Projects in the Apache-Sitgreaves, Fishlake, Lincoln and San Juan Working Circles. Technical Report No. 101. November 2002. Prepared by Gregory S. Alward, Michael J. Niccolucci, Susan A. Winter, USDA Forest Service Inventory and Monitoring Institute.

Exhibit 3-11

SUMMARY OF FUTURE ADMINISTRATIVE EFFORTS RELATED TO TIMBER SALES (2004-2013)

		Consultations		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)		Annual Costs (2003$)	
Agency	**Management Unit**	**Informal**	**Formal**	**Low**	**High**	**Low**	**High**	**Low**	**High**
USFS Region 2	Pike-San Isabel	1	0	$2,300	$12,600	$2,000	$9,000	$200	$900
	Region 2 Subtotal	1	0	$2,300	$12,600	$2,000	$9,000	$200	$900
USFS Region 3	Apache Sitgreaves	10	2	$48,200	$168,800	$34,000	$119,000	$3,000	$12,000
	Carson NF	3	0	$6,900	$37,800	$5,000	$27,000	$500	$3,000
	Cibola NF	4	0	$9,200	$50,400	$6,000	$35,000	$600	$4,000
	Coconino NF	21	3	$86,100	$328,800	$60,000	$231,000	$6,000	$23,000
	Coronado NF	0	0	$0	$0	$0	$0	$0	$0
	Gila NF	15	0	$34,500	$189,000	$24,000	$133,000	$2,000	$13,000
	Kaibab NF	7	0	$16,100	$88,200	$11,000	$62,000	$1,000	$6,000
	Lincoln NF	14	0	$32,200	$176,400	$23,000	$124,000	$2,000	$12,000
	Prescott	0	1	$12,600	$21,400	$9,000	$15,000	$900	$2,000
	Santa Fe NF	9	2	$45,900	$156,200	$32,000	$110,000	$3,000	$11,000
	Tonto NF	9	2	$45,900	$156,200	$32,000	$110,000	$3,000	$11,000
	Region wide*	9	8	$271,500	$434,600	$191,000	$305,000	$19,000	$31,000
	Region 3 Subtotal	101	18	$609,100	$1,807,800	$428,000	$1,270,000	$43,000	$127,000
USFS Region 4	Dixie NF	28	0	$64,400	$352,800	$45,000	$248,000	$5,000	$25,000
	Fishlake NF	2	0	$4,600	$25,200	$3,000	$18,000	$300	$2,000
	Manti-La Sal NF	0	0	$0	$0	$0	$0	$0	$0
	Region 4 Subtotal	30	0	$69,000	$378,000	$48,000	$265,000	$5,000	$27,000
USFS TOTAL		132	18	$680,400	$2,198,400	$478,000	$1,544,000	$48,000	$154,000
BLM Total		1	0	$2,300	$12,600	$2,000	$9,000	$200	$900
BIA Total		22	1	$63,200	$298,600	$44,000	$210,000	$4,000	$21,000
DOD - NAVY		1	0	$2,300	$12,600	$2,000	$9,000	$200	$900
TOTALS		**156**	**19**	**$748,200**	**$2,522,200**	**$526,000**	**$1,771,000**	**$53,000**	**$177,000**

Sources: IEc analysis based on data from the Federal Government General Schedule Rates, Office of Personnel Management, 2002, a review of consultation records from Service field offices, and communications with Biologists in the Albuquerque, New Mexico and Flagstaff, Arizona U.S. Fish and Wildlife Service Field Offices.

Project Modifications

160. As stated above, since 1996, USFS Region 3 has been planning its timber sales based on Recovery Plan guidance. The primary impact of implementing the Recovery Plan is the reduction in timber harvest volume that has occurred. Other than reductions in timber volume, modeled as regional economic impacts below, modifications to timber sale projects are not expected to result in any significant project modifications in the future.

Summary of Future Economic Efficiency Effects Related to Timber Harvest

161. The economic efficiency effects forecast to result from future MSO conservation efforts are summarized in Exhibit 3-12. These future impacts represent costs of administrative efforts related to consultations for timber activities. These costs range from $0.5 million to $1.8 million for the time period 2004 to 2013. On an annual basis these impacts range from $52,000 to $177,000 per year.

Exhibit 3-12

FORECAST FUTURE EFFICIENCY EFFECTS ASSOCIATED WITH MSO CONSERVATION EFFORTS: 2004 - 2013

(Millions of 2003 dollars)

Administrative Costs	Project Modification Costs	Total
$0.5 - $1.8	Minimal	$0.5 - $1.8
	Annualized @ 7 percent (2004-2013):	$0.05 - $0.2

3.3.2 Future Distributional or Regional Economic Effects

162. This section discusses potential future distributional effects related to reduced timber harvest in the future. In particular, this section addresses the potential for continued distributional impacts resulting from limitations on timber harvest, including: reductions in affected counties' shares of receipts from USFS timber sales and reductions in employment and earnings in the forestry industry, which in turn impacts the regional economy.

Reduced Payments to Counties

163. Because USFS changed the method by which payments to counties were determined in 2001, county revenues received from USFS in Arizona and New Mexico are not expected to be affected by MSO-related timber harvest reductions in the future. Most of the counties now receive set payments, not dependent on the level of USFS receipts.[86]

[86] Personal communication with Michael Ray, Region 3, USFS, February 9, 2004.

Regional Economic Impacts

164. This section presents the regional economic impacts expected to result from potential continued reductions in sustainable timber harvest on USFS Region 3 National Forests resulting from areas set aside to protect the MSO in the past. This information is intended to help the Service understand economic impacts that may continue into the future. Specifically, this section presents the additional economic contribution that each NF is forecast to provide in terms of timber harvest in the absence of MSO restrictions.

165. As discussed previously, there is a great deal of uncertainty about the future of the timber industry in the region. While there is a potential for an increased market for timber sales from NFs due to possible investments in new mills to process the available small diameter timber, the current market for small diameter timber in the region is very limited.[87] It is not possible to separate the impacts of MSO conservation efforts from those resulting from other factors such as USFS Region 3 goshawk and old growth forest management amendments, since these impacts have occurred simultaneously. Therefore, the regional economic impact analysis estimates a range of direct effects. The lower-bound estimate assumes that there would be no impact related to MSO restrictions on timber harvest, and the upper-bound estimate assumes that sustainable harvest of areas set aside to meet MSO standards and guidelines would have continued. This upper bound estimate measures the level of economic output in terms of timber harvest that is no longer available and harvested for lumber production because of MSO conservation efforts. However, it is important to note that because harvest restrictions have been occurring since USFS Region 3 implemented Recovery Plan guidance, the existing regional timber industry has likely already absorbed and adjusted to the reduced timber supply.

166. This analysis relies on the same methodology presented previously to estimate the past and ongoing regional economic impact of a reduction in lumber production in the proposed CHD. The analysis relies on estimates of acreage where timber harvest is forecast to be reduced due to MSO restrictions, in both protected and restricted MSO habitat. These restrictions are based on past management actions, including USFS implementation of the Recovery Plan and MSO standards and guidelines under the 1996 MSO amendments.

167. This analysis assumes that the acreage of protected and restricted MSO habitat in USFS Region 3 remains at the same level through 2013.[88] Exhibit 3-13 demonstrates expected future regional economic impacts. In addition, the analysis assumes that the future price for wholesale lumber production in the region will equal the 1996 to 2002 average.

[87] The capacity of currently operating mills in the region is 61 MMBF (Email communication from Paul Fink, Region 3 USFS, January 8, 2004). The analysis estimates that the additional annual timber harvest that NFs would contribute without MSO restrictions would be approximately 60 MMBF (see Exhibit 3-9). It is unknown what the available capacity would have been in the absence of MSO related restrictions.

[88] Annual results may be underestimated if the acreage of protected and restricted habitat increases as the MSO recovers. However, as the MSO recovers, the Service will have greater flexibility under the Act to allow activities otherwise restricted, to occur on USFS Region 3 lands.

Exhibit 3-13

FORECAST FUTURE REGIONAL ECONOMIC IMPACT OF REDUCED TIMBER HARVEST*
(Sorted by Output)
(Millions of 2003 dollars)

National Forest	Direct Effect (Output/ Employment)		Indirect Effect (Output/ Employment)		Induced Effect (Output/ Employment)		Total Impact (Output/ Employment)	
	Low	High	Low	High	Low	High	Low	High
Gila (NM)	0 (0)	$7.9 (49)	0 (0)	$4.6 (45)	0 (0)	$1.6 (27)	0 (0)	$14.0 (121)
Apache Sitgreaves (AZ/NM)	0 (0)	$4.9 (31)	0 (0)	$2.9 (28)	0 (0)	$1.0 (17)	0 (0)	$8.8 (76)
Coconino (AZ)	0 (0)	$4.9 (31)	0 (0)	$2.8 (28)	0 (0)	$1.0 (17)	0 (0)	$8.7 (75)
Lincoln (NM)	0 (0)	$2.7 (17)	0 (0)	$1.5 (15)	0 (0)	$0.5 (9)	0 (0)	$4.8 (41)
Cibola (NM)	0 (0)	$2.4 (15)	0 (0)	$1.4 (14)	0 (0)	$0.5 (8)	0 (0)	$4.3 (37)
Santa Fe (NM)	0 (0)	$1.7 (11)	0 (0)	$1.0 (10)	0 (0)	$0.3 (6)	0 (0)	$3.0 (26)
Tonto (AZ)	0 (0)	$1.5 (10)	0 (0)	$0.9 (9)	0 (0)	$0.3 (5)	0 (0)	$2.7 (23)
Kaibab (AZ)	0 (0)	$0.7 (5)	0 (0)	$0.4 (4)	0 (0)	$0.2 (3)	0 (0)	$1.3 (11)
Carson (NM)	0 (0)	$0.7 (4)	0 (0)	$0.4 (4)	0 (0)	$0.1 (2)	0 (0)	$1.2 (10)
Prescott (AZ)	0 (0)	$0.5 (3)	0 (0)	$0.3 (3)	0 (0)	$0.1 (2)	0 (0)	$0.9 (8)
TOTAL	0 (0)	$27.9 (175)	0 (0)	$16.1 (159)	0 (0)	$5.6 (95)	0 (0)	$49.7 (429)

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

168. The total estimated change in regional economic output of continued limitations on timber harvest on approximately 904,000 acres of National Forest land in Arizona and New Mexico ranges from no impact to $49.7 million annually (Exhibit 3-13). This limitation on timber harvest could also impact as many as 429 jobs. In addition, the reduction in timber harvest may also impact (decrease) taxes by as much as $1.1 million in the study area. That

is, if no limits existed on timber harvests in areas requiring MSO protection, regional output might be $49.7 million higher each year, and 429 additional jobs might be created. The upper-bound impact figures represent annual impacts associated with reduced lumber production in each year through 2013. This impact would be ongoing as long as sustainable timber harvest in these areas is restricted in a similar manner due to MSO protection efforts.

169. Three National Forests account for two-thirds of the potential impact. As shown in Exhibit 3-13, the National Forests with the greatest potential regional economic impact are the Gila, Coconino and Apache Sitgreaves. From the Gila NF, a total regional economic impact of up to $14.0 million and 121 jobs is expected. The Coconino expected total impacts are $8.8 million and 76 jobs, while from the Apache Sitgreaves, the estimated upper bound impact is approximately $8.7 million and 75 jobs.

3.4 Caveats to Economic Analysis of Impacts on the Timber Industry

170. Exhibit 3-14 summarizes the key assumptions of the analysis of economic impacts on the timber industry, as well as the potential direction and relative scale of bias introduced by these assumptions.

Exhibit 3-14

CAVEATS TO THE ECONOMIC ANALYSIS OF FUTURE IMPACTS ON THE TIMBER INDUSTRY

Key Assumption	Effect on Impact Estimate
Historic administrative consultation costs and project modifications are good predictors of future consultation costs and modifications.	+/-
Timber in the PACs and restricted areas would have been harvested sustainably, under a 30-year rotation.	+
Analysis does not address market factors that could have affected or could impact future timber sales from impacted National Forests.	+/-
Analysis does not account for stand structure or species type within the PAC and restricted areas that may be unsuitable for commercial harvest.	+
The IMPLAN model used to estimate regional economic impacts is a static model and does not account for the fact that the economy will adjust. IMPLAN measures the effects of a specific policy change at one point in time. Over the long-run, the economic losses predicted by the model may be overstated as adjustments such as re-employment of displaced employees occurs.	+
The IMPLAN model that is used to estimate regional economic impacts relies on 1998 data. If significant changes have occurred in the structure of the affected counties' economies, the results may be sensitive to this assumption. The direction of any bias is unknown.	+/-
Due to data processing constraints, the analysis does not calculate the area within restricted habitat that is designated as wilderness areas. Therefore, the analysis does not exclude these areas from restricted acreage potentially impacted by limitations from MSO standards and guidelines. As a result, estimated acreages of impacted restricted habitat may be overstated by as much as 20 percent.	+
Other than impacts of reduced timber harvest, which is the primary impact of Recovery Plan implementation on timber sales, other project modifications to timber sale projects have not been quantified in this analysis.	+
The analysis does not estimate specific impacts resulting from injunctions against the USFS.	-

- : This assumption may result in an underestimate of real costs.
+ : This assumption may result in an overestimate of real costs.
+/- : This assumption has an unknown effect on estimates.

171. This section describes past, ongoing, and future impacts to livestock grazing activities on Federal lands in MSO critical habitat areas. The importance of the regional livestock industry is discussed in Section 2, in the Socioeconomic Profiles sub-section. This section focuses on economic impacts of changes in grazing activity resulting from MSO conservation measures. Specifically, this analysis estimates the loss in permit values and regional economic impacts associated with MSO-related restrictions on grazing activity on Federal lands. In addition, administrative and other project modification costs associated with MSO conservation activities are identified.

4.1 Background

172. The proposed critical habitat area for the MSO includes large areas of USFS and BLM lands that are leased for seasonal or year-round livestock grazing. As noted previously, areas proposed as critical habitat for the MSO cover approximately 30 percent of USFS lands in Region 3. For a graphic representation of the livestock grazing allotments in USFS Region 3, see Appendix A.

173. While livestock grazing does not directly impact the MSO, it has the potential to indirectly affect it. The Recovery Plan states that livestock grazing may affect the MSO by:

- Altering prey availability;
- Altering susceptibility of the forest to fire;
- Degenerating riparian plant communities; and
- Impairing ability of plant communities to develop into spotted owl habitat[89]

174. The Recovery Plan notes that "...the collective efforts of grazing are neither always predictable nor always negative. Effects depend on site-specific factors such as the grazing system, condition of the plant community prior to livestock grazing, soil types, climate, community composition of plant species, and the presence or absence of aggressive exotic

[89] Recovery Plan for the Mexican spotted owl (*Strix occidentalis lucida*), Service, December 1995 (p. 96).

plant species." Thus, specific management of grazing allotments for MSO is left to the discretion of the Federal agencies responsible for permitting grazing on their lands.

4.2 Overview of Efficiency Impacts on Grazing Activities

175. Efforts to conserve the MSO have resulted in economic efficiency effects with regard to livestock grazing. Three types of economic efficiency effects are discussed below, including: **permit value reductions, administrative costs, and other project modifications**. This section investigates the difficulties in determining whether changes to grazing permits are the result of MSO conservation or other factors.

> The factors that result in changes to utilization, head, and AUMs on an allotment are correlated temporally and spatially, and therefore it is difficult to separate MSO-related causes from other causes for decisions made in MSO habitat areas. For example, was past utilization so high that a reduction in AUMs was inevitable, or are the observed reductions a function of increased pressure on range managers from outside parties to cut the number of cattle grazing these lands? While the presence of the MSO is only one factor, it can be argued that the Act imposes a legal standard that allows range managers to make grazing reductions that would otherwise not be possible.* For example, an October 30, 2003 ruling by a New Mexico judge canceled permits on seven grazing allotments in Cibola, Coconino, Coronado, and Tonto NFs and required USFS to consult on twenty-one other grazing permits across seven NFs in New Mexico and Arizona. While this case is not specific to MSO, it does suggest that identifying the location of endangered species habitat could lead outside parties to file legal challenges that would not have been filed otherwise. This analysis calculates potential losses in permit value from MSO conservation activities by using examples of reductions that occurred on allotments that were subjects of past consultations on MSO.
>
> * This discussion derives from comments by Dr. Delworth Gardner, Brigham Young University, February 27, 2004.

176. On some allotments that contain MSO habitat, USFS has introduced grazing utilization standards and made direct reductions in carrying capacity, or AUMs, since the listing of the species. These reductions in AUMs have impacted the ranchers that graze those lands. However, numerous factors affect the number of permitted and authorized AUMs approved by USFS and BLM for a given grazing allotment. On a particular allotment containing MSO habitat, reductions to authorized or permitted AUMs made by USFS or BLM may be: (1) directly related to MSO conservation; (2) indirectly related to MSO conservation; (3) not related to MSO conservation at all; or (4) a combination of factors. These scenarios are described below:

(1) *Causes directly related to MSO.* Even though livestock grazing does not directly harm MSOs, Action agencies have had to consider potential impacts of livestock grazing actions on MSO in habitat areas since its listing. Indeed, in a 2001 hearing with the New Mexico Public Land Grazing Task Force (New Mexico Task Force),

the Federal agencies in New Mexico cited compliance with Federal laws as a key factor that affects their management of livestock grazing.[90] As part of a survey, the New Mexico Task Force asked USFS and BLM permittees whether the permitted number of livestock on their allotments had been decreased due to the presence of Federally listed endangered or threatened species (Exhibit 4-1). Their answers indicate that endangered species considerations have influenced the number of permitted AUMs, particularly on National Forest lands.[91] Although not definitive, this survey raises the issue that MSO considerations may affect the number of permitted AUMs on allotments in habitat areas.

Exhibit 4-1

RESPONDENTS CLAIMING REDUCTIONS IN PERMITTED AUMS DUE TO THREATENED AND ENDANGERED SPECIES PRESENCE

Management Unit	Percent
Carson NF	23
Cibola NF	2
Gila NF	42
Lincoln	7
Santa Fe NF	2
New Mexico BLM*	5

Notes: (1) The survey question was not specific to MSO, thus drawing conclusions from this study about reductions in AUMs that may have resulted from MSO conservation activities is not possible. (2) BLM percentage presented is an average of the four offices. The Task Force sent surveys to 1,128 USFS permittees and 2,045 BLM permittees. They received responses from 322 USFS and 482 BLM permittees, or 29 and 24 percent, respectively.
Source: "Report to the Governor of New Mexico from the Public Land Grazing Task Force," prepared by George A. Douds, New Mexico Department of Agriculture, 2002, Appendices D, E and F.

(2) *Causes indirectly related to MSO.* As part of the New Mexico Task Force survey, Federal agencies cited tree encroachment as a factor that recently has been affecting their decisionmaking regarding permitting of livestock grazing.[92] Tree encroachment has been continuing for the past 100 years, in part due to fire suppression activities by Federal agencies. Recent reductions in timber harvest may have exacerbated this effect.[93] Because reductions in timber harvest may have been introduced, in part, for

[90] "Report to the Governor of New Mexico from the Public Land Grazing Task Force," prepared by George A. Douds, New Mexico Department of Agriculture, 2002.

[91] While this survey does not present a definitive answer to the question posed, it suggests that AUM reductions may be, in part, associated with endangered species considerations. However, the survey question was not specific to MSO, thus drawing conclusions from this study about reductions in AUMs that may have resulted from MSO conservation activities is not possible.

[92] As time passes without timber harvest, trees grow, the forest canopy closes, and availability of open range forest is reduced.

[93] Personal communication with Larry Lichthardt, Ranger Management Lead, Utah BLM, January 29, 2004.

MSO (see Section 3), some forage reductions from tree encroachment (and ensuing AUM reductions) may be indirectly caused by MSO conservation activities.[94]

(3) *Causes unrelated to MSO.* When Federal agencies assess an allotment for permit renewal, they must also consider weather conditions (drought), forage availability, presence of other ungulates, such as elk, as well as presence of other sensitive, threatened and endangered species.[95] In the Tonto NF, for example, recent drought conditions have led to reductions in AUMs in most allotments in the forest, whether or not they contained MSO habitat.[96]

Permittees in the New Mexico survey responded that forage use by elk populations may have contributed to reductions in permitted AUMs on their allotments. For Carson and Gila NFs, 38 percent and 34 percent of respondents, respectively, reported that their permitted AUMs may have been reduced due to elk forage use. Respondents at Cibola and Lincoln NFs reported fewer incidences of elk forage conflicting with their AUM use (four percent and seven percent affected, respectively). BLM permittees responded to the question of whether wild elk populations were contributing to reductions unpermitted AUMs "overwhelmingly" with "no".[97] While the survey does not provide definitive results, it suggests that elk populations appear to be a factor in causing reductions to permitted AUMs on Federal lands, though elk appear to be a larger factor on NF lands than on BLM lands.

(4) *Combination of Causes.* In most cases, decisions made by the Federal agencies to change the permitted or authorized AUMs in MSO habitat areas is a combination of MSO considerations, other regulatory considerations (such as Forest Plans and Resource Management Plans), current forage availability and an assessment of weather conditions. In addition, subjective factors such as political pressures from interest groups or other land user groups may also influence agency decisions. These subjective impacts are the most difficult to predict, but may play an important role in the decisionmaking process.

177. The rest of this section discusses the past, ongoing, and potential future impacts that implementing MSO conservation measures have had and will have on livestock grazing activity in proposed critical habitat areas. The factors that result in changes to utilization, head, and AUMs on an allotment are correlated temporally and spatially, and therefore it is difficult to separate MSO-related causes from other causes for decisions made in MSO

[94] Personal communication with Nick Ashcroft, NMSU, February 4, 2004.

[95] Personal communication with Don Pollock, Wildlife Biologist, Tonto National Forest, February 3, 2004.

[96] Personal communication with Don Pollock, Wildlife Biologist, Tonto National Forest, February 3, 2004. Personal communication with Buck McKenney, Range Management Specialist, Tonto National Forest, February 4, 2004.

[97] The Task Force sent surveys to 1,128 USFS permittees and 2,045 BLM permittees. They received responses from 322 USFS and 482 BLM permittees, or 29 and 24 percent, respectively. "Report to the Governor of New Mexico from the Public Land Grazing Task Force," prepared by George A. Douds, New Mexico Department of Agriculture, 2002.

habitat areas. This analysis calculates potential losses in permit value from MSO conservation activities by using examples of reductions that occurred on allotments that were subjects of past consultations on MSO. As a result, this analysis may somewhat overstate the impacts related to MSO conservation activities because impacts related to other factors are not removed from the impact estimates. This analysis estimates the level of AUM reductions by assessing several case studies where allotments were changed in MSO habitat.

178. The remainder of this section is organized as follows. First, it addresses past and ongoing then future impacts. For each time period, administrative costs and project modifications are addressed, for USFS and BLM. In addition, the analysis estimates past and future regional economic impacts related to reduced grazing.

4.3 Past and Ongoing Impacts of MSO Conservation on Forest Service Lands

179. This section discusses the past and ongoing impacts of MSO conservation activities on USFS lands by looking at the administrative burden, lost permit value, other project modification costs, and regional economic impacts associated with past MSO conservation activities.

180. Part of the administrative burden of the Act is the consultation requirement for Federal agencies (section 7). Since the listing of the species, there have been approximately 15 formal consultations and 83 informal consultations specifically related to grazing activities and the MSO. In addition, grazing impacts have been addressed in several large, multi-activity consultations, including consultations on the 11 National Forest Plans and the 1996 amendments. Of these consultations, 100 percent of formal consultations and 43 percent of informal consultations were conducted with USFS. Exhibit 4-2 summarizes the consultation history related to grazing activities.

Exhibit 4-2

MSO CONSULTATION HISTORY RELATED TO LIVESTOCK GRAZING (SINCE 1993)

Action Agency	Formal	Informal
USFS	15	23
BLM	0	60
Total	**15**	**83**

Sources: Consultation history and administrative record for MSO 1993-2003.

181. USFS Region 3 first issued directives for managing its forests to accommodate the MSO in 1989, prior to the listing of the species.[98] When the USFS Region 3 amended its 11 Forest Plans in 1996 to specifically address the MSO, northern goshawk, and “old growth”,

[98] U.S. Fish and Wildlife Service. "Formal biological opinion on the proposed rates of implementation of the grazing standards and Guidelines (S&Gs) in the June 1996 Forest Plan Amendments for National Forests in Arizona and New Mexico, and its effects on the Mexican spotted owl," from Susan MacMullin at the Service to Harv Forsgren, USFS Region 3, January 17, 2003

Standards and Guidelines (S&Gs) were also established by the USFS for managing livestock grazing activities for all threatened and endangered species.[99] In a 2003 consultation with USFS Region 3, the Service indicated that the USFS has, with respect to grazing, considered "the 1996 amendment [to be] a prospective amendment intended to be implemented as the Forest Service conducts individual National Environmental Policy Act (NEPA) analyses and decisions across the Region."[100] Thus, USFS has chosen to assess grazing allotments over time, implementing the S&Gs as the allotments come up for inspection and renewal under NEPA rather than all at once. By January 2003, the USFS had completed site-specific NEPA assessments on 202 allotments within MSO habitat areas, and had 307 remaining to assess. Most of the completed assessments resulted in a "no effect" determination for the MSO.[101] Nonetheless, the 1996 forest plan amendments changed the philosophy of the USFS towards managing grazing activities. Since 1996, the USFS has reduced AUMs allowed under some permits in MSO habitat following NEPA assessment. While several factors may have led to these reductions, the spatial and temporal overlap of these actions with MSO consultation activities associated with NEPA assessments makes separating the causes difficult.

182. USFS Region 2 and Region 4 did not amend their forest plans in the same manner as Region 3 for MSO. Overall, fewer conservation efforts for the MSO have occurred in Regions 2 and 4 since the listing of MSO. The efforts that did occur are discussed below.

4.3.1 Past Administrative Costs on USFS Lands

183. Past costs associated with the administrative requirements of section 7 consultations are estimated using a model of consultation costs developed from a series of interviews with Agency personnel across the U.S. Past administrative costs to the Service and USFS are presented at the end of this section in Exhibit 4-11. This estimate includes the following:

- Costs associated with 14 formal consultations and 14 informal consultations in USFS Region 3. Costs include administrative costs associated with conducting the consultation, such as the cost of time spent in meetings, preparing letters, and in some cases, developing a biological opinion.

- Costs associated with one programmatic consultation and nine informal consultations for livestock grazing on USFS Region 4 forests (Dixie, Fishlake, and Manti-La Sal NFs) in Utah.

[99] The USFS defines "standards and guidelines" as "the bounds or constraints within which all management activities are to be carried out...The standards contain no discretionary elements and the guidelines may occasionally contain discretionary elements." "Record of Decision for Amendments of Forest Plans: Arizona and New Mexico," USFS, Southwestern Region, May 1996 (p.87). The guidelines were subsequently revised in 1998 and 2002.

[100] U.S. Fish and Wildlife Service. "Formal biological opinion on the proposed rates of implementation of the grazing Standards and Guidelines (S&Gs) in the June 1996 Forest Plan Amendments for National Forests in Arizona and New Mexico, and its effects on the Mexican spotted owl," from Susan MacMullin at the Service to Harv Forsgren, USFS Region 3, January 17, 2003.

[101] Ibid.

- Costs to the USFS Region 3 and the Service to develop grazing Standards and Guidelines in the 1996 amendments. Although these were developed for multiple species, this analysis attributes the administrative costs of one formal consultation on MSO to the development of these standards.

- Costs associated with USFS development of "Guidance Criteria" for MSO in 1998, and related revisions in 2002. These are each assumed to involve effort similar to a high-end consultation, although these efforts were voluntary on the part of USFS.

184. No costs are included for USFS Region 2 forests (Pike-San Isabel National Forest) because no consultation history on range management exists.

4.3.2 Past Project Modifications on USFS Lands

185. This section discusses the typical project modifications to grazing activities, then estimates costs associated with these modifications.

186. The Recovery Plan also lays out several goals for managing grazing activities. While these goals are not binding on any agency, and thus do not explicitly require changes to agency practices, they act as guiding principles, and are used by the agencies in determining whether activities are likely to have adverse effects on MSO. The grazing guidelines in the Recovery Plan are the following[102]:

- Monitor grazing use by livestock and wildlife in "key grazing areas." These are primarily riparian areas, meadows, and oak types. The intent is to maintain good to excellent range conditions in key areas while accommodating the needs of MSO and its prey.

- Implement and enforce grazing utilization standards that would attain good to excellent range conditions within key grazing areas. Establish maximum allowable use levels that are conservative and that will expedite attaining and maintaining good to excellent range conditions. A primary purpose is to restore adequate levels of residual plant cover, fruits, seeds, and regeneration to provide for the needs of prey species.

- Implement management strategies that will restore good conditions to degraded riparian communities as soon as possible. Strategies may include reductions in grazing levels and increased numbers of exclosures (i.e., fencing) to protect riparian plant cover and regeneration, and to prevent damage to stream banks and channels. Ensure that allowable use of plant species will maintain plant diversity, density, vigor, and regeneration over time.

[102] Recovery Plan for the Mexican spotted owl (*Strix occidentalis lucida*), Service, December 1995. (p. 96)

187. For the allotments for which formal consultation was conducted in the past, the USFS proposed adaptations that would accommodate the MSO, and in turn the Service presented Reasonable and Prudent Measures and Terms and Conditions for USFS to follow. This analysis refers to these actions as project modifications. Exhibit 4-3 presents a list of example project modifications from past consultations.

188. The costs associated with project modifications are estimated in the following sections for both reductions in AUMs and other project modifications.

Restrictions on AUMs, Head, and Utilization

189. The largest economic impact of MSO conservation on grazing activity occurs when there is any reduction in the number of head, utilization, or AUMs permitted on an allotment. Range managers consider that reductions in utilization can be translated into AUMs or number of head.[103] A complete history of the changes to authorized and permitted head, utilization, and AUMs by allotment over time due to MSO is not available.[104] However, for allotments that have gone through formal section 7 consultation, specific changes are described and documented. These consultations contain evidence of the ways in which the USFS has altered the level of permitted grazing in MSO habitat areas.[105]

[103] Personal communication with Larry Lichthardt, Ranger Management Lead, Utah BLM, January 29, 2004.

[104] Email communication with Ray Suazo, Region 3 Forest Service, January 22, 2004.

[105] The formal consultation history reflects instances where an allotment or set of allotments needs renewal and the proposed permit is determined to "likely to adversely affect" the MSO. Thus, the formal consultation history reflects instances where the proposed permit by USFS did not follow the Recovery Plan for the MSO to the satisfaction of the Service. Instances where the USFS proposes a permit that complies with the Recovery Plan are likely to result in informal consultations on MSO. These instances may also incorporate changes to permitted/authorized grazing. However, in these cases these make less desirable examples because the required changes to the permit are less evident.

Exhibit 4-3

EXAMPLE PROJECT MODIFICATIONS FROM PAST FORMAL CONSULTATIONS ON MSO

Grazing restrictions:

- Limit grazing on allotment to protect owl habitat (a)
- Minimize livestock grazing in PACs or USFS-defined "Management Territories"[106] and unsurveyed suitable habitat (b)
- To minimize take of MSO, implement and enforce grazing utilization restrictions at springs and associated meadows in PACs (c,e)
- Forego the use of pastures with riparian or aquatic resources to reduce effects and foster recovery of these areas (e)
- If overall pasture levels are above acceptable utilization levels, livestock will be move to the next pasture (f)
- To avoid MSO take, the Forest shall apply forage/range guidelines allotment-wide. The Forest Service shall adjust grazing in an attempt to achieve forage/range guidelines within key grazing areas (h)
- Implement and enforce grazing restrictions in riparian areas within the identified PAC's within the Lone Mountain and Mescal allotments (i).

Locate water sources out of sensitive areas:

- Eliminate all livestock access to river (e)
- Water sources should be kept as far away from owl habitat areas as possible (a)
- Salt or mineral supplement sites shall not occur within PACs, except in special cases (h)
- Construction of fences, corrals, trick tanks, livestock traps, etc, in PACs shall be conducted outside the breeding season (h)

Studies:

- Conduct research study to determine effects of grazing on prey base of owls (a,b,c,d,e,f,g)

Monitoring:

- Monitor grazing utilization within key grazing areas (c)
- During periods when forage may be low on summer pastures, monitor allotment (h)

Surveys:

- Conduct surveys to determine occupancy status of restricted habitat (a,d,g)

Administrative:

- Develop utilization standards (c,f)
- USFS shall provide a report documenting compliance with biological opinion and annual implementation progress report, with supporting documentation (h)
- Establish additional key areas in two PACs (h)

General:

- Reduce impacts of grazing on the MSO prey base by improving upland range conditions in pastures adjacent to restricted habitat (d,f)

Sources: (a) USFS R3 XI.B.1.56, Dec 1993; XI.B.1.65, May 1994 (b) USFS R3, XI.B.1.106, May 1996; (c) Mud-Tinney and Tinny Springs, Coconino, XI.B.7.68, April 1999 (d) Pleasant Valley, Apache-Sitgreaves, 2.21.01.F.189, 2002 (e) USFS R3,XI.B.1.106, Nov 1995 (f) Buck Springs, Coconino, 2.21.01.F.0425,April 2003; (g) Udall, Apache-Sitgreaves, AESO/SE, February 2002; (h) Sacramento, Lincoln, 2-22-00-F-473, February 4, 2004; (i) Lone Mountain/Parker Canyon and Mescal allotments, Coronado, http://www.fs.fed.us/r3/coronado/grazing_bo/mso.htm. Roman numerals refer to MSO Administrative Record Items, while other consultations were summarized in an email communication from Biologist, Flagstaff, Arizona Field Office, FWS, December 2003.

[106] These have been defined by USFS as established in locations where at least a single Mexican spotted owl had been identified. Accessed at http://www.fs.fed.us/r3/coronado/grazing_bo/mso.htm on January 27, 2004.

190. While not all changes to the permitted AUMs in the allotments described below may be attributable to MSO conservation activities, the spatial and temporal overlap with MSO consultation activities makes separating these impacts difficult. For example, was past utilization so high that a reduction in AUMs was inevitable, or are the observed reductions a function of increased pressure on range managers from outside parties to cut the number of cattle grazing these lands? While the presence of the MSO is only one factor, it can be argued that the Act imposes a legal standard that allows range managers to make grazing reductions that would otherwise not be possible.[107] The following is a discussion of changes made to specific allotments in MSO habitat areas.

Example: Sacramento Allotment, Lincoln National Forest. On the 111,484-acre Sacramento allotment, the USFS proposed a 35 to 40 percent allowable use (utilization) for all key areas in summer and winter range pastures, and maintenance of a four-inch herbaceous ground cover height. Records indicate that utilization was very high (70 to 80 percent) on this allotment in past years. Thus, the USFS proposal represented a reduction in utilization from past use of 50 percent. Stubble height records from July 2003 indicate that stubble heights were also generally well below four inches, averaging approximately two inches. Other threatened and endangered species considered included the Sacramento Mountains prickly poppy and Sacramento Mountains thistle. Elk use of forage affected forage availability on this allotment.[108] While the Service asserts that other factors, such as implementation of the USFS range management guidelines led to the reduction in recommended AUMs rather than MSO considerations,[109] these reductions were nonetheless confirmed as part of the Service biological opinion on the MSO. Thus, the MSO may have played a role in these reductions.

Example: Udall Allotment, Apache-Sitgreaves NF. On the 10,820-acre Udall allotment, the USFS proposed reducing the permitted livestock numbers from 618 cow/calf to 334 cow/calf over a three-year period. This represents a 45 percent reduction in permitted numbers of cattle. The USFS also proposed reducing the season of use by one month, and instilling a 25 percent utilization standard for the allotment. The Service approved of this plan and offered no additional stipulations. Other threatened and endangered species present in the allotment included the loach minnow. [110]

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[107] This discussion derives from peer review comments by Dr. Delworth Gardner, Brigham Young University, February 27, 2004.

[108] "Biological Opinion on the Effects to the Mexican spotted owl, Sacramento Mountains thistle, and Sacramento Mountains prickly poppy from the proposal to issue a permit for the Sacramento Grazing allotment, Sacramento Ranger District, Lincoln National Forest, Otero County, New Mexico," New Mexico Ecological Services Field Office, Service. February 4, 2004.

[109] Written comments from Service field office and Region 2 representatives, February 26, 2004.

[110] Untitled Biological Opinion on the 10-year livestock grazing permit for the Udall Allotment and ongoing grazing activity and management on the P.S. and Hayground Allotments, Phoenix Field Office, Service. February 28, 2002.

Example: Mud-Tinney and Tinney Springs, Coconino NF. On the 75,885 Mud-Tinney and 12,200-acre Tinney Springs allotments, the USFS proposed to reduce utilization from 50 percent to 40 percent on two pastures that contain MSO PACs. The Service added stipulations that the USFS remove cattle from pastures when 25 percent utilization was reached. Thus, utilization was reduced from 50 to 25 percent (50 percent reduction) on one pasture, from 50 to 40 percent on one pasture, and seven pastures (outside of MSO habitat) were unaffected (overall average of seven percent). Elk use of forage affected forage availability on these allotments.

191. Although the examples above represent a small sample, the examples suggest that reductions in AUMs as a result of MSO conservation measures, elk, and other threatened and endangered species, range management conditions, and other factors may range from less than 10 percent to 50 percent for allotments that cross MSO PACs. Using these figures, this analysis assumes that all AUMs grazed in MSO habitat areas in USFS Region 3 have been reduced by 10 to 50 percent. Note that these permit value losses are likely to result from multiple causes. Because they overlap temporally and spatially, it is difficult to separate MSO-related impacts from the other causes. As a result, this analysis is likely to somewhat overstate the impacts related to MSO conservation activities. The high end of this range is also likely to overestimate the real reductions that will be required for areas outside of MSO PACs because these areas may not contain PCEs for MSO (for example, in meadow areas), and therefore reductions that occur would be less likely to be imposed as a result of MSO conservation measures.

Value of Federal Grazing Permits

192. A 1970 court decision, Pankey Land and Cattle Co. V. Hardin and Hickel, Cite 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."[111] 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.[112] 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

[111] 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.

[112] "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. Torell, L. Allen and S.A. Bailey. "Public land policy and the value of grazing permits." Western Journal of Agricultural Economics, Volume 16 (174-184), 1991. Also see Rowan, R. C., and J.P. Workman. "Factors affecting Utah ranch prices." Journal of Range Management. Volume 45 (263-266), 1992.Sunderman, M. A., and R. Spahr. "Valuation of government grazing leases." Journal of Real Estate Research, Volume 9 (179-196), 1992.Spahr, R. and M.A. Sunderman. "Additional evidence on the homogeneity of the value of government grazing leases and changing attributes for ranch value." Journal of Real Estate Research, Volume 10 (601-616), 1995.Torell, L. Allen and M.E. Kincaid. "Public land policy and the market value of New Mexico ranches, 1979-1994." Journal of Range Management, Volume 49 (270-276), 1996.

impacts are discussed later in this section). This lost rancher wealth is measured in terms of lost value of his grazing permit.

193. 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."[113] 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 inherent production characteristics, regulations, and economic potential of specific allotments."[114] 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.[115]

194. As defined in a public comment 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 permitee."[116] Exhibit 4-4 presents the results of nine recent studies that attempt to measure the permit value of Federal grazing (per AUM). The results are differentiated by permitting agency (USFS and BLM).

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[113] 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.

[114] 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.

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

[116] 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.

Exhibit 4-4
SUMMARY OF RELEVANT PERMIT VALUE ESTIMATES FOR BLM AND USFS PERMITS (1985-present)

Study	Method	Years	Location	$/BLMAUM (2002$)	$/FSAUM (2002$)
Rowen & Workman	Regression	1975-1987	Utah	$31	$31
Torell & Doll	Regression	1979-1988	New Mexico	$93	$93
Rowen & Workman	Regression	1980-1988	Utah	$58	$58
Torell & Kincaid	Various	1988	New Mexico	$103	$96
Torell et.al.	Regression	1992	New Mexico	$107	$87
Kincaid	Regression	1987-1994	New Mexico	$98	$95
Torell & Kincaid	Various	1994	New Mexico	$100	$69
Torell et.al.	Case studies	2002	Idaho, Nevada, Oregon	$92	$92
Average				**$85**	**$78**

Values adjusted to $2002 using "Table B-3: Quantity and price indexes for gross domestic product, and percent changes, 1959-2003." *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.

195. 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/AUM,[117] which translates to approximately $42 to $142/AUM permit value in perpetuity at a seven percent discount rate (presented as midpoint below). The range of values in the permit value studies in Exhibit 4-4 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 $85/BLM AUM and $78/USFS AUM.

196. This analysis estimates that permit value losses that have resulted from past USFS MSO conservation activities (1993 to 2003) range from $2.8 to $14.1 million ($255,000 to $1.3 million annually) (2003 dollars) since the listing of the species. Results are presented in Exhibit 4-5. This estimate of lost permit value on USFS lands relies on the following assumptions:

- The number of AUMs grazed in MSO critical habitat is proportional by acreage to the total number of AUMs grazed in that Forest. This assumption may overstate the number of AUMs that occur in MSO habitat because the habitat tends to be on steep slopes and densely forested areas, where cattle are less likely to graze.[118]

[117] 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 SG–01–02, 2002.

[118] Data containing the permitted and authorized AUMs by allotment was not available from USFS Region 3 at the time of this analysis. Email communication with Ray Suazo, USFS Region 3, January 22, 2004.

- Every allotment that has MSO habitat had some reductions in utilization for MSO when it was assessed for NEPA/renewal. Because the specific allotments that completed NEPA are not known, this analysis assumes that the number of AUMs assessed in critical habitat areas is proportional to the number of allotments assessed at the forest level. For example, 62 percent of Apache-Sitgreaves NF allotments have completed NEPA, thus this analysis assumes that 62 percent of AUMs in critical habitat were affected by NEPA assessment in the past.

- When a permit came up for renewal in MSO habitat, AUMs were reduced by 10 to 50 percent (based on the review of past consultations above).

- The permit value for USFS livestock grazing permits is $78 per AUM (2002$) (based on the literature review above).

- Permit value has not been lost in Colorado or Utah Forests. There is no formal consultation history in Pike-San Isabel, and biologists state that no reductions in permitted AUMs have occurred as a result of MSO conservation activities.[119] In Utah, the statewide programmatic consultation found no effect of grazing on MSO habitat. This conclusion is supported by San Juan County, which contains a large portion of the USFS lands in Utah, whose planner commented that grazing conflicts with MSO are not a large public concern in that county.[120]

197. The factors that result in changes to utilization, head, and AUMs on an allotment are correlated temporally and spatially, and therefore it is difficult to separate MSO-related causes from other causes for decisions made in MSO habitat areas. This analysis calculates potential losses in permit value from MSO conservation activities by using examples of reductions that occurred on allotments that were subjects of past consultations on MSO. As a result, this analysis may somewhat overstate the impacts related to MSO conservation activities because impacts related to other factors are not removed from the impact estimates.

198. In areas outside of MSO PACs, this analysis may overestimate impacts on permit value loss because these areas may not contain PCEs for MSO (for example, in meadow areas), and therefore reductions would be less likely to be imposed as a result of MSO conservation measures.

[119] Personal communication with Mike Wrigley, Pike-San Isabel National Forest, January 8, 2004.

[120] Personal communication with Ed Scherick, San Juan County Planner, Utah, January 28, 2004.

Exhibit 4-5
PAST IMPACTS OF MSO CONSERVATION EFFORTS ON RANCHER WEALTH ASSOCIATED WITH PERMIT VALUE LOSS (1993-2003)

Agency	Management Unit	Estimated AUMs grazed in MSO CHD	Percent Allotments Assessed to Date	Low impact: 10 percent loss in AUMS	High impact: 50 percent loss in AUMS	Value per AUM (2002$)	Estimated Loss in Permit Value (Nominal $)	
							Low	High
USFS	Apache-Sitgreaves	52,200	62%	3,236	16,182	$78	$252,000	$1,262,000
	Carson	29,515	24%	708	3,542	$78	$55,000	$276,000
	Cibola	107,739	70%	7,542	37,709	$78	$588,000	$2,941,000
	Coconino	37,251	42%	1,565	7,823	$78	$122,000	$610,000
	Coronado	82,277	30%	2,468	12,342	$78	$193,000	$963,000
	Dixie		0%	0	0	$78	$0	$0
	Fishlake		0%	0	0	$78	$0	$0
	Gila	134,195	42%	5,636	28,181	$78	$440,000	$2,198,000
	Kaibab	13,179	48%	633	3,163	$78	$49,000	$247,000
	Lincoln	47,003	37%	1,739	8,696	$78	$136,000	$678,000
	Manti-La Sal		0%	0	0	$78	$0	$0
	Pike-San Isabel		0%	0	0	$78	$0	$0
	Prescott	8,775	22%	193	965	$78	$15,000	$75,000
	Santa Fe	31,151	32%	997	4,984	$78	$78,000	$389,000
	Tonto	20,175	20%	404	2,018	$78	$31,000	$157,000
Total USFS		**563,461**		**25,121**	**125,603**		**$1,959,000**	**$9,796,000**
Total USFS and BLM		**580,089**		**25,121**	**125,603**		**$1,959,000**	**$9,796,000**
						Present Value (2003$)*	**$2,811,000**	**$14,056,000**
						Annual Costs (2003$)*	**$255,500**	**$1,278,000**

* Estimated loss in rancher wealth associated with reductions in permit values are discounted assuming a rate of seven percent.

199. Note that continuous, or year-long, permits for grazing on Federal are common in the affected study area. Ranchers with year-long permits are likely to have a greater fraction of their annual forage base on Federal lands than those holding shorter, seasonal permits. This would imply that permit holders with year-long permits may have less access to substitute forage, and thus may be more disadvantaged by AUM reductions than holders of seasonal permits. What is also implied is that an AUM grazed in a year-long permit has greater value than an AUM in a seasonal permit. Indeed, Torell et al. find some evidence that permit values are greater in New Mexico, where year-long permits are common, than other states where seasonal use is more common.[121] However, research has also shown that forage values vary throughout a year, and that some seasons may be more critical than others to a ranch operation.[122] Thus, a rancher with a seasonal permit who relies on a particular season may also be severely affected by reductions in AUMs. Because of the lack of data available to quantify the differential effect of AUM reductions on seasonal versus year-long permits, no such distinctions are made in the cost estimates in this analysis.

4.3.3 Regional Economic Impacts

200. The above estimates state that approximately 25,000 to 126,000 AUMs have been lost from MSO critical habitat areas since 1993, or approximately 2,300 to 11,000 AUMs annually. This estimated annual reduction in grazing anticipated to result from MSO conservation measures represents less than one half of one percent of the annual AUMs grazed in affected states (approximately 3.4 million AUMs in New Mexico and Arizona). Note that this estimate includes impacts that may result from numerous causes unrelated to ESA, but which could not be separated due to their temporal and spatial correlation with MSO-related restrictions.

201. To assume that a reduction in AUMs in MSO critical habitat areas will result in an accompanying decrease in livestock production region-wide requires the assumption that no substitutions in forage will be made to the adjust for the reductions in AUMs authorized in MSO critical habitat areas. 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

[121] Torell, L. Allen, et al. "The Market Value of Public Land Forage Implied from Grazing Permits." Current Issues in Rangeland Economics, Western Research Coordinating Committee 55, Range Economics, 1994.

[122] Godfrey, E. Bruce and Verl L. Bagley, "Alternative Measures of Livestock Dependency." Current Issues in Rangeland Economics, Western Research Coordinating Committee 55, Range Economics, 1994.

by ranchers was the reduction in the number of cattle they would run on their ranches."[123] 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."[124] 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."[125] Thus, given observed rancher behavior, it is unclear that a reduction in permitted or authorized AUMs of Federal allotments in MSO critical habitat areas would necessarily lead to a reduction herd size, as long as replacement forage is available.

202. However, given the localized nature of ranching and the increasing number of restrictions on ranching behavior overall, it is possible that additional reductions that may be associated with MSO conservation could occur in areas where substitute forage is not available, or where supplemental forage is prohibitively expensive. This analysis assumes that AUMs will be reduced as a result of MSO 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), measuring the regional economic impact of that reduction provides additional context for the reader who wishes to understand the potential impacts to the regional economy.[126]

203. To estimate the regional economic impact of grazing restrictions, the analysis first estimates the number of AUMs likely to be lost annually as a result of MSO conservation measures. Direct effects are calculated by converting this AUM reduction to an estimated loss in livestock production.[127] Next, the analysis utilizes IMPLAN to estimate indirect and induced impacts on the region in terms of output and jobs.

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[123] 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.

[124] 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.

[125] Rowe, Helen I., Matt Shinderman, and E.T. Bartlett. "Change on the range." Rangelands 23 (2), April 2001.

[126] Several commenters state that regional economic impacts in areas where livestock grazing may be affected should be considered. These include comments on the Draft Economic Analysis of Critical Habitat Designation for the MSO from New Mexico Department of Agriculture (April 26, 2004); Nick Ashcroft, New Mexico State University, Agricultural Extension (April 28, 2004); New Mexico Public Lands Council (April 26, 2004); Coalition of Arizona/New Mexico Counties for Stable Economic Growth (April 25, 2004); New Mexico Wool Growers, Inc (April 26, 2004); New Mexico Cattle Growers Association (April 26, 2004); New Mexico Farm and Livestock Bureau (April 26, 2004); Ric Frost (April 28, 2004).

[127] Using value of production per AUM lost as the basis for regional economic impact analysis was recommended in the public comments by Julie Maitland, New Mexico Department of Agriculture, April 26, 2004; and in Personal Communications with Tim Darden, Water and Natural Resources Policy Analyst, New Mexico Department of Agriculture, May 24, 2004.

Running the IMPLAN Model

204. For the purposes of this regional economic impact analysis, the study area includes 31 counties in Arizona and New Mexico. The study area includes only the counties in Arizona and New Mexico in which MSO critical habitat is proposed, with the exception of three counties containing large urban areas: Maricopa County Arizona (Phoenix), Pima County Arizona (Tucson), and Bernalillo County New Mexico (Albuquerque). These three counties are excluded from the analysis because including their large economies would likely mask impacts within the region's rural areas likely to be significantly affected by restrictions to grazing activity.[128] The affected counties and their socioeconomic characteristics are discussed in Section 2. This scale at which regional impacts are modeled was determined by considering that the overall impact of this activity relative to the size of the sector is small. While it would be possible to run the IMPLAN model at the individual county level, at that fine scale, some regional impacts may "leak out" of the analysis and cause the impacts to appear smaller yet.

205. 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 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.

206. As in the timber analysis, 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.

207. 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

[128] Previous analysis of MSO critical habitat utilized a similar methodology and excluded the same three counties (Ekstrand 1995).

- *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.

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

Regional Economic Impact Estimates

209. The calculation of the direct effect of reduced AUMS in Region 3 National Forests on annual livestock production are estimated at the upper-bound to be $528,000 annually, and are presented in Exhibit 4-6.[129] The following inputs are used in this calculation:

- The five-year average value of livestock production per head in New Mexico and Arizona (758$)[130]
- Value per head is converted to annual forage value (per AUM) by dividing by 18 ($42)[131]

210. Exhibit 4-7 presents the results of the IMPLAN analysis. The reduction in livestock production as a result of AUM reductions is shown to have resulted in an annual reduction of $848,000 in regional output and 11 jobs lost across all sectors of the economy. This impact represents approximately 0.13 percent of total output from the livestock sector in this region and 0.14 percent of regional employment in the livestock sector.[132]

[129] Regional economic impacts are estimated assuming a high-impact 50 percent loss in AUMS.

[130] Value of all cattle and calves per head (dollars), 1999-2003. NASS, 2002.

[131] 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).

[132] This data is from IMPLAN for the Range-Fed, Ranch-Fed and Cattle Feedlots livestock sectors.

Exhibit 4-6
CALCULATION OF PAST DIRECT EFFECT OF GRAZING REDUCTIONS ON LIVESTOCK PRODUCTION (ANNUAL, 1993-2003)

Agency	Management Unit	Estimated Reduction in AUMs: High Impact*(10 years)	Estimated Reduction in AUMs (annually)	Value of Livestock Production (per AUM)**	Total Livestock Production Loss (Annual)***
USFS	Apache-Sitgreaves	16,182	1,618	$42	$68,000
	Carson	3,542	354	$42	$15,000
	Cibola	37,709	3,771	$42	$158,000
	Coconino	7,823	782	$42	$33,000
	Coronado	12,342	1,234	$42	$52,000
	Dixie	0	0	$42	$0
	Fishlake	0	0	$42	$0
	Gila	28,181	2,818	$42	$118,000
	Kaibab	3,163	316	$42	$13,000
	Lincoln	8,696	870	$42	$37,000
	Manti-La Sal	0	0	$42	$0
	Pike-San Isabel	0	0	$42	$0
	Prescott	965	97	$42	$4,000
	Santa Fe	4,984	498	$42	$22,000
	Tonto	2,018	202	$42	$8,000
Total USFS		**125,605**	**12,561**		**$528,000**

* High impact estimate assumes a 50 percent loss in AUMS.
** Value of production represents the five-year average for NM and AZ.
*** Totals may not sum due to rounding.

Exhibit 4-7
PAST REGIONAL ECONOMIC IMPACT OF REDUCTIONS IN LIVESTOCK PRODUCTION (ANNUAL, 1993-2003)*

Agency	Management Unit	Direct Effect (Output/ Employment)	Indirect Effect (Output/ Employment)	Induced Effect (Output/ Employment)	Total Impact (Output/ Employment)
USFS	A-S	$68,000	$23,000	$18,000	$109,000
		0.79	0.35	0.31	1.44
	Carson	$15,000	$5,000	$4,000	$24,000
		0.17	0.08	0.07	0.32
	Cibola	$158,000	$54,000	$42,000	$255,000
		1.83	0.81	0.72	3.36
	Coconino	$33,000	$11,000	$9,000	$53,000
		0.38	0.17	0.15	0.70
	Coronado	$52,000	$18,000	$14,000	$83,000
		0.60	0.27	0.24	1.10
	Dixie	$0	$0	$0	$0
		0.00	0.00	0.00	0.00
	Fishlake	$0	$0	$0	$0
		0.00	0.00	0.00	0.00
	Gila	$118,000	$40,000	$32,000	$190,000
		1.37	0.61	0.54	2.51
	Kaibab	$13,000	$5,000	$4,000	$22,000
		0.15	0.07	0.06	0.28
	Lincoln	$37,000	$12,000	$10,000	$59,000
		0.42	0.19	0.17	0.78
	Manti-La Sal	$0	$0	$0	$0
		0.00	0.00	0.00	0.00
	Pike-San Isabel	$0	$0	$0	$0
		0.00	0.00	0.00	0.00
	Prescott	$4,000	$1,000	$1,000	$6,000
		0.05	0.02	0.02	0.09
	Santa Fe	$21,000	$7,000	$6,000	$34,000
		0.24	0.11	0.10	0.44
	Tonto	$8,000	$3,000	$2,000	$13,000
		0.10	0.04	0.04	0.18
Total Output Loss		$528,000	$179,000	$141,000	$848,000
Total Employment Loss		6.1	2.7	2.4	11.2

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

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

Other Project Modifications

212. In addition to AUM reductions, the Service has also included stipulations for small modifications to permits, and administrative requirements. These consist of:

- Locate water sources outside of sensitive areas;
- Conducting studies on the impact of grazing on MSO;
- Conducting additional monitoring of allotments;
- Conducting MSO surveys; and
- Writing annual reports to the Service

These are minor and are estimated to total less than $10,000 to $20,000 annually per forest.

4.3.4 Summary of Past and Ongoing Impacts on USFS Lands

213. In summary, the following past impacts are estimated for USFS lands in MSO habitat from 1993 to 2003 (2003 dollars assuming a rate of seven percent):

- Total efficiency impacts related to impacts on grazing on USFS lands are estimated at $5.5 million to $19.7 million (1993-2003).
  - $2.8 million to $14.1 million in lost ranch-level income associated with the value of Federal grazing permits;
  - $0.3 million to $0.9 million in administrative costs to Federal agencies; and

- $2.4 million to $4.7 million in other project modification costs, primarily to Federal agencies.

- Regional economic impacts resulting from reductions in livestock production are estimated to be:

  - $0.8 million in lost output annually

  - 11 jobs lost annually across all sectors

  - In addition, the reduction in grazing may also reduce state and local taxes by as much as $38,000 annually in the study area.

4.4 Past and Ongoing Impacts of MSO Conservation on Bureau of Land Management Lands

214. This section discusses the past and ongoing impacts of MSO conservation activities on grazing activities on BLM lands. The analysis addresses both administrative burden and project modification costs associated with past MSO conservation activities. Permit value losses are not estimated, because none are observed.

215. The vast majority of proposed MSO critical habitat on BLM lands is in Utah (1.7 million acres), where critical habitat has been in place since 2001. The remaining states (Colorado, New Mexico, and Arizona) have a total of approximately 175,000 acres of proposed critical habitat lands that are under the management of BLM. Overall, there is a common sentiment among BLM offices that much of the proposed critical habitat areas do not contain PCEs for the MSO (see below for details). One formal consultation is ongoing with the Utah BLM that will address livestock grazing issues, among others.

4.4.1 Past Administrative Costs and Project Modifications on BLM Lands

216. Past costs associated with the administrative costs of consultations are estimated using a model of consultation costs developed from a series of interviews with agency personnel across the U.S. Administrative costs to the Service and BLM related to grazing activity are presented in Exhibit 4-11. This estimate includes costs associated with no formal consultations and 59 informal consultations (all in Utah). Specific cost estimates are described below for each state.

217. **Utah**. As stated above, the vast majority of proposed MSO CHD on BLM lands is in Utah. Public comments from the Utah State Office of BLM state that "it has become clear that substantial areas located within the five currently designated critical habitat boundaries clearly do not meet the definition of critical habitat."[133] Nonetheless, to address MSO habitat

[133] Bureau of Land Management (Utah State). 2003. "Comments of the Proposed Rule Designating Critical Habitat for the Mexican Spotted Owl," Deputy State Director, Division of Natural Resources, December 16.

that exists, BLM has engaged in efforts to revise its office land use plans to incorporate MSO considerations. A statewide programmatic formal consultation is also currently being initiated with the Service to ensure that the land use plans are in compliance with MSO requirements.[134]

218. Other than administrative efforts to survey and inventory the MSO, it appears that few additional changes, or project modifications, have been recommended for range activities on Utah BLM lands as a result of the MSO. To date, only informal consultations regarding grazing issues have been completed in Utah. The BLM State Range Management lead in Utah surveyed the 11 field offices in Utah, and reports that "no changes in livestock use have occurred. [The field offices] consult with the FWS and they are doing inventories, but no AUM changes or season of use changes have been required."[135] The state biologist also points out that MSO habitat in Utah is in "slot canyons" that are rocky and generally have little use by cattle, and thus little conflict exists.[136] In addition, San Juan County comments that grazing conflicts with MSO have not been an issue in their county, which contains a large portion of the BLM lands in Utah.[137] Thus, this analysis assigns only costs of surveying, inventorying, and consulting to Utah BLM range management activities ($10,000 to $20,000 annually).

219. **Colorado**. Public comments from the Royal Gorge Field Office in Colorado state that the majority of proposed critical habitat areas on BLM lands do not contain PCEs for MSO. The comments state that of the approximately 150,000 acres of BLM administered lands in Colorado, "BLM estimated that 59,925 acres of public lands have the necessary primary constituent elements to be designated as critical habitat."[138] The consultation records indicate that no formal and one informal consultation with BLM have occurred in Colorado. The only informal consultation occurred before MSO listing. Thus, this analysis assigns only costs of surveying and inventorying to Colorado BLM range management activities ($10,000 to $20,000 annually).

220. **New Mexico**. Approximately 10,000 acres of BLM lands are proposed as critical habitat in New Mexico. The consultation records indicate that no formal or informal consultations with BLM have occurred in New Mexico. Thus, this analysis assigns only costs of surveying and inventorying to New Mexico BLM range management activities ($10,000 to $20,000 annually).

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[134] Ibid.

[135] Email communication with Larry Lichthardt, Range Management Lead, Utah BLM, February 6, 2004.

[136] Personal communication with Ron Bolander, Utah BLM, January 28, 2004.

[137] Personal communication with Ed Scherick, San Juan County Planner, Utah, January 28, 2004.

[138] Public comment, Royal Gorge Field Office, Colorado BLM, December 10, 2003.

221. **Arizona**. Approximately 9,000 acres of BLM lands are proposed critical habitat in Arizona. Public comments from the Arizona State Office of the BLM state that two of the three units that contain BLM lands in Arizona do not contain PCEs and should be removed from the critical habitat designation.[139] The state biologist asserts that because of the lack of PCEs, BLM has found very little impact of grazing activities on MSO.[140] Indeed, the consultation record shows that no formal or informal consultations with BLM have occurred in Arizona. Thus, this analysis assigns only costs of surveying and inventorying to Arizona BLM range management activities ($10,000 to $20,000 annually).

4.4.2 Summary of Past and Ongoing Impacts on BLM Lands

222. In summary, the following past impacts are estimated for BLM lands in MSO habitat since the listing of the MSO (2003 dollars assuming a rate of seven percent):

- $0.2 million to $1.0 million in administrative costs to Federal agencies (for consultation efforts).

- $0.6 million to $1.3 million in survey and inventorying costs (project modifications), primarily to Federal agencies.

Total costs related to impacts on grazing on BLM lands are estimated at $0.8 million to $2.3 million since the listing of the MSO.

4.5 Future Impacts of MSO Conservation on Forest Service Lands

223. This section discusses the future impacts of MSO conservation activities on USFS lands by looking at the administrative burden, lost permit value, and other project modification costs associated with MSO conservation activities.

4.5.1 Future Administrative Costs on USFS Lands

224. **Arizona and New Mexico**. This analysis assumes that consultations on grazing activities for USFS Region 3 continue over the next 10 years as NEPA assessments are completed for each Forest. Because approximately 40 percent of NEPA assessments had been completed by January 2004, this analysis assumes that the remaining 60 percent of NEPA assessments will be completed in the next 10 years.[141] Corresponding to the increased number of allotments that need NEPA assessment, this analysis assumes that the overall number of consultations will increase by 20 percent over past totals. This analysis estimates

[139] "Comments on Proposed Rule Designating Critical Habitat for the Mexican Spotted Owl, dated November 18, 2003," Deputy State Director, Arizona State Office, BLM, December 17, 2003.

[140] Personal communication with Ted Cordery, Arizona BLM State Office, January 28, 2004.

[141] This is consistent with the plan presented in the USFS Region 3 2003 biological assessment on programmatic activities.

that approximately 16 informal and 17 formal consultations will occur with USFS Region 3 regarding range management activities over the next 10 years. Total administrative and other related survey costs for USFS Region 3 forests associated with these range management consultations are presented in Exhibit 4-12.

225. **Colorado**. Although no formal consultations on livestock grazing activities have occurred with Pike-San Isabel National Forest since the listing of the species, Pike-San Isabel is planning to write a biological assessment for all allotment management plans in MSO habitat in the next 10 years. Thus, this analysis estimates that one formal consultation in this forest will occur. However, this consultation may be informal if the biological assessment follows the Recovery Plan.[142] Other informal consultations are not anticipated for Pike-San Isabel. These costs are included in Exhibit 4-12.

226. **Utah**. As stated above, there has been one programmatic consultation for livestock grazing on Dixie, Fishlake, and Manti-La Sal NFs in Utah. In this consultation, the Service concurred with USFS that grazing activities were "not likely to adversely affect" the MSO in any of the three forests. Conclusions were primarily based on the history of extensive surveying in the forests, and the inability of livestock to access large portions of suitable habitat. Because critical habitat has been in place in all of these forests since 2001, the new critical habitat proposal is unlikely to lead to any new management in the forests. Thus, this analysis assumes that the past informal consultation rate will continue (approximately one per year in Dixie NF, none in Manti-La Sal or Fishlake NFs).

4.5.2 Future Project Modifications on USFS Lands

227. This section describes potential project modification costs that may be incurred by USFS associated with grazing activities over the next 10 years.

Permit Value Impacts

228. **Arizona and New Mexico**. This analysis estimates that lost permit value resulting from future USFS MSO conservation activities may range from $1.7 to $8.6 million over the next 10 years (2003 dollars assuming a rate of seven percent). Results are presented in Exhibit 4-8. The estimate of lost permit value relies on the following assumptions:

- The number of AUMs grazed in MSO critical habitat is proportional by acreage to the total number of AUMs grazed in that Forest. This assumption may overstate the number of AUMs that occur in MSO habitat because the habitat tends to be on steep slopes and densely forested areas, where cattle are less likely to graze.[143]

- Every allotment that has MSO habitat will have some reductions in AUMs for MSO when it is assessed for NEPA/renewal.

[142] Written comments from Service field office and Region 2 representatives, February 26, 2004.

[143] Data containing the permitted and authorized AUMs by allotment was not available from USFS Region 3 at the time of this analysis. Email communication with Ray Suazo, USFS Region 3, January 22, 2004.

- When a permit comes up for renewal in MSO habitat, the AUMs will be reduced by 10 to 50 percent (based on the review of consultations above).

- The permit value for USFS livestock grazing permits is $78 (based on the literature review above).

229. The factors that result in changes to utilization, head, and AUMs on an allotment are correlated temporally and spatially, and therefore it is difficult to separate MSO-related causes from other causes for decisions made in MSO habitat areas. This analysis calculates potential losses in permit value from MSO conservation activities by using examples of reductions that occurred on allotments that were subjects of past consultations on MSO. As a result, this analysis may somewhat overstate the impacts related to MSO conservation activities because impacts related to other factors are not removed from the impact estimates.

230. In areas outside of MSO PACs, this analysis may overestimate impacts on permit value loss because these areas may not contain PCEs for MSO (for example, in meadow areas), and therefore reductions that occur would be less likely to be imposed as a result of MSO conservation measures.

Exhibit 4-8
FUTURE IMPACTS OF MSO CONSERVATION EFFORTS ON GRAZING PERMIT VALUE (2004-2013)

Agency	Management Unit	Percent allotments with anticipated reductions**	Low impact: 10 percent loss in AUMS	High impact: 50 percent loss in AUMS	Value per AUM (2002$)	Estimated Loss in Permit Value (Nominal $)	
						Low	High
BLM	AZ	20%	0	1	$85	$0	$0
	CO	20%	7	34	$85	$1,000	$3,000
	NM	20%	2	12	$85	$0	$1,000
	UT	20%	323	1,616	$85	$27,000	$137,000
Total BLM			**333**	**1,663**		**$28,000**	**$141,000**
USFS	Apache-Sitgreaves	38%	1,983	9,917	$78	$155,000	$774,000
	Carson	76%	2,243	11,216	$78	$175,000	$875,000
	Cibola	30%	3,232	16,161	$78	$252,000	$1,261,000
	Coconino	58%	2,161	10,803	$78	$169,000	$843,000
	Coronado	70%	5,759	28,797	$78	$449,000	$2,246,000
	Dixie	100%	0	0	$78	$0	$0
	Fishlake	100%	0	0	$78	$0	$0
	Gila	58%	7,783	38,916	$78	$607,000	$3,035,000
	Kaibab	52%	685	3,427	$78	$53,000	$267,000
	Lincoln	63%	2,961	14,806	$78	$231,000	$1,155,000
	Manti-La Sal	100%	0	0	$78	$0	$0
	Pike-San Isabel	0%	0	0	$78	$0	$0
	Prescott	78%	684	3,422	$78	$53,000	$267,000
	Santa Fe	68%	2,118	10,591	$78	$165,000	$826,000
	Tonto	80%	1,614	8,070	$78	$126,000	$629,000
Total USFS			**31,225**	**156,126**		**$2,435,000**	**$12,178,000**
Total USFS and BLM			**31,558**	**157,789**		**$2,463,000**	**$12,319,000**
					Present Value (2003$)*	**$1,730,000**	**$8,652,000**
					Annual Costs (2003$)*	**$173,000**	**$865,000**

* Estimated loss in income associated with reductions in permit values are discounted assuming a rate of seven percent.
**For USFS lands in Region 3, this represents the percent of allotments that have not yet undergone NEPA analysis.

231. **Colorado**. As stated above, some administrative impacts associated with livestock grazing could occur in Pike-San Isabel NF when they undergo their planning process. However, the Forest and Service biologists do not anticipate that grazing will be found to conflict with MSO conservation because cattle rarely enter the habitat type MSO uses in this forest (steep canyons). As a result, project modifications associated with consultations are not anticipated.[144]

232. **Utah**. Because the past programmatic consultation on the three Utah forests with designated MSO critical habitat found no effect to MSO from grazing activities, future project modifications associated with grazing activities on Utah forests are not anticipated.

4.5.3 Regional Economic Impacts

233. This section presents the regional economic impacts expected to result from potential continued reductions in grazed AUMs on USFS Region 3 National Forests resulting from MSO conservation measures. This information is intended to help the Service understand economic impacts on grazing activities that may continue into the future.

234. This analysis relies on the same methodology presented previously to estimate the past and ongoing regional economic impact of a reduction in AUMs grazed in the proposed CHD. Exhibit 4-9 presents the estimated annual reduction in livestock production from 2004 to 2013. Exhibit 4-10 presents the results of the IMPLAN analysis. The loss in livestock production as a result of AUM reductions is shown to have resulted in an annual reduction of $1.1 million in regional output and 14 jobs lost across all sectors of the economy. This impact represents approximately 0.16 percent of total output from the livestock sector in the region and 0.18 percent of regional employment in the livestock sector.

235. As above, 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 relationships derived from 1998 data. Thus, this analysis assumes that this historical characterization of the affected counties' economies are a reasonable approximation of current conditions. If significant changes have occurred since 1998 in the structure of the economies of the counties in the study area, the results may be sensitive to this assumption. The magnitude and direction of any such bias are unknown.

[144] Personal communication with Mike Smith, Forest Biologist, Pike-San Isabel National Forest, Colorado, January 21, 2004; Personal communication with Service Biologist, Colorado, January 5, 2004.

Exhibit 4-9
CALCULATION OF FUTURE DIRECT EFFECT OF GRAZING REDUCTIONS ON LIVESTOCK PRODUCTION
(Annual, 2004-2013)

Agency	Management Unit	Estimated Reduction in AUMs: High Impact*(10 years)	Value of Livestock Production (per AUM)**	Total Livestock Production Loss (Annual)***
BLM	AZ		$42	$0
	CO	3	$42	$100
	NM	1	$42	$50
	UT	162	$42	$6,800
Total BLM		**166**	$42	**$7,000**
USFS	Apache-Sitgreaves	992	$42	$42,000
	Carson	1,122	$42	$47,000
	Cibola	1,616	$42	$68,000
	Coconino	1,080	$42	$45,000
	Coronado	2,880	$42	$121,000
	Dixie	0	$42	$0
	Fishlake	0	$42	$0
	Gila	3,892	$42	$163,000
	Kaibab	343	$42	$14,000
	Lincoln	1,481	$42	$62,000
	Manti-La Sal	0	$42	$00
	Pike-San Isabel	0	$42	$00
	Prescott	342	$42	$14,000
	Santa Fe	1,059	$42	$44,000
	Tonto	807	$42	$34,000
Total USFS		**15,613**		**$656,000**
Total USFS and BLM		**15,779**		**$663,000**

* High impact estimate assumes a 50 percent loss in AUMS.
** Value of production represents the five-year average for NM and AZ.
*** Totals may not sum due to rounding.

Exhibit 4-10
FUTURE REGIONAL ECONOMIC IMPACT OF REDUCTIONS IN LIVESTOCK PRODUCTION
(Annual, 2004-2013)*

Agency	Management Unit	Direct Effect (Output/Employment)	Indirect Effect (Output/Employment)	Induced Effect (Output/Employment)	Total Impact (Output/Employment)
BLM	AZ	$0	$0	$0	$0
		0.0	0.0	0.0	0.0
	CO	$100	$50	$40	$200
		0.0	0.0	0.0	0.0
	NM	$50	$20	$10	$80
		0.0	0.0	0.0	0.0
	UT	$7,000	$2,000	$2,000	$11,000
		0.1	0.0	0.0	0.1
USFS	A-S	$42,000	$14,000	$11,000	$67,000
		0.5	0.2	0.2	0.9
	Carson	$47,000	$16,000	$13,000	$76,000
		0.5	0.2	0.2	1.0
	Cibola	$68,000	$23,000	$18,000	$109,000
		0.8	0.3	0.3	1.4
	Coconino	$45,000	$15,000	$12,000	$73,000
		0.5	0.2	0.2	1.0
	Coronado	$121,000	$41,000	$32,000	$194,000
		1.4	0.6	0.5	2.6
	Dixie	$0	$0	$0	$0
		0.0	0.0	0.0	0.0
	Fishlake	$0	$0	$0	$0
		0.0	0.0	0.0	0.0
	Gila	$163,000	$56,000	$44,000	$263,000
		1.9	0.8	0.7	3.5
	Kaibab	$14,000	$5,000	$4,000	$23,000
		0.2	0.1	0.1	0.3
	Lincoln	$62,000	$21,000	$17,000	$100,000
		0.7	0.3	0.3	1.3
	Manti-La Sal	$0	$0	$0	$0
		0.0	0.0	0.0	0.0
	Pike-San Isabel	$0	$0	$0	$0
		0.0	0.0	0.0	0.0
	Prescott	$14,000	$5,000	$4,000	$23,000
		0.2	0.1	0.1	0.3
	Santa Fe	$44,000	$15,000	$12,000	$71,000
		0.5	0.2	0.2	0.9
	Tonto	$34,000	$12,000	$9,000	$54,000
		0.4	0.2	0.2	0.7
Total Output Loss		$663,000	$225,000	$177,000	$1,065,000
Total Employment Loss		7.70	3.40	3.00	14.10

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

Other Project Modifications

236. These are assumed to be the same as in past years (1993-2003), where each management unit incurs $10,000 to $20,000 in other project modification costs annually, including costs related to MSO monitoring and surveying.

4.5.4 Summary of Future Impacts on USFS Lands

237. In summary, the following future impacts are estimated for USFS lands in MSO habitat from 2004 to 2013 (2003 dollars assuming a rate of seven percent):

- Total efficiency impacts related to impacts on grazing on USFS lands are estimated at $3.0 million to $11.1 million (2004-2013).
  - $1.7 million to $8.6 million in lost ranch-level income associated with the value of Federal grazing permits;
  - $0.2 million to $0.5 million in administrative costs to Federal agencies; and
  - $1.0 million to $2.1 million in other project modification costs, primarily to Federal agencies.
- Regional economic impacts resulting from reductions in livestock production are estimated to be:
  - $1.1 million in lost output annually; and
  - 14 jobs lost annually across all sectors.
  - In addition, the reduction in grazing may also reduce state and local taxes by as much as $47,000 in the study area.

4.6 Future Impacts of MSO Conservation on Bureau of Land Management Lands

238. This section discusses the future impacts of MSO conservation activities on BLM lands by looking at the administrative burden, lost permit value, and other project modification costs associated with past MSO conservation activities.

4.6.1 Administrative Costs and Project Modification Costs

239. **Utah**. As stated above, Utah BLM is currently consulting with the Service on a state-wide programmatic consultation regarding amendments to the field office land use plans. After the completion of this consultation, BLM may be impelled to set up utilization allowable use limits for some areas where MSO habitat is found as they did in Region 3

USFS. ."[145] The Moab district reports that they "are anticipating that livestock use will be affected in future permit renewals."[146] The Monticello district also anticipates that "some future permit renewals may be affected by MSO habitat."[147] The Price and St. George districts also anticipate future surveying, inventorying, and informal consultations associated with MSO critical habitat areas.[148] However, for all districts that contain MSO habitat, because PCEs are scarce, any grazing limits are likely to be limited to small areas within critical habitat. As stated above, the state biologist states that MSO habitat in Utah is in "slot canyons" that are rocky and generally have little use by cattle, and thus little conflict exists.[149]

240. Thus, using the past consultation rate, this analysis estimates that approximately 59 informal consultations will occur will BLM in Utah regarding range management activities over the next 10 years. In addition, this analysis assumes that as a result of future consultations and/or utilization targets, 20 percent of allotments in MSO habitat may experience reductions in AUMs of 10 to 50 percent, similar to those experienced in Region 3.[150] Permit value is assumed to be $85/BLM AUM (see Exhibit 4-4). As in USFS land areas, these reductions, if they occur, are likely to result from multiple causes. Because the factors overlap temporally and spatially, it is difficult to separate MSO-related impacts from the others in MSO habitat.

241. **Arizona.** Although no formal or informal consultations have occurred in Arizona since the listing of the species, it is possible that in the future, these BLM offices will each initiate formal consultation on updating land use plans for offices that have critical habitat lands for the MSO. Although the full cost of this consultation would not be solely due to livestock grazing issues, this analysis includes the costs of a future formal consultation with BLM. In its public comment on the draft economic analysis, BLM Arizona commented that future AUM reductions are unlikely to result from MSO conservation measures. Thus, this analysis does not anticipate that future AUM reductions on BLM lands in Arizona are likely.

242. **Colorado and New Mexico**. Although no formal or informal consultations have occurred in these states since the listing of the species, it is possible that in the future, these BLM offices will each initiate formal consultation on updating land use plans for offices that have critical habitat lands for the MSO. Although the full cost of these consultations would not be solely due to livestock grazing issues, this analysis includes the costs of two future formal consultations with BLM. In addition, this analysis assumes that as a result of future consultations and/or utilization targets, 20 percent of allotments may experience reductions

[145] Email communication with Larry Lichthardt, Range Management Lead, Utah BLM, February 6, 2004.

[146] Email communication with Larry Lichthardt, Range Management Lead, Utah BLM, February 6, 2004.

[147] Ibid.

[148] Ibid.

[149] Personal communication with Ron Bolander, Utah BLM, January 28, 2004.

[150] The estimate that 20 percent of allotments will be affected reflects the scarcity of PCEs in MSO critical habitat areas, as described above.

in AUMs similar to those experienced in USFS Region 3 of 10 to 50 percent. Permit value of an AUM is assumed to be $85/BLM AUM (see Exhibit 4-4). As above, these impacts, if they occur, are likely to stem from multiple causes.

4.6.2 Summary of Future Impacts on BLM Lands

243. In summary, the following future impacts are estimated for BLM lands in MSO habitat (2003 dollars assuming a rate of seven percent):

- $20,000 to $99,000 in permit value costs to ranchers with Federal grazing permits;
- $132,000 to $591,000 in administrative costs to Federal agencies; and
- $281,000 to $562,000 in other project modification costs, primarily to Federal agencies.

244. Total costs to BLM resulting from MSO-related impacts on grazing are estimated at $432,000 to $1.2 million over the next 10 years. As in USFS land areas, permit value losses, if they occur, are likely to result from multiple causes. Because the factors overlap temporally and spatially, it is difficult to separate MSO-related impacts from other impacts in MSO habitat. As a result, this analysis is likely to somewhat overstate the impacts related to MSO conservation activities.

4.7 Summary of Past and Future Impacts to Livestock Grazing Activities

245. In summary, the following past impacts related to grazing activities are estimated for Federal lands (including all USFS and BLM) in MSO habitat 1993 to 2003 (2003 dollars assuming a rate of seven percent):

- Total efficiency impacts related to impacts on grazing are estimated at $6.4 million to $22.0 million (1993-2003).
  - $2.8 million to $14.1 million in lost ranch-level income associated with the value of Federal grazing permits;
  - $545,000 to $2.0 million in administrative costs to Federal agencies; and
  - $3.0 million to $6.0 million in other project modification costs, primarily to Federal agencies.
- Past regional economic impacts resulting from reductions in livestock production are estimated to be:
  - $848,000 in lost output annually in lost output annually

- 11 jobs lost annually across all sectors

- In addition, the reduction in grazing may also reduce state and local taxes by as much as $38,000 in the study area.

246. In summary, the following future impacts related to grazing activities are estimated for Federal lands (including all USFS and BLM) in MSO habitat 2004 to 2013 (2003 dollars assuming a rate of seven percent):

- Total efficiency impacts related to impacts on grazing are estimated at $3.4 million to $12.4 million (2004-2013).

  - $1.7 million to $8.7 million in lost ranch-level income associated with the value of Federal grazing permits;

  - $332,000 to $1.0 million in administrative costs to Federal agencies; and

  - $1.3 million to $2.7 million in other project modification costs, primarily to Federal agencies.

- Future regional economic impacts resulting from reductions in livestock production are estimated to be:

  - $1.1 in lost output annually

  - 14 jobs lost annually across all sectors

  - In addition, the reduction in grazing may also reduce state and local taxes by as much as $47,000 in the study area.

247. Results by management unit are presented in Exhibits 4-11 and 4-12.

Exhibit 4-11
PAST IMPACTS OF MSO CONSERVATION EFFORTS ON LIVESTOCK GRAZING (1993-2003)

Agency	Management Unit	Consultations		Total Estimated Loss in Permit Value (Nominal $)		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Informal	Formal	Low	High	Low	High	Low	High	Low	High
USFS Region 2	Pike-San Isabel	0	0	$0	$0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	Region 2 Subtotal	**0**	**0**	**$0**	**$0**	**$110,000**	**$220,000**	**$158,000**	**$316,000**	**$14,000**	**$29,000**
USFS Region 3	Apache-Sitgreaves	1	4	$252,000	$1,262,000	$415,000	$1,580,000	$595,000	$2,267,000	$54,000	$206,000
	Carson NF	0	0	$55,000	$276,000	$165,000	$496,000	$237,000	$712,000	$22,000	$65,000
	Cibola NF	0	0	$588,000	$2,941,000	$698,000	$3,161,000	$1,002,000	$4,536,000	$91,000	$412,000
	Coconino NF	5	3	$122,000	$610,000	$281,000	$957,000	$404,000	$1,373,000	$37,000	$125,000
	Coronado NF	0	1	$193,000	$963,000	$316,000	$1,204,000	$453,000	$1,728,000	$41,000	$157,000
	Gila NF	2	0	$440,000	$2,198,000	$555,000	$2,443,000	$796,000	$3,506,000	$72,000	$319,000
	Kaibab NF	0	0	$49,000	$247,000	$159,000	$467,000	$228,000	$670,000	$21,000	$61,000
	Lincoln NF	1	2	$136,000	$678,000	$274,000	$953,000	$392,000	$1,368,000	$36,000	$124,000
	Prescott	0	0	$15,000	$75,000	$125,000	$295,000	$179,000	$423,000	$16,000	$38,000
	Santa Fe NF	1	0	$78,000	$389,000	$190,000	$622,000	$273,000	$892,000	$25,000	$81,000
	Tonto NF	1	1	$31,000	$157,000	$156,000	$411,000	$224,000	$590,000	$20,000	$54,000
	Region wide	3	3			$45,000	$102,000	$64,000	$146,000	$6,000	$13,000
	Region 3 Subtotal	**14**	**14**	**$1,959,000**	**$9,796,000**	**$3,378,000**	**$12,692,000**	**$4,846,000**	**$18,211,000**	**$441,000**	**$1,656,000**
USFS Region 4	Dixie NF	9	1	$0	$0	$143,000	$355,000	$206,000	$509,000	$19,000	$46,000
	Fishlake NF			$0	$0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	Manti-La Sal NF			$0	$0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	Region 4 Subtotal	**9**	**1**	**$0**	**$0**	**$363,000**	**$795,000**	**$521,000**	**$1,140,000**	**$47,000**	**$104,000**
USFS TOTAL		**23**	**15**	**$1,959,000**	**$9,796,000**	**$3,851,000**	**$13,707,000**	**$5,526,000**	**$19,668,000**	**$502,000**	**$1,788,000**
BLM	BLM/AZ	0	0	$0	$0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	BLM/CO	1	0	$0	$0	$112,000	$233,000	$161,000	$334,000	$15,000	$30,000
	BLM/NM	0	0	$0	$0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	BLM/UT	59	0	$0	$0	$246,000	$963,000	$353,000	$1,382,000	$32,000	$126,000
	BLM Total	**60**	**0**	**$0**	**$0**	**$578,000**	**$1,636,000**	**$829,000**	**$2,347,000**	**$75,000**	**$213,000**
TOTALS		**83**	**15**	**$1,959,000**	**$9,796,000**	**$4,429,000**	**$15,343,000**	**$6,355,000**	**$22,015,000**	**$578,000**	**$2,001,000**

* Administrative costs and project modification costs are discounted assuming a rate of seven percent.

Source: US Fish and Wildlife administrative record for the Mexican Spotted Owl, personal communication with Action Agencies, IEc cost model.

Exhibit 4-12

FUTURE IMPACTS OF MSO CONSERVATION EFFORTS ON LIVESTOCK GRAZING (2004-2013)

		Consultations		Total Estimated Loss in Permit Value (Nominal $)		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
Agency	**Management Unit**	**Informal**	**Formal**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**
USFS Region 2	Pike-San Isabel	0	1	$0	$0	$113,000	$221,000	$79,000	$156,000	$8,000	$16,000
	Region 2 Subtotal	**0**	**1**	**$0**	**$0**	**$113,000**	**$221,000**	**$79,000**	**$156,000**	**$8,000**	**$16,000**
USFS Region 3	Apache Sitgreaves	1	5	$155,000	$774,000	$320,000	$1,094,000	$225,000	$768,000	$22,000	$77,000
	Carson NF	0	0	$175,000	$875,000	$275,000	$1,075,000	$193,000	$755,000	$19,000	$76,000
	Cibola NF	0	0	$252,000	$1,261,000	$352,000	$1,461,000	$247,000	$1,026,000	$25,000	$103,000
	Coconino NF	6	4	$169,000	$843,000	$333,000	$1,204,000	$234,000	$846,000	$23,000	$85,000
	Coronado NF	0	1	$449,000	$2,246,000	$562,000	$2,467,000	$394,000	$1,733,000	$39,000	$173,000
	Gila NF	2	0	$607,000	$3,035,000	$712,000	$3,260,000	$500,000	$2,290,000	$50,000	$229,000
	Kaibab NF	0	0	$53,000	$267,000	$153,000	$467,000	$107,000	$328,000	$11,000	$33,000
	Lincoln NF	1	2	$231,000	$1,155,000	$359,000	$1,410,000	$252,000	$991,000	$25,000	$99,000
	Prescott	0	0	$53,000	$267,000	$153,000	$467,000	$107,000	$328,000	$11,000	$33,000
	Santa Fe NF	1	0	$165,000	$826,000	$267,000	$1,039,000	$188,000	$729,000	$19,000	$73,000
	Tonto NF	1	1	$126,000	$629,000	$241,000	$863,000	$169,000	$606,000	$17,000	$61,000
	Region wide	4	4			$60,000	$136,000	$42,000	$96,000	$4,000	$10,000
	Region 3 Subtotal	**16**	**17**	**$2,435,000**	**$12,178,000**	**$3,786,000**	**$14,943,000**	**$2,659,000**	**$10,496,000**	**$266,000**	**$1,050,000**
USFS Region 4	Dixie NF	9	0	$0	$0	$121,000	$313,000	$85,000	$220,000	$8,000	$22,000
	Fishlake NF	0	0	$0	$0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	Manti-La Sal NF	0	0	$0	$0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	Region 4 Subtotal	**9**	**0**	**$0**	**$0**	**$321,000**	**$713,000**	**$225,000**	**$501,000**	**$23,000**	**$50,000**
USFS TOTAL		**25**	**18**	**$2,435,000**	**$12,178,000**	**$4,219,000**	**$15,878,000**	**$2,963,000**	**$11,152,000**	**$296,000**	**$1,115,000**

Exhibit 4-12 (continued)

FUTURE IMPACTS OF MSO CONSERVATION EFFORTS ON LIVESTOCK GRAZING (2004-2013)

		Consultations		Total Estimated Loss in Permit Value (Nominal $)		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
Agency	**Management Unit**	**Informal**	**Formal**	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**
BLM	BLM/AZ	0	1	$0	$0	$113,000	$221,000	$79,000	$156,000	$8,000	$16,000
	BLM/CO	1	1	$1,000	$3,000	$116,000	$237,000	$81,000	$166,000	$8,000	$17,000
	BLM/NM	0	1	$0	$1,000	$113,000	$222,000	$79,000	$156,000	$8,000	$16,000
	BLM/UT	59	1	$27,000	$137,000	$275,000	$1,102,000	$193,000	$774,000	$19,000	$77,000
BLM Total		**60**	**4**	**$28,000**	**$141,000**	**$616,000**	**$1,783,000**	**$433,000**	**$1,252,000**	**$43,000**	**$125,000**
TOTALS		**85**	**22**	**$2,463,000**	**$12,319,000**	**$4,836,000**	**$17,661,000**	**$3,396,000**	**$12,404,000**	**$340,000**	**$1,240,000**

* Administrative costs and project modification costs are discounted assuming a rate of seven percent.

Source: US Fish and Wildlife administrative record for the Mexican Spotted Owl, personal communication with Action Agencies, IEc cost model.

248. The public is concerned that MSO conservation measures may affect efforts to reduce the risk of catastrophic wildfire.[151] The public concern is valid, considering the increasing incidence of wildfires, many of which have begun on Federal lands in recent years. This analysis finds that the impacts of MSO conservation measures on fire management activities have been modest to the agencies conducting fuels management, and are anticipated to be in the future. However, some impacts on fire management effectiveness will occur as a result of MSO conservation activities. Specifically, impacts on fire management activities are likely to be greatest in areas where Wildland and Urban interface areas (WUI) overlap with MSO PACs. In these areas, agencies must avoid treating some acres that contain MSO, must adhere to rules regarding the size of trees that may be thinned, and must conduct intensive surveys on fire impacts. Nonetheless, PAC overlap areas make up a small percentage of the total WUI areas (approximately four percent of currently mapped WUIs in USFS Region 3), and thus the overall impact of these modifications is likely to be small.

249. This section is divided into three parts. First, the analysis presents a background discussion on the impacts of fire impacts in the region, fire management efforts, and impacts on MSO. Second, the analysis presents the past and ongoing impacts of MSO conservation on fire management activities. Finally, potential future impacts of MSO conservation on fire management activities are discussed. Each of these sections discusses impacts to the USFS, BLM, and NPS, and breaks down costs by administrative versus project modification costs.

5.1 Background

5.1.1 Wildfire in the Southwest

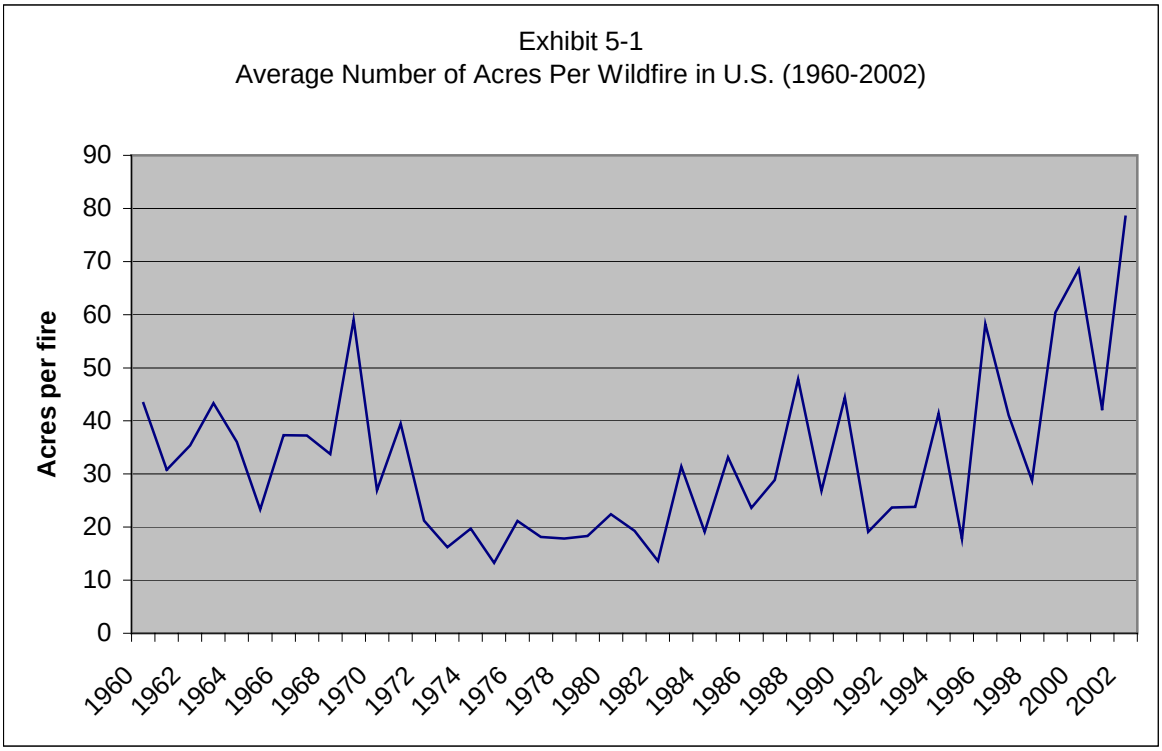
250. There is little debate that there is a high risk of catastrophic wildfire in the southwest. According to the Southwest Forest Health and Wildfire Prevention Act of 2003, 39 million acres of NF land in the interior west are at high risk of catastrophic wildfire.[152] In addition,

[151] Verbal comments of Bruce Raden, Senior District Aide, Congressman John Shadegg, Service Office, Phoenix, Arizona, November 7, 2003; McDaniel, Kenneth S., "Re: C.F.R. Part 17, Designation of critical habitat for the Mexican Spotted Owl", Public comment of City of Alamogordo, New Mexico, December 17, 2003; Howard Hutchinson for the Coalition of New Mexico and Arizona Counties, public comment on the Proposed Critical Habitat Designation for the Mexican Spotted Owl, December 22, 2003.

[152] H.R. 2696, July 10, 2003.

the frequency and intensity of catastrophic wildfire has been increasing over time. As presented in Exhibit 5-1, the average size of wildfires has been increasing since 1960, and particularly since the 1970's. Reportedly, the average size of a wildfire since the 1970's is double the average size of a wildfire in the 1940s to 1960s.[153]

Exhibit 5-1
Average Number of Acres Per Wildfire in U.S. (1960-2002)



Source: National Interagency Fire Center, Wildlands Fire Statistics, 1960-2002, www.nifc.gov/stats/wildlandfirestats.html, accessed February 16, 2004.

251. The primary contributor to the recent increases in wildland fire and intensity is widely believed to be the long-standing practice of fire suppression by USFS and other land management agencies. Logging practices and grazing activities exacerbated impacts on the natural fire regime. These practices resulted in a reduction in the frequency of low-intensity fires that historically removed fuels from the forest floor. As a result, the number of "stand-replacing," high-intensity fires has increased.[154]

[153] "Wildfire history and ecology," http://www.cpluhna.nau.edu/Biota/wildfire.htm, accessed February 17, 2004.

[154] Ibid.

252. With the increase in stand-replacing fires has come increasing damage to private property. For example, the 2000 Cerro Grande Fire in New Mexico burned 47,650 acres, including the destruction of 235 structures and part of Los Alamos National Laboratory.[155] The 468,638-acre Rodeo-Chediski fire of 2002 ranks as Arizona's second most expensive disaster ever, with insurance companies paying out over $102 million for the destruction of 426 structures (including 250 homes).[156] As a result of the increased risk and cost of catastrophic wildfires, both the public and the land management agencies have a vested interest in implementing fuel reduction and fire management efforts in the southwest.

5.1.2 MSO and Fire Management

253. The Recovery Plan states that catastrophic wildfire is one of the primary threats to the owl, and a factor in listing the owl under the Act.[157] The Recovery Plan encourages fire management programs that take into account the ecological role of fire. Thus, fire "plays the duel role of being both potentially beneficial and catastrophic to the owl and its habitat."[158] Recognizing the importance of low-intensity fire to owl habitat, the Recovery Plan broadly supports many fuel reduction activities:

> *Heavy accumulations of ground and ladderfuels have rendered many Southwestern forests vulnerable to stand-replacing fires. Such fires represent a real and immediate threat to the existence of spotted owl habitat. The management guidelines are intended to provide land managers with flexibility to reduce these fuel levels and abate fire risks. Fire management should be given the highest priority. The goals are flexible in that they require local land managers to make site-specific decisions.*

254. The Recovery Plan provides several guidelines for treatments occurring in MSO habitat areas. The key aspects of these guidelines are discussed below as they relate to project modifications of fire management activities.

255. In MSO critical habitat areas, and in many areas across the U.S., Department of Agriculture and the Department of Interior are jointly implementing what is known as the "National Fire Plan," which grew out of a report to the President called *Managing the Impacts of Wildfire on Communities and the Environment: A report to the President in Response to the Wildfires of 2000.* This plan calls for a substantial increase in the number of forested acres treated annually to reduce hazardous fuels, and has resulted in increased funding from Congress to address this issue. Under the plan, WUI areas are defined by each

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[155] National Interagency Fire Center, Historical Wildland Fire Statistics, www.nifc.gov/stats/historicalstats.html, accessed February 16, 2004.

[156] Wichner, David. "Rodeo-Chediski Costs Rank 2nd," *Arizona Daily Star*, July 16, 2002.

[157] Recovery Plan p ix, xii.

[158] USFS 2001. Biological Opinion on the "USFS Proposed Wildland/Urban Interface (WUI) Fuel treatments in New Mexico and Arizona and their effects on listed and proposed species in accordance with section 7 of the Endangered Species Act", Service, April 2001.

agency "where human life, property, and natural resources are in imminent danger from catastrophic wildfire."[159] It is on these areas that this analysis focuses.

256. As part of the National Fire Plan effort, the Agencies published new regulations for implementing section 7 consultation requirements in December 2003. These regulations provide an alternative process that "eliminates the need to conduct informal consultation and eliminates the need to provide written concurrence from the Service for those National Fire Plan actions that the Action Agency determines are "not likely to adversely affect (NLAA) any listed species or its designated critical habitat." Thus, future informal consultation efforts on fire management activities are expected to be streamlined.[160]

5.2 Past and Ongoing Impacts of MSO Conservation

257. This section discusses the past and ongoing impacts of MSO conservation on fire management activities of USFS, BLM, and NPS. Impacts on all agencies are described as a group.

258. As with other activities, the Recovery Plan recommends the most limitations to activities in PAC areas. Where WUI areas have been defined, these are the priority areas for fuel reduction efforts. Thus, the most conflict between fuel reduction efforts and MSO conservation efforts are in areas where WUI areas and PACs overlap. As shown in Exhibit 5-2, these overlap areas are fairly small in Region 3 of USFS, with areas in PACs comprising approximately four percent of the total WUI areas identified by USFS.[161] Lincoln and Tonto NFs have the largest areas of overlap of WUI and PAC areas. (For a graphic representation of this data, see Appendix A.)

[159] *Ibid.*

[160] "Joint Counterpart Endangered Species Ace Section 7 Consultation Regulations," 68 FR No 235, p. 68254, December 8, 2003.

[161] R3 GIS data on WUI location was downloaded from http://www.fs.fed.us/r3/maps/gis/datasets.shtml#regional. Note that this GIS data includes some areas not included in the formal consultation on WUI with the Service. R3 data on PAC locations "MSO PACs" was provided by USFS Region 3 GIS technicians, December, 2003.

Exhibit 5-2

WILDLAND AND URBAN INTERFACE AREAS IN PACS AS PERCENT OF TOTAL

FOREST	WUI (acres)	Overlap with PACs	Percent
Apache-Sitgreaves	322,803	0	0.0%
Carson	685,654	1,451	0.2%
Cibola	93,837	725	0.8%
Coconino	239,370	10,476	4.4%
Coronado	289,048	16,838	5.8%
Gila	558,850	15,691	2.8%
Kaibab	113,485	5,469	4.8%
Lincoln	275,765	42,229	15.3%
Prescott	285,248	9,103	3.2%
Santa Fe	213,226	5,388	2.5%
Tonto	347,786	27,027	7.8%
Total	**3,425,071**	**134,397**	**3.9%**

Source: R3 GIS data on WUI location was downloaded from http://www.fs.fed.us/r3/maps/gis/datasets.shtml#regional. Note that this data includes some areas not included in the formal consultation on WUI with the Service. R3 data on PAC locations "MSO PACs" was provided by USFS Region 3 GIS technicians, December, 2003.

259. Since the listing of the species, there have been approximately 39 formal consultations and 121 informal consultations specifically related to fire management activities and the MSO. As shown in Exhibit 5-3, most of the consultations were with USFS Region 3. In addition, fire management activities have also been addressed in large, multi-activity consultations, including the 1996 amendments to the 11 National Forest Plans (administrative costs associated with these consultations are presented in the Timber Section and are not included below). Exhibit 5-3 summarizes the consultation history related to fire management activities.

Exhibit 5-3

MSO CONSULTATION HISTORY RELATED TO FIRE MANAGEMENT, INCLUDING PRESCRIBED BURNS AND FIRE SUPPRESSION ACTIVITIES (1993-2003)

Action Agency	Formal Consultations	Informal Consultations
USFS	31	99
NPS	6	14
Other (BLM, FWS, DOE, BIA)	2	8
Total	**39**	**121**

Source: Administrative record and MSO consultation files from 1993 to present.

260. Of the past consultation efforts on fire management, one is notable for its size and complexity. After the passage of the National Fire Plan, USFS in Arizona and New Mexico (Region 3) engaged in an intensive effort to assess and treat its WUI areas. The Region prepared a large biological assessment and conducted a formal consultation for 32 threatened and endangered species on its proposed treatment plan. This large programmatic consultation

is part of an effort by all agencies to streamline future section 7 consultations, particularly for consultations on wildfire risk reduction.[162] At the time of consultation, the USFS estimated that it would take over five years to treat the number of acres they had identified as WUI areas. Since then, approximately 35 projects have been implemented under this opinion.[163]

5.2.1 Administrative Costs

261. The administrative costs for fire management activities are estimated to have been between $1.1 million to $3.4 million since 1993, or $100,000 to $308,000 per year (2003 dollars at seven percent discount rate). Although the large programmatic consultation on WUI areas is likely to involve more effort than a typical consultation, it involved 32 species. Thus, included in the estimate is an assumption that the portion of effort associated with MSO for this consultation is equal to effort on a typical formal consultation.

5.2.2 Project Modifications Associated with Fuel Reduction/Vegetation Management Activities

262. Past project modifications for fire management/fuel reduction activities fall into five major categories: area avoidance, thinning level restrictions, delay, snag protection, and monitoring. These project modifications primarily apply to projects in MSO PACs. Projects that do not affect PACs are often consulted on informally, and typically do not include project modifications. In addition, some fire projects that result in informal consultation are deemed beneficial to the owl.[164] Modifications to past consultations are summarized below:

Area avoidance in PACs. The Recovery Plan for the MSO states that, within PACs, the agencies should "designate 40 ha (100 acres) centered around the nest site. This nest area should include habitat that resembles the structural and floristic characteristics of the nest site. These areas will be deferred from [treatments]." Following this guidance, the Region 3 programmatic consultation and other formal consultations have recommended avoiding treatments in 100 acre areas around nest sites.[165] This reduction in effort is unlikely to result in additional direct costs to the agencies. However, in areas where high PAC density occurs in WUI areas, it is possible that the avoidance of 100-acre areas could result in a decrease

[162] Biological Opinion on the "USFS Proposed Wildland/Urban Interface (WUI) Fuel treatments in New Mexico and Arizona and their effects on listed and proposed species in accordance with section 7 of the Endangered Species Act", Service, April 2001.

[163] Written comments from Service field office and Region 2 representatives, February 26, 2004.

[164] For example, the informal consultation for the prescribed fire on the Peloncillo Mountains in the Coronado NF concluded that the project would be beneficial to the owl: "the proposed action will reduce the threat of catastrophic wildfire in suitable habitat....and fire may increase the prey base for the owl by increasing grass cover in areas that burn." April 20, 2001.

[165] U.S. Fish and Wildlife Service. 2003. Formal biological opinion on proposed rates of implementation of the grazing standards and guidelines for USFS Region 3, January 17, 2003. U.S. Fish and Wildlife Service, biological opinion on the Carr Canyon fuel reduction project in Coronado National Forest, February 10, 1999.

in the effectiveness of actions taken to reduce catastrophic fire risk to surrounding communities.

Thinning level restrictions in PACs. Outside of the 100-acre avoidance area, treatments in PACs are sometimes restricted to lower levels than in areas outside of PACs. For example, on the Carr Canyon fuel reduction project in Coronado NF, the USFS proposed thinning at up to 80 percent of trees with greater than five-inch dbf for areas outside of PACs, while areas within PACs were restricted to 50 percent of trees of that diameter.[166] This reduction in effort is unlikely to result in additional direct costs to the agencies. As above, in areas where high PAC density occurs in WUI areas, it is possible that reduced thinning in PACs could result in a decrease in the effectiveness of actions taken to reduce catastrophic fire risk to surrounding communities.

Delay in PACs. The Recovery Plan recommends that fuel reduction treatments in PACs occur during the MSO "non-breeding" season (September 1 to February 28). This recommendation has been made to several agencies during formal consultations on MSO. While this delay may inconvenience the agencies in their planning, it is not expected to result in increased costs to the agencies. As above, in areas where high PAC density occurs in WUI areas, 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. The Service comments that these delays frequently overlap other delays unrelated to MSO conservation activities, such as delays caused by NEPA requirements or budget limitations.[167]

Protection of Snags and Large Trees in PACs. Large trees and snags (e.g., standing dead trees) sometimes need to be protected from burn impacts. Such protections are occasionally recommended in consultations. Consultations may recommend techniques such as "applying water or foam, hand lining, burning under cooler prescriptions, changing burn patterns, etc." Costs associated with these efforts are anticipated to be minimal.

Surveys and Monitoring. Because the impact of fire on MSO is not perfectly understood, the Recovery Plan recommends that impacts on MSO should be assessed after fuel treatments. Following this guidance, nearly every formal consultation on fire management/fuels reduction recommends regular monitoring of PACs and the provision of monitoring reports to the Service. Monitoring efforts by management unit are estimated to range from $10,000 to $20,000 per year.

263. A summary of typical project modifications to fire management activities are presented in Exhibit 5-4. In summary, across the management units containing MSO habitat, project modifications are expected to range from $488,000 to $976,000 annually (2003

[166] U.S. Fish and Wildlife Service. Biological opinion on the Carr Canyon fuel reduction project in Coronado National Forest, February 10, 1999.

[167] For example, in recent years, some WUI projects have been delayed or cancelled due to funds being pulled for use in fire suppression efforts. Written comments from Service field office and Region 2 representatives, February 26, 2004.

dollars). While area avoidance and thinning level restrictions may lead to a marginal decrease in the effectiveness of actions taken to reduce catastrophic fire risk, this impact is not anticipated to be large, since a small percentage of WUIs contain MSO PACs (see Exhibit 5-2).

Exhibit 5-4

SUMMARY OF PROJECT MODIFICATIONS FOR THE MSO RELATED TO FIRE MANAGEMENT/FUEL REDUCTION ACTIVITIES

Type of Action	Modification	Estimated Impact
Fire Suppression	None.	None.
Fuels Reduction/ Vegetation Management	Area avoidance (PACs only)	Marginal decrease in the effectiveness of actions taken to reduce fire risk to surrounding communities near areas of dense PACs.
	Thinning restrictions (PACs only)	Marginal decrease in the effectiveness of actions taken to reduce fire risk to surrounding communities near areas of dense PACs.
	Delay (PACs only)	Minimal.
	Protection of large trees and snags (PACs only)	Minimal.
	Surveys and Monitoring	$10,000 to $20,000 annually per management unit.

5.2.3 Project Modifications Associated with Fire Suppression Activities

264. Of the 39 formal consultations on fire management and the MSO, approximately 15 (38 percent) were emergency consultations on wildfire suppression activities. An additional 10 informal consultations (eight percent) addressed these activities. The administrative actions were completed, universally, after the fire suppression activities were completed. Thus, this category of consultation has no effect on the suppression activities when they occur. For example, three recent biological opinions on the following actions all conclude that, though impacts to the MSO may have occurred during fire suppression activities, no reasonable and prudent measures are warranted: suppression activities for the Penasco wildfire on Lincoln NF; suppression and emergency rehabilitation activities for the Pack Rat Fire on Tonto NF; wildfire suppression actions for the Tram Fire in Coconino NF.[168] These outcomes are logical, because suppression actions were complete at the time the biological opinion was written. Because of this pattern, this analysis does not attribute project modification costs to this category of fire management activities.

[168] "Final Biological Opinion on the effects to the Mexican Spotted Owl from the Penasco wildfire suppression activities, Sacramento Ranger District, Otero County, Mew Mexico," New Mexico Ecological Services Office, Service, May 5, 2003; Biological opinion on suppression and emergency rehabilitation activities on the Pack Rat Fire in Gila and Coconino Counties, Phoenix Office, Service, September 19, 2003; Biological opinion on wildfire suppression actions for the Tram Fire on the Coconino National Forest, Coconino County, Arizona, Phoenix Office, Service, April 4, 2003.

5.3 Future Impacts of Critical Habitat Designation

265. This section discusses the future impacts of MSO conservation activities on fire management activities of USFS, BLM, and NPS.

5.3.1 Administrative Costs

266. Regionally and nationally, there is a great deal of attention being paid to, and an increase in funding for, fire management and fuel reduction activities on Federal lands. This analysis assumes that there will be a 50 percent increase in the number of formal consultations on fire management activities over the next 10 years, due to the large backlog of projects that may be undertaken given the new funding from the National Fire Plan. Thus, approximately six formal consultations are anticipated annually. One of these future consultations will likely be a reinitiation of the formal biological opinion on WUI projects in USFS Region 3.[169] Because the recently published Agency guidelines state that they will "eliminate the need to conduct informal consultation" for activities under the National Fire Plan, future informal consultation costs are expected to be minimal over the next 10 years.[170] To account for some lag time in implementing the new regulations, the past annual number of informal consultations (12) is projected over the next three years. Thus, administrative costs are anticipated to range from $62,000 to $127,000 annually, or $617,000 to $1.3 million over 10 years for all agencies. Administrative costs for each management unit are summarized in Exhibit 5-5.

5.3.2 Project Modifications

267. Future modifications to fuel reduction and vegetation management projects are anticipated be reflective of modifications that were conducted in the past for these activities. As a result of these project modifications, communities that are nearby areas dense with PACs may experience a decrease in the effectiveness of actions taken to reduce the risk of catastrophic fires. As in the past, because of the low percentage of WUIs that contain MSO PACs, this impact is not anticipated to be large (see Exhibit 5-2). Areas outside of PACs are expected to be burdened with few conservation measures taken for the MSO. These project modification costs are estimated to be equal to those in the past. Thus, project modification costs for the 18 management units containing MSO habitat are expected to range from $246,000 to $492,000 annually (2003 dollars).

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[169] According to a letter from USFS Region 3, "The time and money required by both the FWS and the Federal action agencies to complete Endangered Species Act (ESA) section 7 consultation for designated critical habitat in WUI areas would be totally fruitless…" Letter from Donald DeLorenzo, Director for Wildlife, Fish and Rare Plants, USFS Region 3, on the Draft Environmental Assessment of MSO Critical Habitat. Undated. Email communication with Service, Southwestern Regional Office, July 26, 2004.

[170] "Joint Counterpart Endangered Species Act Section 7 Consultation Regulations," 68 FR No 235, p. 68254, December 8, 2003.

268. Undoubtedly, future wildfires will affect MSO habitat, and emergency consultations on fire suppression will ensue. No costs are anticipated as a result of these consultations, as these consultations always happen after the fact.

5.4 Summary of Impacts on Fire Management

269. This analysis finds that the impacts of MSO conservation measures on fire management activities have been modest to the agencies conducting fuels management, and are anticipated to be in the future. However, some impacts on fire management effectiveness will occur as a result of MSO conservation activities. Specifically, impacts on fire management activities are likely to be greatest in areas where WUI areas overlap with MSO PACs. In these areas, agencies must avoid treating some acres that contain MSO, must adhere to rules regarding the size of trees that may be thinned, and must conduct intensive surveys on fire impacts. Nonetheless, PAC overlap areas make up a small percentage of the total WUI areas (approximately four percent), and thus the overall impact of these modifications is likely to be small. Past impacts of MSO conservation efforts on fire management activities are presented in Exhibit 5-5. Future impacts of MSO conservation efforts on fire management activities are presented in Exhibit 5-6.

Exhibit 5-5

PAST IMPACTS OF MSO CONSERVATION EFFORTS ON FIRE MANAGEMENT (1993-2003)

Agency	Management Unit	Consultations*		Total Administrative and Project Modifications (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Informal	Formal	Low	High	Low	High	Low	High
USFS Region 2	Pike-San Isabel	0	0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	Region 2 Subtotal	**0**	**0**	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
USFS Region 3	Apache Sitgreaves	4	4	$170,000	$356,000	$243,000	$511,000	$22,000	$46,000
	Carson NF	7	1	$139,000	$330,000	$199,000	$473,000	$18,000	$43,000
	Cibola NF	6	0	$124,000	$296,000	$178,000	$424,000	$16,000	$39,000
	Coconino NF	8	8	$229,000	$492,000	$329,000	$706,000	$30,000	$64,000
	Coronado NF	6	3	$162,000	$360,000	$232,000	$516,000	$21,000	$47,000
	Gila NF	6	0	$124,000	$296,000	$178,000	$424,000	$16,000	$39,000
	Kaibab NF	5	4	$172,000	$369,000	$247,000	$529,000	$22,000	$48,000
	Lincoln NF	8	3	$166,000	$385,000	$238,000	$552,000	$22,000	$50,000
	Prescott	2	1	$127,000	$267,000	$183,000	$383,000	$17,000	$35,000
	Santa Fe NF	13	2	$165,000	$427,000	$237,000	$612,000	$22,000	$56,000
	Tonto NF	8	4	$179,000	$406,000	$257,000	$583,000	$23,000	$53,000
	Region wide	5	1	$24,000	$84,000	$35,000	$121,000	$3,000	$11,000
	Region 3 Subtotal	**78**	**31**	$1,780,000	$4,066,000	$2,554,000	$5,834,000	$232,000	$530,000
USFS Region 4	Dixie NF	19	0	$154,000	$459,000	$221,000	$659,000	$20,000	$60,000
	Fishlake NF	2	0	$115,000	$245,000	$164,000	$352,000	$15,000	$32,000
	Manti-La Sal NF	0	0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	Region 4 Subtotal	**21**	**0**	**$378,000**	**$925,000**	**$543,000**	**$1,327,000**	**$49,000**	**$121,000**
USFS TOTAL		99	31	$2,268,000	$5,211,000	$3,255,000	$7,477,000	$296,000	$680,000
BLM	BLM/AZ	1	0	$112,000	$233,000	$161,000	$334,000	$15,000	$30,000
	BLM/CO	1	0	$112,000	$233,000	$161,000	$334,000	$15,000	$30,000
	BLM/NM	1	0	$112,000	$233,000	$161,000	$334,000	$15,000	$30,000
	BLM/UT	2	0	$115,000	$245,000	$164,000	$352,000	$15,000	$32,000
	District wide	0	0	$0	$0	$0	$0	$0	$0
BLM Total		**5**	**0**	**$452,000**	**$943,000**	**$648,000**	**$1,353,000**	**$59,000**	**$123,000**
BIA	BIA/Mescalero			$0	$0	$0	$0	$0	$0
	BIA/Navajo	2	0	$115,000	$245,000	$164,000	$352,000	$15,000	$32,000
	BIA/San Carlos			$0	$0	$0	$0	$0	$0
	Other Tribes			$0	$0	$0	$0	$0	$0
	All Tribes			$0	$0	$0	$0	$0	$0
BIA Total		**2**	**0**	**$115,000**	**$245,000**	**$164,000**	**$352,000**	**$15,000**	**$32,000**

Exhibit 5-5

PAST IMPACTS OF MSO CONSERVATION EFFORTS ON FIRE MANAGEMENT (1993-2003)

Agency	Management Unit	Consultations*		Total Administrative and Project Modifications (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Informal	Formal	Low	High	Low	High	Low	High
NPS	Bandelier NM	0	1	$123,000	$241,000	$176,000	$346,000	$16,000	$31,000
	Canyon de Chelly NM	0	0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	Canyonlands NP	0	0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	Capitol Reef NP	0	0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	Chiricahua NM	2	1	$127,000	$267,000	$183,000	$383,000	$17,000	$35,000
	Coronado NM	0	0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	El Malpais NM	2	0	$115,000	$245,000	$164,000	$352,000	$15,000	$32,000
	Glen Canyon NRA	0	0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	Grand Canyon NP	1	4	$163,000	$318,000	$233,000	$457,000	$21,000	$42,000
	Navajo NM	0	0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	Rainbow Bridge NM	0	0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
	Saguaro NP	8	0	$128,000	$321,000	$184,000	$460,000	$17,000	$42,000
	Walnut Canyon NM	1	0	$112,000	$233,000	$161,000	$334,000	$15,000	$30,000
	Zion NP	0	0	$110,000	$220,000	$158,000	$316,000	$14,000	$29,000
NPS Total		**14**	**6**	**$1,648,000**	**$3,385,000**	**$2,364,000**	**$4,857,000**	**$215,000**	**$442,000**
Other Federal Agencies**		**1**	**2**	**$28,000**	**$55,000**	**$39,000**	**$79,000**	**$4,000**	**$7,000**
TOTALS		**121**	**39**	**$4,510,000**	**$9,839,000**	**$6,471,000**	**$14,118,000**	**$588,000**	**$1,283,000**

** Administrative costs and project modification costs are discounted assuming a rate of seven percent.

Source: U.S. Fish and Wildlife administrative record for the Mexican Spotted Owl, personal communication with Action Agencies, IEc cost model.

Exhibit 5-6

FUTURE IMPACTS OF MSO CONSERVATION EFFORTS ON FIRE MANAGEMENT (2004-2013)

		Consultations		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs* (2003$)		Annual Costs* (2003$)	
Agency	**Management Unit**	**Informal**	**Formal**	**Low**	**High**	**Low**	**High**	**Low**	**High**
USFS	Pike-San Isabel	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
Region 2	Region 2 Subtotal	**0**	**0**	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
USFS	Apache Sitgreaves	1	6	$178,000	$341,000	$125,000	$240,000	$12,000	$24,000
Region 3	Carson NF	2	2	$130,000	$268,000	$91,000	$188,000	$9,000	$19,000
	Cibola NF	2	0	$105,000	$225,000	$73,000	$158,000	$7,000	$16,000
	Coconino NF	2	12	$256,000	$482,000	$180,000	$339,000	$18,000	$34,000
	Coronado NF	2	5	$168,000	$332,000	$118,000	$233,000	$12,000	$23,000
	Gila NF	2	0	$105,000	$225,000	$73,000	$158,000	$7,000	$16,000
	Kaibab NF	2	6	$180,000	$354,000	$127,000	$248,000	$13,000	$25,000
	Lincoln NF	2	5	$168,000	$332,000	$118,000	$233,000	$12,000	$23,000
	Prescott	1	2	$128,000	$255,000	$90,000	$179,000	$9,000	$18,000
	Santa Fe NF	4	3	$147,000	$315,000	$103,000	$221,000	$10,000	$22,000
	Tonto NF	2	6	$180,000	$354,000	$127,000	$248,000	$13,000	$25,000
	Region wide	2	2	$30,000	$68,000	$21,000	$48,000	$2,000	$5,000
	Region 3 Subtotal	**24**	**49**	$1,773,000	$3,551,000	$1,245,000	$2,494,000	$125,000	$249,000
USFS	Dixie NF	6	0	$114,000	$276,000	$80,000	$194,000	$8,000	$19,000
Region 4	Fishlake NF	1	0	$102,000	$213,000	$72,000	$149,000	$7,000	$15,000
	Manti-La Sal NF	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	Region 4 Subtotal	**7**	**0**	$316,000	$688,000	$222,000	$483,000	$22,000	$48,000
USFS TOTAL		**31**	**49**	**$2,189,000**	**$4,439,000**	**$1,537,000**	**$3,118,000**	**$154,000**	**$312,000**
BLM	BLM/AZ	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	BLM/CO	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	BLM/NM	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	BLM/UT	1	0	$102,000	$213,000	$72,000	$149,000	$7,000	$15,000
	District wide	0	0	$0	$0	$0	$0	$0	$0
BLM Total		**1**	**0**	**$402,000**	**$813,000**	**$283,000**	**$571,000**	**$28,000**	**$57,000**
BIA	BIA/Mescalero	0	0	$0	$0	$0	$0	$0	$0
	BIA/Navajo	1	0	$102,000	$213,000	$72,000	$149,000	$7,000	$15,000
	BIA/San Carlos	0	0	$0	$0	$0	$0	$0	$0

Exhibit 5-6

FUTURE IMPACTS OF MSO CONSERVATION EFFORTS ON FIRE MANAGEMENT (2004-2013)

		Consultations		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs* (2003$)		Annual Costs* (2003$)	
Agency	**Management Unit**	**Informal**	**Formal**	**Low**	**High**	**Low**	**High**	**Low**	**High**
	Other Tribes	0	0	$0	$0	$0	$0	$0	$0
	All Tribes	0	0	$0	$0	$0	$0	$0	$0
BIA Total		**1**	**0**	**$102,000**	**$213,000**	**$72,000**	**$149,000**	**$7,000**	**$15,000**
NPS	Bandelier NM	0	2	$125,000	$243,000	$88,000	$171,000	$9,000	$17,000
	Canyon de Chelly NM	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	Canyonlands NP	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	Capitol Reef NP	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	Chiricahua NM	1	2	$128,000	$255,000	$90,000	$179,000	$9,000	$18,000
	Coronado NM	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	El Malpais NM	1	0	$102,000	$213,000	$72,000	$149,000	$7,000	$15,000
	Glen Canyon NRA	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	Grand Canyon NP	0	6	$176,000	$328,000	$123,000	$231,000	$12,000	$23,000
	Navajo NM	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	Rainbow Bridge NM	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	Saguaro NP	2	0	$105,000	$225,000	$73,000	$158,000	$7,000	$16,000
	Walnut Canyon NM	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
	Zion NP	0	0	$100,000	$200,000	$70,000	$140,000	$7,000	$14,000
NPS Total		**4**	**10**	**$1,535,000**	**$3,064,000**	**$1,078,000**	**$2,152,000**	**$108,000**	**$215,000**
Other Federal Agencies**		**0**	**4**	**$150,000**	**$286,000**	**$106,000**	**$201,000**	**$11,000**	**$20,000**
TOTALS		**37**	**63**	**$4,379,000**	**$8,814,000**	**$3,076,000**	**$6,191,000**	**$308,000**	**$619,000**

* Administrative costs and project modification costs are discounted assuming a rate of seven percent.

** Other Federal agencies include consultations with DOE, DOD, and EPA.

Source: U.S. Fish and Wildlife administrative record for the Mexican Spotted Owl, personal communication with Action Agencies, IEc cost model.

POTENTIAL ECONOMIC IMPACTS TO TRIBAL ACTIVITIES — SECTION 6

270. As described in Section 2 of this analysis, lands owned by three Tribes are included within the boundaries of the proposed MSO CHD. These Tribes are the Mescalero Apache, Navajo Nation, and San Carlos Apache. This section provides an analysis of economic impacts associated with MSO conservation activities on these Tribal lands.

271. Each of the Tribes is a sovereign nation. Under Secretarial Order 3206, Tribal governments have the authority to protect and manage their resources in the manner that is most beneficial to them. Each of the three affected Tribes have their own natural resource programs and staff, and have enacted MSO management plans. In addition, as trustee for land held in trust by the United States for Indian Tribes, the BIA provides technical assistance to the Tribes on forest management planning and oversees a variety of programs on Tribal lands. MSO conservation activities have been ongoing on Tribal lands included in the proposed CHD and will continue with or without CHD. As stated in the Recovery Plan,

> "*Tribal beliefs and philosophies guide resource management on Tribal lands. Several Tribes consider owls a bad omen; however, Tribal beliefs also dictate that all living creatures are essential parts of nature and, as such, they are revered and protected. For example, the Elders Council of the San Carlos Apache Tribe expressed the traditional view that owls and their homes should not be disturbed.*"[171]

272. Given the unique characteristics of Tribal economies, the approach used to analyze potentially affected activities on Tribal lands is different than that for other types of activities. For each of the affected Tribes, this section provides a discussion of the current economic status of these Tribal communities, and discusses potential impacts to Tribal activities occurring in proposed MSO critical habitat areas.[172]

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[171] U.S. Fish and Wildlife Service. 1995. Recovery Plan for the Mexican spotted owl (*Strix occidentalis lucida*), December (p. 8).

[172] This methodology is similar to that used by Dr. Joseph Kalt in his analysis of the economic impacts of critical habitat designation of the Arizona Willow on the White Mountain Apache Tribe. Economic Analysis of Proposed Designation of Critical Habitat for the *Saliz Arizonica* (Arizona Willow) on the Fort Apache Indian Reservation. Prepared by Professor Joseph P. Kalt. Submitted to the White Mountain Apache Tribe. April 1993. Redacted Version.

273. For each of the Tribes, this analysis provides current socioeconomic data underscoring the conditions on each of the reservations. Available data demonstrate the economic vulnerability of each of the Tribes analyzed; their economies are characterized by high unemployment, low income, low education levels and high poverty rates. In addition, the unique circumstances on Tribal lands affect re-employment opportunities. For example, Tribal members who lose jobs may be less likely to move off the reservation to find work elsewhere. Thus, if MSO conservation impacts job availability on the reservation, those impacts are compounded.

274. Where information is available, the overall contribution of potentially affected activities is discussed to provide an upper bound estimate of potential impacts resulting from MSO conservation activities. For example, two of the tribes, the Mescalero Apache and the San Carlos Apache, currently operate sawmills. To the extent that information on these operations was made available by the Tribes, the information is presented in this section.

6.1 Mescalero Apache

275. The Mescalero Apache Reservation encompasses 460,678 acres in southeastern New Mexico in the Sacramento Mountains. Approximately 172,000 acres of Mescalero land is included in the proposed MSO critical habitat designation. The Lincoln NF borders the Mescalero Reservation to the north and south. The following discussion provides background information on the Mescalero Apache Tribe and discusses activities potentially affected by MSO conservation efforts.

6.1.1 Mescalero Apache Socioeconomic Status

276. Based on the U.S. Census, the 2000 population on the Mescalero Apache Reservation was 3,156. As shown in Exhibit 6-1, the unemployment rate was 16.1 percent in 2000. This rate is more than double the average for New Mexico. Per capita income was $8,118 in 2000, less than half of the average for the state of New Mexico. In addition, approximately 36 percent of the Tribe's population live below the poverty line, which is double the state average. In 2000, less than five percent of the population over age 25 held a bachelor's degree or equivalent. These factors illustrate the economic vulnerability of the Mescalero Apache Tribe to additional economic impact.

Exhibit 6-1

2000 SOCIOECONOMIC INFORMATION MESCALERO APACHE TRIBE

Area	Unemployment Rate	Per Capita Income	Poverty Rate (1)	Educational Attainment (2)	Population per Square Mile (3)
USA	4.2%	$21,587	12.4%	15.1%	79.8
New Mexico	7.3%	$17,261	18.4%	13.6%	15.0
Otero County, NM	7.5%	$14,345	9.4%	9.2%	9.4
Mescalero Apache Reservation	16.1%	$8,118	35.7%	4.5%	4.4

Notes:
(1) Poverty rate represents the percent of families or individuals below the applicable poverty threshold level. Poverty thresholds are the same for all parts of the country, but vary depending on the applicable family size, age of householder, and number of related children under 18. Poverty thresholds are shown at http://www.census.gov/hhes/poverty/threshld/thresh99.html.
(2) Educational Attainment indicates percent of population ages 25 and over that hold a Bachelors degree or higher.
(3) Population density on Tribal lands is based on 1992-93 information.
Source: U.S. Census Bureau, Census 2000 and Bureau of Labor Statistics. Population density from Tillers Guide to Indian County, Economic Profiles of American Indian Reservations and Census QuickFacts for US, States, etc.

277. Exhibit 6-1 also illustrates the relative population density on the Mescalero Reservation. Within the Mescalero reservation, the population density is 4.4 persons per square mile, compared with 15 persons per square mile in New Mexico overall. Population density is considered to be an indicator of employment opportunities. Employment opportunities on reservation lands, and in rural areas generally, are likely to be limited; thus so will be opportunities for re-employment.

278. The Mescalero economy is based on a variety of Tribal enterprises including two sawmills, a ski area, a casino, a hotel and convention center, and a tribal livestock enterprise. Recent drought conditions have severely impacted livestock and ski area operations. Because of the lack of snow, the ski area had to shorten its operating season for each of the past five years and the Mescalero Apache Cattle Growers, a tribal enterprise which once had as many as 6,000-7,000 head of cattle, is no longer in existence. Today there are approximately 500 head of cattle grazing on Mescalero lands. In addition, the Inn of the Mountain Gods Resort has been demolished and the Tribe is in the process of building a new resort facility, expected to be completed in 2005. When it was operating, the resort was the largest Tribal employer, with a workforce of 1,300 in 1998. In 1998, Casino Apache was the second largest employer, with 552 employees, followed by Ski Apache with 442 employees. Mescalero Forest Products (MFP) draws from 193,000 acres of timber lands containing 620 million board feet of commercial pine and fir. In 1998, MFP had 116 employees, directly accounting for four percent of jobs on the reservation.[173]

[173] Socioeconomic information provided by Thora Padilla, Resource Management & Protection, Mescalero Apache Tribe.

6.1.2 Potentially Affected Activities

279. Based on consultation records and conversations with the Service, BIA and Tribal staff, activities on the Mescalero Apache lands likely to be impacted by MSO conservation efforts include the following:

- Administrative activities;
- Timber harvest activities; and
- Other activities, including fire management and grazing.

The potential impacts on each of these activities is discussed in more detail below.

Administrative Costs

280. Prior to the final MSO listing, as early as 1990, the Mescalero were expending resources to prepare guidelines for management of the MSO on their lands.[174] Administrative costs include the opportunity costs related to using Tribal resources to prepare management plans, undertake owl surveys and monitoring, and undergo consultations with the Service.

281. The Mescalero Apache have prepared an MSO Management Plan. This plan was prepared in 1998, and BIA initiated consultation on the plan in September 2000.[175] The Service issued a final biological opinion on November 15, 2001. While the personnel and financial resources used to develop this plan have not been estimated, creation of the plan required a commitment of Tribal resources prior to 1998 and through 2001 when the Service issued its biological opinion. In addition, the Service's biological opinion included the following terms and conditions with which the Tribe complies:

- Restrictions on cutting and skidding and vehicle traffic from March 1 - June 1 within occupied PACs; and
- Limitations on vehicle traffic and vehicle speeds on unsurfaced logging roads in occupied PACs during breeding season.

282. BIA has indicated that most land management activities that occur on Mescalero lands proposed for critical habitat designation have a Federal nexus; however, there have been few consultations with the Mescalero for the MSO. The only formal consultation on

[174] Letter from Superintendent, Mescalero Agency, BIA to John Peterson, U.S. Fish and Wildlife Service, received April 25, 1990 (included in MSO Administrative record, XI.A.3.1).

[175] Memorandum to Field Supervisor, New Mexico Ecological Service Field Office, U.S. Fish and Wildlife Service, from Regional Director, Bureau of Indian Affairs, Southwest Region, dated September 19, 2000 re: Biological Assessment (BA), Mexican Spotted Owl Management Plan for Mescalero Apache Reservation.

record for the Mescalero is for its MSO Management Plan. In addition, there were several informal consultations regarding earlier drafts of the MSO plan and one informal consultation for a timber sale.[176] Much of the burden of consultation under section 7 falls on the Action agency, Mescalero Agency, BIA.

283. The Mescalero agency, BIA, estimates that the costs to the Tribe of managing for the MSO are approximately $100,000 annually. This figure includes the cost of doing surveys, follow-up, data management, labor costs, vehicle costs, some consultation and implementation and oversight of the MSO Management Plan. The Tribe surveys only when there is a project planned in an area. Costs of MSO surveys represents about $51,000 of these costs, however, with approximately $31,000 related to surveys for timber sales and $20,000 related to surveys for fuels reduction projects.[177]

Timber Harvest Impacts

284. The Mescalero have approximately 206,000 acres of accessible commercial timberland.[178] The allowable annual cut on the Mescalero Reservation is 16.8 MMBF.[179] This figure already takes into account the Tribe's set asides for wildlife; thus, this figure could be larger without the need to set aside areas for the MSO.

285. The Mescalero Apache Tribe has been managing for the MSO by surveying areas and avoiding timber harvest in occupied owl areas; these practices date back as early as 1988. Since at least 1998, when the Mescalero completed their MSO management plan, the Tribe has set aside PACs where timber harvest is not allowed. For each MSO discovered during surveys of areas where activity is planned, the Mescalero set aside 400 acres where activity is affected. In particular, MSO conservation efforts affect timber production as follows:

- Because MSO PACs are in more valuable timber areas, valuable areas are removed from production.
- Since hauling routes may have to change to avoid PACs, transportation costs are potentially increased.
- Since harvest may be affected by seasonal restrictions, production may be disrupted, resulting in added costs, especially in cases where they have short lead times to meet the needs of the mill.

286. To estimate the potential past impact of limiting timber harvest on the Mescalero Reservation, the following assumptions are made:

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[176] This refers to the Upper Tularosa timber sale in 1992 (Administrative record XI.A.3.4).

[177] Personal communication with John Andrews, BIA Mescalero Forestry, January 6 2004.

[178] 2001 Catalog of Forest Acres. Compiled by USDI, Bureau of Indian Affairs, Division of Forestry, Branch of Forest Resources Planning. September 30, 2001.

[179] Personal communication with Mescalero Apache Tribe, December 3, 2003.

- The Mescalero have set aside approximately two and a half PACs per year on average, each containing 400 acres.

- For each PAC, the analysis assumes that a 100 acre core area would not be available for timber harvest. In addition, in the remaining 300 acres, efforts taken to benefit the MSO likely result in a reduction in timber volume harvested equal to 25 percent, or 75 acres. Thus, the analysis assumes that 175 acres per year that would otherwise have been harvested are lost from production due to MSO conservation efforts.[180]

- Approximately 3,800 board feet of timber could be harvested per acre.[181]

- Timber harvest is converted to lumber production using a 1.3 conversion factor.[182]

- Average price for lumber production in the region during this time period is approximately $340/MBF.[183]

Based on these assumptions, the past impact of lost timber harvest would be approximately $735,000 per year. In addition, if the MSO is discovered after an area has been marked for cutting, then the effort spent on marking the timber is lost. These impacts are likely to continue as the Mescalero continue to survey their commercial timberlands in the future.

287. Mescalero Agency, BIA, indicated that the additional efforts related to additional section 7 consultation efforts and potential for delay in projects resulting from application of the adverse modification standard could greatly affect timber harvest on Mescalero Apache lands.[184] If critical habitat is designated, the Tribe believes it could significantly impact their ability to harvest timber, effectively shutting down their mill and affecting the surrounding regional economy as well. In its public comment, the BIA noted:

> "*The inclusion of tribal reservation lands, as critical habitat for the Mexican spotted owl would ultimately increase operational costs to harvesting operations, increase forest management administrative costs, and reduce the amount of available acreage for active sustainable forest management. These associated impacts would inevitably cause serious operational and business hardship on the MFP to a point where added to current economic challenges MFP is facing, may lead to the closing*

[180] Personal communication with John Andrews, Mescalero Agency, BIA, March 3, 2004.

[181] Ibid.

[182] Personal communication with Jimmy Bridge, General Manager, Mescalero Forest Products, February 13, 2004.

[183] Based on the average estimated wholesale value of lumber production in the four corners region for 1998-2002 taken from the 2002 Statistical Yearbook of the Western Lumber Industry, published by the Western Wood Products Association. Also, confirmed with Jimmy Bridge, General Manager, Mescalero Forest Products, February 13, 2004.

[184] Personal communication with Bill Hornsby, Mescalero Agency, BIA, February 27, 2004.

of the enterprise, thus affecting the regional economy and forest management treatments on the Reservation."[185]

288. Based on communication with the Mescalero Agency, BIA, it is likely that this rulemaking may result in additional consultation efforts and potential delays to timber projects that could affect the Mescalero's ability to harvest timber on their lands. This could in turn result in a reduced supply of timber of the Tribe's mills, which would then affect those operations. While the specific impacts of MSO conservation activities are not known with certainty, the following represents the best available information for estimating the upper-bound of potential impacts on Mescalero Apache timber harvesting activities resulting from MSO conservation activities. However, future impacts of MSO conservation will depend on the outcome of future consultations and on the level of operations and funding sources for operation of MFP mills and logging-related enterprises over the long term.

289. Mescalero Forest Products (MFP) is currently operating two sawmills. The Mescalero mill has been in operation since 1987, and the Alamogordo mill (formerly White Sands Forest Products) was purchased by the Tribe in April 2001. The Mescalero mill is designed to process 12-inch and larger logs, while the Alamogordo mill is designed for small-diameter logs (12-inch and smaller). The Mescalero mill requires 14 MMBF per year, and mill requirements for the Alamogordo mill are 15-16 MMBF per year[186]. Gross revenue for both mills combined is $5 million annually. The mills have been operating at a loss for the past two years, however, with a combined net loss of approximately $1.4 million in 2003. The Mescalero mill employs about 80 Tribal members, while the Alamogordo mill employees about 80 non-Tribal members. Each mill has a payroll of approximately $1.8 million.[187]

290. In addition to MFP, the Mescalero Apache Tribe oversees a Purchaser Payment program that is highly dependent on logging projects. The Tribe requires these payments from the timber (e.g., the mill) to fund logging follow-up work. Under purchaser payments, the Tribe issues contracts to individual Tribal members. Purchaser payments fund projects including reforestation, grass seeding of skid trails and landings, burning of landing slash piles, control of invasive weeds in burnt landings, and forest stand improvement (pre-commercial thinning). Prior to listing of the MSO, these payments were as high as $600,000 to 700,000 per year. For FY 2001 to FY 2003, an average of $242,000 was collected each year. The Tribe issues from 12 to 35 contracts per year, depending on the amount of funding available. The size of contracts varies, and contractors (individual Tribal members) are paid on a per acre basis, averaging $100 to $150 per acre.[188]

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[185] Letter from Sheldon Kipp, Acting Regional Director, BIA Southwestern Region, to Joy Nicholopoulos, U.S. Fish and Wildlife Service, received December 29, 2003.

[186] Personal communication with Mescalero Apache Tribe, December 3, 2003.

[187] Email communication from Thora Padilla, Resource Management & Protection, Mescalero Apache Tribe, January 2, 2004.

[188] Email communication from Thora Padilla, Resource Management & Protection, Mescalero Apache Tribe, January 5, 2004.

Impacts on Other Activities

291. In addition to timber harvest, several other activities occur in the areas proposed for MSO critical habitat on the Mescalero Reservation including fire management (e.g., fuels reduction and thinning), grazing, gathering, and recreation. These activities are not expected to be impacted significantly by MSO conservation efforts or designation of critical habitat. In particular, there are no Federal nexuses associated with recreation and gathering activities.

292. With regard to fire management, these programs are under BIA responsibility and thus may be somewhat limited by MSO protection efforts. If the areas that can be treated are limited, it could impact funding opportunities from the USFS for forest health activities. In addition, the Tribe's thinning projects benefit surrounding communities by recharging springs and aquifers. If thinning were limited, recharge could be reduced.[189]

293. The Tribe is currently considering its options with regard to raising livestock. The numbers of cattle grazing on the reservation have been drastically reduced because of drought. In 2003, the Tribe bought the remaining assets of the Mescalero Cattle Growers Association, which went out of business. They have recently put out bids for a rangeland survey, reservation-wide. Because there is an increasing market for the type of cattle produced by the Tribe (i.e., natural "hormone-free" beef), there is some potential that the Tribe will again pursue livestock as a revenue-producing enterprise.[190]

6.2 Navajo Nation

294. The Navajo Reservation is the largest Indian reservation in the United States, encompassing more than 16.2 million acres in northeast Arizona, northwest New Mexico and southeast Utah. Approximately 1.0 million acres of Navajo land is included in the proposed MSO critical habitat designation. The following discussion provides background information on the Navajo Nation and estimates potential impacts on the Navajo Nation due to MSO conservation efforts.

6.2.1 Navajo Nation Socioeconomic Status

295. Based on the U.S. Census, the Navajo Nation population was 180,462 in 2000. As shown in Exhibit 6-2, a quarter of the Tribe's labor force was unemployed in 2000, with an unemployment rate of 25.1 percent (which may be severely understated, according to the Navajo Division of Economic Development).[191] This unemployment rate is nearly five times

[189] Personal communication with Mescalero Apache Tribe, December 3, 2003. Also, public comment by the City of Alamogordo, dated December 17, 2003.

[190] Personal communication with Mescalero Apache Tribe, December 3, 2003.

[191] The Navajo Division of Economic Development conducts an annual survey of employers on the Navajo Nation. Based on this survey and on assumptions about the reasonable size of the labor force, the Division concludes that true unemployment could be as high as 65 percent. 2002-2003 Comprehensive Economic Development Strategy. Prepared by Trib Choudhary, Support Services Department, Division of Economic Development, The Navajo Nation.

the average rate in any of the surrounding states, where rates range from 5.0 to 7.6 percent. Navajo Nation per capita income was $7,269 in 2000, less than half that of any of the three states in which the tribal lands fall. In addition, the poverty rate on the Navajo reservation is approximately 43 percent, compared with rates between nine and 18 percent in the three surrounding states. These factors illustrate the economic vulnerability of the Navajo Nation to any additional economic impact.

Exhibit 6-2

2000 SOCIOECONOMIC INFORMATION NAVAJO NATION

Area	Unemployment Rate	Per Capita Income	Poverty Rate[1]	Education Attainment[2]	Population Density[3]
USA	4.2%	$21,587	12.4%	15.1%	79.8
Arizona	5.6%	$20,275	13.9%	15.2%	45.2
New Mexico	7.3%	$17,261	18.4%	13.6%	15.0
Utah	5.0%	$18,185	9.4%	17.9%	27.2
Apache County, AZ	13.0%	$8,986	37.8%	7.3%	6.2
Cococino County, AZ	5.8%	$17,139	18.2%	18.7%	6.2
Navajo County, NM	11.6%	$11,609	29.5%	7.4%	9.8
McKinley County, NM	7.2%	$9,872	36.1%	6.6%	13.7
San Juan County, NM	7.2%	$14,282	21.5%	8.8%	20.6
Navajo Nation	25.1%	$7,269	42.9%	4.7%	6.7

Notes:
(1) Poverty rate represents the percent of families or individuals below the applicable poverty threshold level. Poverty thresholds are the same for all parts of the country, but vary depending on the applicable family size, age of householder, and number of related children under 18. Poverty thresholds are shown at http://www.census.gov/hhes/poverty/threshld/thresh99.html.
(2) Educational Attainment indicates percent of population ages 25 and over that hold a Bachelors degree or higher.
(3) Population density on Tribal lands is based on 1992-93 information.
Source: U.S. Census Bureau, Census 2000 and Bureau of Labor Statistics. Population density from Tillers Guide to Indian County, Economic Profiles of American Indian Reservations and Census QuickFacts for US, States, etc.

296. In addition, it is useful to compare the population density on the Navajo Reservation with other areas (Exhibit 6-2). Within the Navajo Nation, the population density is 6.7 persons per square mile, as compared to between 15 and 45 persons per square mile overall in Arizona, New Mexico, and Utah. Population density is considered an indicator of employment opportunities. Employment opportunities on reservation lands, as in rural areas generally, are likely to be limited; thus, opportunities for re-employment will also be limited.

297. The Navajo Nation economy is based on a combination of private and Tribal enterprises. While the largest employers are the Tribal and State governments, the Service sector has the most employment (46 percent of total), including all the schools, hospitals, and hotels. The sector with the largest gross receipts is the mining sector. In 2002 to 2003, royalties and taxes paid by the mining corporations accounted for more than $60 million, roughly 60 percent of the total general fund budget of the Navajo Nation. The Navajo

Nation operates a variety of Tribal enterprises. One of the largest is the Navajo Agricultural Products Industries. Others include a shopping center, housing authority, hospitality enterprise, a utility, an engineering and construction authority, an oil and gas company, radio station, newspaper, an arts and crafts enterprise, and a power generation project. Private employers on the Navajo Nation include a few manufacturing companies, two power plants, a generating station, and several mining operations.[192]

6.2.2 Potentially Affected Activities

298. Based on consultation records and conversations with the Service, BIA and Tribal personnel, impacts to Navajo Nation activities occurring in areas proposed for critical habitat designation include the following:

- Administrative efforts for complying with the Act and preparing an MSO management plan;
- Timber harvest;
- Fire management activities;
- Coal mining activities;
- Project modifications; and
- Other activities.

Each of these activities is discussed in more detail below.

Administrative Costs

299. The Navajo Nation has prepared an MSO Management Plan. The Navajo Nation approved this plan in October 2000 and the Service reviewed the document in early 2001. Formal consultation was initiated for this plan in 2003, and a draft biological opinion has been provided to the BIA and the Navajo Nation. The plan follows nearly all of the recommendations of the MSO Recovery Plan, with the exception of grazing and recreation recommendations since these activities are unregulated on the Navajo Nation.

300. The financial resources required to complete the Navajo Nation MSO Management Plan have been estimated to cost approximately $120,000 for MSO surveys and $7,500 for creation and approval of the plan.[193] This required a commitment of Navajo Nation resources that could have been otherwise been applied to other activities.

[192] 2002-2003 Comprehensive Economic Development Strategy. Prepared by Trib Choudhary, Support Services Department, Division of Economic Development, The Navajo Nation.

[193] Email communication from Jeff Cole, Navajo Fish and Wildlife Department, Navajo Nation, March 2, 2004.

301. The BIA has consulted with the Service 13 times over the past 10 years for various activities on Navajo Nation lands. This includes three formal consultations and 10 informal consultations. In addition, the BIA is currently consulting with the Service on the Navajo Forest Management Plan.

302. BIA expects to undergo several large-scale consultations with the Service in the near future for various management plans, including continuing consultation on the Navajo Forest Management Plan, initiation of consultation for the Navajo MSO Management Plan, and the Navajo Nation Fire Management Plan.

Timber Harvest Impacts

303. The Navajo Nation has approximately 390,000 acres of accessible commercial timberland.[194] All timber sales on the Navajo Nation were halted in 1994 under a lawsuit filed by the Navajo environmental group, Diné Care, until a Forest Management Plan was completed. The Navajo Nation's forest management plan is still undergoing review by the BIA. The Service is also completing a formal consultation on the plan. It is unclear when the plan will be finalized. Currently the only activities occurring on the Navajo forests are related to fire management. Under a settlement in the Diné Care lawsuit, every project must be approved by the Arizona Federal District Court.

304. The Navajo Nation operated a sawmill, Navajo Forest Products Industries (NFPI), which was closed in July 1994. In 1992, this mill had a work force of 265, with an additional 200 employees working for various logging contractors of NFPI. In 1992, the NFPI supported an annual payroll of $6.9 million and had sales revenues of $21.7 million.[195] The mill closure was likely due to a variety of factors, including cessation of timber harvest on Navajo Nation lands (as discussed above), as well as financial mismanagement.[196] The mill attempted to remain open by purchasing timber from outside sources, but doing so was not feasible.[197] The mill closure had a significant impact on the Navajo Nation, and in particular on the community where the mill was located (Navajo, New Mexico) where the mill accounted for approximately 40 percent of employment in 1993.[198]

305. The Navajo Nation has indicated that once their Forest Management Plan is approved and the injunction on timber harvest is dropped, the first timber sale that will occur is the

[194] 2001 Catalog of Forest Acres. Compiled by USDI, Bureau of Indian Affairs, Division of Forestry, Branch of Forest Resources Planning. September 30, 2001.

[195] Economic Impact of Designating Critical Habitat For Mexican Spotted Owl (4/11/95). Provided by Trib Choudhary, Division of Economic Development, Navajo Nation.

[196] Letter from Bruce Baizel, Legal Counsel for Dine Care, to Field Supervisor, New Mexico Ecological Services Field Office, dated April 23, 2004.

[197] Letter from Albert Hale, President, Navajo Nation, to Earl Eckstrand, NBS, MESC, dated May 2, 1995 (Included in MSO Administrative Record XI.A.4.17).

[198] Economic Impact of Designating Critical Habitat For Mexican Spotted Owl (4/11/95). Provided by Trib Choudhary, Division of Economic Development, Navajo Nation.

Toh-ni-Tsa sale. This sale has been consulted on with the Service in the past, and has undergone several revisions. It is a large sale, and Navajo Nation forestry personnel estimate that it has the potential to create as many as 62 jobs and as much as $1 million in stumpage fees, depending on market values at the time.[199]

306. In addition, the Navajo Nation has recently funded a feasibility study for a small diameter mill on the Navajo Nation. The Navajo Nation is currently reviewing the results of that study.[200]

Fire Management Impacts

307. Fire management activities on the Navajo Nation are undertaken primarily by BIA forestry division. The MSO has caused impacts to fire management activities on Navajo lands because of the following:

- Survey requirements often force delay of treatment projects because they are currently on about a one-year planning horizon for these types of projects.

- Delays to treatment projects may have resulted in a loss of funding from the National Interagency Fire Center. This can have two impacts: first they may lose immediate funding because an activity cannot occur in time; and second, they lose future funding if they are unable to show a successful track record.

Coal Mining Impacts

308. Peabody Coal Mining operations, which are located within the proposed MSO critical habitat, employed a total of 690 people (590 Navajo and 100 non-Navajo) with total annual salary and benefits of $57 million.[201] The Navajo Nation leases land within the proposed critical habitat designation to Peabody for its coal mining operations. The initial environmental impact statement for this project was finalized in 1990, prior to the listing of the MSO. Peabody performs surveying and monitoring for the MSO. The mining operations avoid any owl habitat, so no impacts to these operations are expected beyond administrative efforts of the private company to comply with regulations.[202]

309. The U.S. Office of Surface Mining consulted with the Service once, informally, in 1997 regarding a permit for the Kayenta mining operations.[203]

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[199] Personal communication with Navajo Nation, December 8, 2003.

[200] Personal communication with Trib Choudhary, January 28, 2004.

[201] 2002-2003 Comprehensive Economic Development Strategy. Prepared by Trib Choudhary, Support Services Department, Division of Economic Development, The Navajo Nation.

[202] Personal communication with John Stucker, Navajo Minerals Department, December 8, 2003.

[203] MSO Administrative record XI.C.64.

310. There are reports that Peabody may close as soon as 2005 because of issues regarding water rights and the potential closure of the Mojave Generating Station, which receives five million tons of coal slurry annually from the Peabody Black Mesa Mine. If it occurs, this closure would significantly worsen the economy in the Navajo Nation.[204]

Project Modifications

311. The BIA have consulted with the Service for MSO on a variety of activities on Navajo lands in addition to those discussed above. Either in the process of planning these projects, or as a result of these consultations, the Navajo Nation have made modifications to projects in order to protect the MSO. Exhibit 6-3 summarizes these project modifications. No costs have been estimated; however, the need to modify activities likely represents some level of impact on Navajo resources.

Exhibit 6-3

SUMMARY OF PROJECT MODIFICATIONS

Project Description (Date of Service concurrence)	**Recommended Project Modifications***
Timber sale in the Chuska Mountains (1992)	- Avoid core areas- Perform additional surveys
Yale Point Radio Tower Project (1995)	- Perform construction outside of breeding season - Design modifications for raptor protection
Navajo Tribal Utility Authority (NTUA) Powerline Extensions - Barney Tap, Mullahan Tap, Black Rock (1996)	- Perform construction outside of breeding season - Design modifications for raptor protection
NTUA 115 KV Electric Transmission Line (1996)	- Perform construction outside of breeding season - Design modifications for raptor protection
Navajo Abandoned Mine Reclamation - Monument Valley #3 AML Project (1996)	- Perform additional surveys
Navajo Route B13 (sections 7 and 8) (1997)	- Perform construction outside of breeding season - Limit construction within PACs- Perform additional surveys - Changes to planned construction of turnout
Roof Butte wildfire (1997)	- Avoid unnecessary overhead flights - Avoid unnecessary disturbance to vegetation along canyon rims - Minimize vegetation disturbance and removal within PACs
Navajo NB64 Road Construction (2000)	- Construction restricted during breeding season - No mixed conifer removed from right-of-way - Additional surveys conducted

* These represent measures suggested by the Navajo Fish and Wildlife Division and concurred with by the Service.
Source: Consultation records included in the MSO Administrative Record.

Impacts on Other Activities

312. In addition to timber harvest, several other activities occur in the areas proposed for MSO critical habitat on the Navajo Nation. These include abandoned mine reclamation, grazing, and recreation. These activities are not expected to be impacted to a large degree by MSO conservation activities.

[204] "Jobs, revenue, water at stake in Mohave power plan talks," Navajo Times article, December 4, 2003.

313. BIA and the Navajo Nation have involvement in issuing permits for grazing on the Navajo Reservation. Grazing is currently managed under the Navajo Department of Agriculture. The Tribe is currently considering a proposed rule that would give jurisdiction to the Forestry department to manage grazing activities. This rule has been tabled until it can go to a referendum.[205] In addition, Navajo Fish and Wildlife have recently developed an Interim Grazing Policy for MSO habitat.[206]

314. Recreation occurs mainly on the two national monuments within the Navajo Nation. Impacts to activities in these monuments is discussed in Section 7. There is, however, some potential for limitation on trail development in owl habitat in the future. Each of the 110 Chapters on the Navajo Nation is putting together its own land use management plan. It is expected that some of these plans may include development of hiking trails and camping facilities. Navajo Fish and Wildlife assisted the Chapters in preparing these plans by providing maps illustrating:

- Areas of concern for endangered species;
- Areas suitable for recreation; and
- Areas suitable for home sites, etc.

6.3 San Carlos Apache

315. The San Carlos Apache Reservation encompasses over 1.8 million acres in southeast Arizona. Approximately 146,500 acres of San Carlos Apache land is included in the proposed MSO critical habitat designation. The following discussion provides background information on the San Carlos Apache and estimates impacts on the San Carlos Apache due to MSO conservation efforts.

6.3.1 San Carlos Apache Socioeconomic Status

316. Based on the U.S. Census, the San Carlos Apache population was 9,385 in 2000. As shown in Exhibit 6-4, more than a third of the Tribe's labor force was unemployed in 2000, with an unemployment rate of 35 percent, which may be severely understated according to the Tribe's planning department.[207] This rate is almost seven times the rate for the state of Arizona. San Carlos Apache per capita income was $5,200 in 2000, or a fifth of the Arizona average. In addition, the poverty rate on the San Carlos Apache reservation is 48 percent

[205] Personal communication with Navajo Nation, December 8, 2003.

[206] Email communication from Jeff Cole, Navajo Nation Department of Fish and Wildlife, March 2, 2004 and email communication from Norma Cady, Planner for Navajo Nation Department of Agriculture and Department of Natural Resources, March 24, 2004.

[207] Discussions with the San Carlos Planning Department indicate that the unemployment rate may reach 74 percent depending on the season, based on enrollment numbers from their aid programs.

and less than two percent of the population over 25 have a bachelors degree. These factors illustrate the economic vulnerability of the San Carlos Apache to any additional economic impact.

Exhibit 6-4

2000 SOCIOECONOMIC INFORMATION - SAN CARLOS APACHE TRIBE

Area	Unemployment Rate	Per Capita Income	Poverty Rate[1]	Education Attainment[2]	Population Density[3]
USA	4.2%	$21,587	12.4%	15.1%	79.8
Arizona	5.6%	$20,275	13.9%	15.2%	45.2
Gila County, AZ	5.9%	$16,315	17.4%	8.5%	17.4
Graham County, AZ	6.7%	$12,139	2.0%	6.4%	23.0
San Carlos Apache, AZ	35.4%	$5,200	48.2%	1.4%	3.2

Notes:
(1) Poverty rate represents the percent of families or individuals below the applicable poverty threshold level. Poverty thresholds are the same for all parts of the country, but vary depending on the applicable family size, age of householder, and number of related children under 18. Poverty thresholds are shown at http://www.census.gov/hhes/poverty/threshld/thresh99.html.
(2) Educational Attainment indicates percent of population ages 25 and over that hold a Bachelors degree or higher.
(3) Population density on Tribal lands is based on 1992-93 information.
Source: U.S. Census Bureau, Census 2000 and Bureau of Labor Statistics. Population density from Tillers Guide to Indian County, Economic Profiles of American Indian Reservations and Census QuickFacts for US, States, etc.

317. In addition, it is useful to compare the population density on the San Carlos Apache Reservation with other areas. Within the San Carlos Apache Reservation, the population density is 3.2 persons per square mile, as compared to 45.2 in Arizona, 15 in New Mexico, 27.2 in Utah, and 79.8 in the U.S. Population density is considered an indicator of employment opportunities. Employment opportunities on reservation lands, as in rural areas generally, are likely to be limited; thus, opportunities for re-employment are limited.

318. The San Carlos Apache Tribe's economy includes cattle operations, forestry, a small service sector, and tourism and recreation. The Tribe has five cattle associations and operates two Tribal ranches. Livestock numbers have decreased recently due to a variety of factors. The San Carlos Apache operated the Cutter sawmill outside of Globe, Arizona, but in 2000 the mill was leased to a private company, Precision Pine.

6.3.2 Activities Potentially Impacted by MSO Conservation

319. Based on consultation records and conversations with the Service, BIA and Tribal staff, past and ongoing impacts to San Carlos Apache activities related to MSO conservation efforts include the following:

- Administrative costs of complying with the Act and preparing an MSO management plan;

- Limitations on timber harvest; and
- Limitations on fire management activities.

Each of these activities is discussed in more detail below.

Administrative Costs

320. In 2003, the San Carlos completed their MSO Management Plan. The plan expands upon the Tribes "Mexican Spotted Owl Conservation Plan for the Malay Gap Forest Management Unit" which underwent informal consultation with the Service in 1995. The Tribe provided a redacted version of this plan to the Service in November 2003. In addition, the Tribe has recently drafted a Forest Management Plan and a Fire Management Plan, both of which have sections addressing the MSO.

321. The San Carlos Apache Tribe have consulted informally with the Service less than 10 times with regard to the MSO over the past 10 years. Consultations with the Service involve a commitment of the Tribe's limited resources.

322. The Tribe has surveyed its forest management units for MSO. In addition, the San Carlos Apache Tribe conducts continuous forest inventory, where they are inventorying for stand structure and fuels management, information integral to MSO management.

323. Surveying for owls, preparation of management plans and consulting with the Service utilizes the Tribe's limited resources, as the Tribe does not have any additional funds to deal with endangered species issues. The Tribe estimates that, on average, approximately $25,000 per year has been spent in staff time and other resources on MSO issues over the past 10 years. Over the past four years, the tribe has also had a consultant working on MSO issues, doing surveys and preparing the management plan, at an additional cost of approximately $18,000.[208]

324. The San Carlos Apache are in the process of preparing a statement of relationship agreement with the Service. In addition, the Tribe is in the process of determining what level of consultation will occur for their MSO Management Plan, Forest Management Plan and Fire Management Plan. Most likely, the Tribe will undergo a programmatic consultation for all types of projects to occur in MSO habitat. The Tribe expects that this could result in greater up-front administrative costs, but will allow them to shift funding to field work in the future rather than incurring costs for consulting on individual projects. The expected cost to the Tribe for this consultation effort is $30,000 to $50,000 over a one-year period. As part of the terms and conditions for the consultation, the Tribe expects to increase spending on monitoring and surveying to ensure that they are meeting threshold conditions for their lands. These costs will likely be in the range of $50,000 per year. This figure does not

[208] Personal communication with Craig Wilcox, Forest Manager, Tribal Forestry Program, San Carlos Apache Tribe, February 5, 2004.

include potentially significant costs for meeting standards that could potentially required as a result of the consultation, such as treating wildfire in owl habitat.[209]

325. The Tribe estimates that the critical habitat designation would not add much time to their administrative efforts since they are already managing for the MSO. Because all MSO habitat is mapped and currently managed under the guidelines of the Recovery Plan, the San Carlos Apache Tribe believe that the CHD would result in little extra administrative effort to address critical habitat in biological evaluations.[210]

Timber Harvest Impacts

326. The San Carlos have approximately 55,120 acres of accessible commercial timberland.[211] Currently, all of their operable timber harvest areas are on slopes less than 40 percent. There is not much overlap between suitable MSO habitat and commercial timberland; only about 10 percent of owl habitat is considered to be commercial timberlands. In the MSO Management Plan, the Tribe specifies that "the vast majority" of owl habitat "is in areas considered inoperable for mechanized treatments."[212] In 1995, the Tribe estimated the amount of owl habitat considered as commercial forest, including 415 acres of nesting/roosting habitat and 3,766 acres of foraging habitat.[213] The MSO Conservation Plan states: "Since the listing of the owl, MSO habitat has been generally deferred from harvests."[214] Therefore, approximately eight percent of commercial timberland has been set aside as a result of MSO conservation activities. While the specific impacts have not been quantified, the overlap of owl habitat into commercial areas has potentially impacted timber harvest activity in these areas.

327. The San Carlos Apache Tribe operated the Cutter sawmill outside of Globe, Arizona, until 2000. Since then, the mill has been leased to a private company, Precision Pine of Heber, Arizona. The mill is a traditional operation that produces recovery grade products from large diameter trees. It is a small operation, employing only 20 to 30 people. The Tribe decided to lease its mill operations for a variety of reasons including:

- The belief that government is not suited to run private enterprise. A private entity has more industry experience and is more suited to deal with liability issues. Also,

[209] Ibid.

[210] Email communication from San Carlos Apache Tribe, March 2, 2004.

[211] 2001 Catalog of Forest Acres. Compiled by USDI, Bureau of Indian Affairs, Division of Forestry, Branch of Forest Resources Planning. September 30, 2001.

[212] Mexican Spotted Owl Conservation Plan for the San Carlos Apache Indian Reservation. November 2003. Redacted copy.

[213] Public comment of San Carlos Apache Tribe 1995. Letter from Raymond Stanley, Chairman, San Carlos Apache Tribe to Jennifer Fowler-Propst, State Supervisor, New Mexico Ecological Services State Office, dated March 10, 1995.

[214] Mexican Spotted Owl Conservation Plan for the San Carlos Apache Indian Reservation. November 2003. Redacted copy, page 8.

Precision Pine has another mill in Eagar, Arizona, and may be able to capitalize on some synergies to operate the mill more efficiently.

- The Tribe is no longer responsible for supplying operating capital; this is now the private contractor's responsibility. The mill's equipment dating from the 1960's is reaching obsolescence and needs upgrades. For example, the mill closed in 2003 from April until June for maintenance needs.

- A private partnership makes it easier to get loans and grants.

328. The San Carlos Apache Tribe have proposed upgrading the mill to use the available harvest of small diameter trees. A consultant has studied the proposal and determined that this would be a profitable enterprise for the Tribe. This proposal would require a substantial investment by the Tribe. Currently the mill utilizes 4.4 MMBF of salvaged logs annually.[215] The annual allowable cut on the San Carlos lands is 5.3 MMBF.[216] In the future, depending on the option chosen, the mill could utilize up to 13.6 MMBF annually. A redesigned mill could provide more of a market for smaller diameter logs cut during thinning treatments, providing a tool for fuels management. Without the mill, transportation costs would likely make selling this timber uneconomical. A grant proposal that would have funded the first phase of this project has recently been denied; the Tribe is considering whether to reapply and is studying other options. However, USFS did provide funding ($70,000) for a new resaw system; this system will improve productivity of the mill.[217]

329. Any further reduction in timber availability from nearby NFs has the potential to affect the San Carlos Apache Tribe's mill operation. The mill has historically gotten some supply from the Tonto NF However, two recent sales purchased by the Tribe were of such small diameter timber that they proved uneconomical. If the mill is expanded to process smaller logs, timber from the NF could make the proposed mill more profitable by allowing it more management flexibility.[218]

Other Potentially Affected Activities

330. Fire management and forest health activities on the San Carlos Apache lands are undertaken by BIA and the Tribe (under Public Law 93-638). The Tribe has not experienced any large impacts to these activities in the past. However, if the level of fuels were reduced to a level that would permit prescribed burns, the Tribe believes they could be impacted by a restriction on burning during the MSO breeding season (March - August).

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[215] Beck Group. 2003. San Carlos Apache Tribe, San Carlos, Arizona, Small Log Development Project, Draft. Project Report July.

[216] San Carlos Apache Tribe Forest Management Plan. Draft. Planning Period January 1, 2003 – December 31, 2015. October 2003.

[217] Personal communication with Craig Wilcox, Forest Manager, Tribal Forestry Program, San Carlos Apache Tribe, February 5, 2004.

[218] Ibid.

331. Recreation in owl habitat is addressed in the San Carlos MSO Conservation Plan and primarily consists of dispersed hunting and fishing. These activities are not likely to be affected by MSO conservation activities because these activities do not have any Federal nexuses associated with them.

6.4 Summary of Potential Impacts to Tribal Activities

332. As the socioeconomic statistics provided in this section demonstrate, the three Tribes with lands proposed for inclusion in MSO critical habitat are in substantially more vulnerable economic positions than their surrounding communities or states. Unemployment on these Tribal lands is significantly higher than in surrounding areas; any lost jobs on these Reservations would likely not be replaced by employment opportunities in other economic sectors.

333. While specific impacts of MSO conservation efforts are not quantified, designation of critical habitat and continued efforts to protect the MSO may impact timber harvest, which could affect all three Tribes in the future. In particular, for the Mescalero and the San Carlos, both of which are actively managing their lands for commercial timber harvest and have interests in operating sawmills, any reduction in timber harvest could result in fewer jobs and revenues for the Tribes. While the Navajo are not currently able to undertake commercial timber operations, the Tribe has indicated its intention to continue these types of efforts once the current injunction is lifted.

334. In addition to timber, grazing, and fire management, other economic activities have the potential to adversely affect the MSO and its habitat. These activities include recreation, oil and gas development, mining, and military activities. Specific actions consulted on in the past have included management plans, utilities construction and maintenance, road construction and maintenance, resource conservation and restoration, facilities construction, and land exchanges.

335. This section describes impacts of MSO conservation on these activities and provides information on potential future impacts. For the most part, the impacts to these activities resulting from MSO protection efforts have been related to section 7 consultation efforts and related project modifications. Therefore, this analysis focuses on the costs of past consultations and project modifications. With the exception of oil and gas activities, future impacts on these activities are likely to be similar to past impacts, as CHD is not anticipated to change the frequency of consultations on these activities or the types of project modifications recommended by the Service. However, as discussed below, oil and gas activities in MSO CHD in Utah are expected to increase significantly in the future. Therefore, the oil and gas section includes estimates of increased future impacts, including a regional economic impact analysis of potential delays to oil and gas activities resulting from future MSO conservation activities.

7.1 Impacts to Recreational Activities

336. Recreational activities potentially impacted by MSO conservation activities include trail construction and repair and the construction and rehabilitation of recreational facilities including campgrounds, trail heads, ski resort projects, and overlook points. Agencies engaging in recreational related activities include the USFS, BLM, and NPS. Since listing, the Service has engaged in approximately 15 formal and 90 informal consultations on recreational activities that have the potential to adversely impact the MSO.

337. In the 1996 Amendments to the USFS Region 3 LRMPs, USFS states that in PACs, forests should "generally allow continuation of the level of recreation activities that was

occurring prior to listing."[219] The USFS has engaged in 13 formal and 80 informal consultations on recreational activities and potential impacts to the MSO, clearly dominating the consultation history. Although consultations have been frequent, project modifications have been minor and have included conducting surveys, monitoring to determine the impact of recreational activities, and initiating educational programs on the MSO. This outcome is not surprising given the regional guidance that recreational activities continue as they did prior to listing. Because there is no reason to believe that USFS will change its policy, future impacts of MSO conservation activities on recreational activities are likely to be similar to past impacts.

338. Staff at the National Parks and Monuments that contain proposed CHD do not anticipate changes to recreational activities as a result of MSO conservation activities. Parks and monuments typically survey and monitor for the MSO on an annual basis and, where possible, avoid projects in areas where the MSO is present. Moreover, some parks do not anticipate recreational activities that require conservation measures for MSO (e.g., Canyonlands National Park).[220] For parks that anticipate future activities in MSO CHD, rates are anticipated to be similar to past levels. Estimates for implementing measures to minimize impacts to the MSO include $500 to $21,000 per year for surveys, monitoring, and public outreach measures.[221]

7.2 Impacts to Oil and Gas Development

339. There were approximately 89,000 active oil and gas wells in the four-state area encompassing the proposed CHD in 2002. This number has increased over the past 10 years, largely driven by an increase in the number of gas-producing wells in Colorado and New Mexico in the late 1990's. Exhibit 7-1 shows the number of producing wells by State for the years 1993 through 2002.

[219] Record of Decision for Amendments of Forest Plans: Arizona and New Mexico, Southwestern Region, USFS, 1996, page 88.

[220] Personal communication with Canyonlands NP, February 10, 2004.

[221] Personal communication with Zion NP, Saguaro NM, Coronado NM, Bandelier, Canyonlands NP, Glen Canyon NP, February 2004.

Exhibit 7-1

PRODUCING OIL AND GAS WELLS IN FOUR-STATE AREA (1993 – 2002)

	Gas Wells					Oil Wells					
Year	**AZ**	**CO**	**NM**	**UT**	**Total**	**AZ**	**CO**	**NM**	**UT**	**Total**	**TOTAL**
1993	6	6,372	20,846	1,061	28,285	27	5,900	17,188	2,004	25,119	53,404
1994	6	7,056	23,292	1,303	31,657	27	5,785	17,127	1,983	24,922	56,579
1995	7	7,017	23,510	1,127	31,661	28	5,648	17,285	2,029	24,990	56,651
1996	7	8,251	24,134	1,339	33,731	31	5,195	17,613	2,132	24,971	58,702
1997	8	12,433	27,421	1,475	41,337	34	5,230	17,930	2,205	25,399	66,736
1998	8	13,838	28,200	1,643	43,689	35	4,931	17,906	2,165	25,037	68,726
1999	8	13,838	26,007	1,978	41,831	36	4,325	17,405	2,116	23,882	65,713
2000	9	22,442	33,948	4,178	60,577	*31*	*4,764*	*17,629*	*2,053*	*24,477*	*73,464*
2001	8	22,112	35,217	4,601	61,938	*25*	*5,204*	*17,852*	*1,990*	*25,071*	*81,215*
2002	*8*	*21,782*	*36,486*	*5,024*	*63,300*	20	5,643	18,076	1,927	25,666	*88,966*

Source: U.S. Energy Information Administration (EIA), accessed at http://www.eia.doe.gov. Numbers shown in *italics* are IEc estimates.

340. The importance of oil and gas production in the economies of the four-State area varies considerably by State. Exhibit 7-2 shows comparative industry data from 1997 (the most recent year for which comprehensive statistics are available). These data indicate that while oil and gas production is not a large industry in Arizona, it is in the other three States. This conclusion is particularly true in New Mexico, which ranks among the top 10 States in terms of production volume and number of wells drilled for both oil and gas.

341. The remainder of this section discusses existing oil and gas activities in the proposed designation, and then analyzes potential past and future impacts to these activities.

Exhibit 7-2

COMPARATIVE OIL AND GAS INDUSTRY STATISTICS (1997)

	Arizona	Colorado	New Mexico	Utah
State Rank *(See Note 1)*				
Oil production	31	11	8	13
Natural gas production	29	8	5	11
Oil wells drilled	NA	17	3	10
Natural gas wells drilled	NA	6	10	15
Production				
Crude oil produced (BBLS)	82,000	25,616,000	69,835,000	19,317,000
Natural gas produced (MMCF)	461	595,647	1,497,069	257,139
Oil wells drilled	-	59	694	209
Gas wells drilled	-	575	379	153
Dry wells drilled	3	126	116	26
Service wells drilled	-	-	26	35
Average cost to drill one well	$ 5,000	$ 242,773	$ 426,681	$ 453,493
Employment				
Oil and gas extraction	122	7,781	10,011	2,305
Refining	NA	544	694	968
Transportation	1,748	2,394	1,499	2,356
Wholesale	1,561	2,340	1,446	871
Retail	10,387	11,230	5,998	7,614
Total	13,818	24,289	19,648	14,114
Taxes				
State severance taxes	$ 5,578,707	$ 18,688,357	$ 372,600,000	$ 17,217,291
Federal oil & gas royalties	$ -	$ 60,450,817	$ 268,515,330	$ 58,802,334

Note 1: State ranks are relative to the 33 states with active oil and gas production.
Source: Independent Petroleum Association of American (IPAA), accessed at http://www.ipaa.org/info/econreports/StateInformation.asp.

7.2.1 Oil and Gas Production in the Proposed CHD

342. Of the four States included in the proposed CHD, only New Mexico and Utah have actively producing oil and gas wells within the proposed CHD. Specifically, of the 235 active or recently-active wells located within the proposed CHD, 207 are spread across four critical habitat units in New Mexico (SRM-NM-10, -11, -12 and -13), all of which are in Rio Arriba County; and 28 are concentrated in small perimeter/corner areas in three proposed critical habitat units in Utah, in Garfield County (along the northeastern edge of CP-12), San Juan County (on the northernmost tip of CP-14) and Carbon County (in a northwestern section of CP-15). There were no active wells identified within the proposed designations in Arizona or Colorado. Furthermore, in Pike and San Isabel NF in Colorado, there was only one oil lease within the proposed CHD in the last 10 years.[222] Exhibit 7-3 below summarizes

[222] Personal communication with Pike-San Isabel NF, January 21, 2004.

the location and type of all the active or recently active oil and gas wells identified within the proposed CHD.

Exhibit 7-3

ACTIVE WELL LOCATIONS WITHIN PROPOSED CHD

Location	County	Well Type	# Wells
New Mexico:			
SRM-NM-10	Rio Arriba	Oil	16
SRM-NM-11	Rio Arriba	Gas	81
SRM-NM-12	Rio Arriba	Gas	64
SRM-NM-13	Rio Arriba	Gas	46
Utah:			
CP-12	Garfield	Oil	10
CP-14	San Juan	Oil	5
CP-15	Carbon	Gas	13

Proposed CHD in New Mexico

343. Active oil and gas development within the proposed CHD in New Mexico is spread among four critical habitat units, as mentioned above, but is primarily concentrated in the following three critical habitat units: SRM-NM-11, SRM-NM-12 and SRM-NM-13. Exhibit 7-4 depicts these units along with SRM-NM-10 and plots the locations of the active wells, which are predominantly gas wells. These units are all located in Rio Arriba County, and for the most part within Carson NF.

344. Public comments received concerning the proposed New Mexico CHD came from two sources: ConocoPhillips Company and Burlington Resources.[223]

345. ConocoPhillips' position is that the proposed CHD would "hamper ConocoPhillips' operations," and would seriously jeopardize the livelihood of many small contractors in the Farmington, New Mexico area.

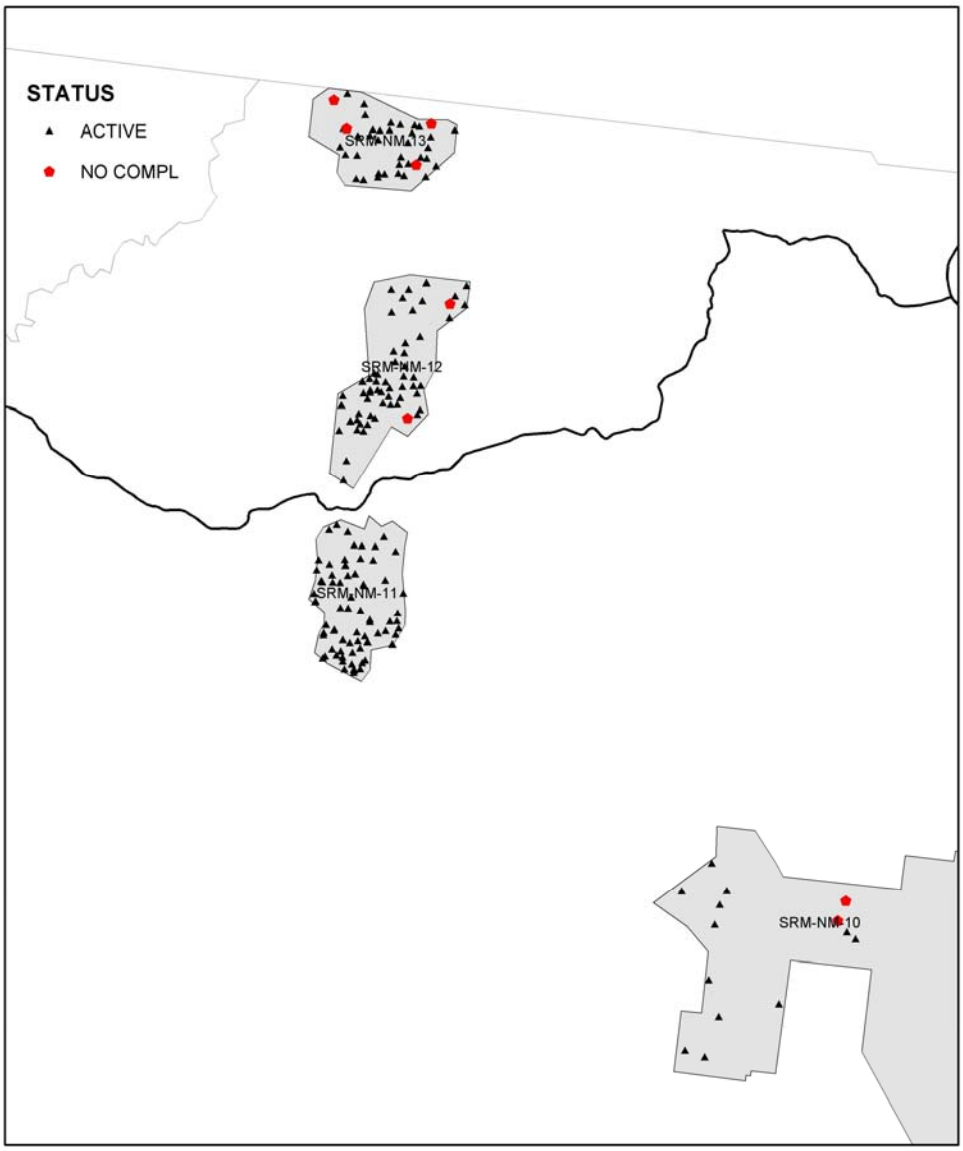
346. In 2002, total production from all active gas wells in Rio Arriba County was approximately 377 million cubic feet (MMCF).[224] The active wells within the proposed CHD produced approximately 8.0 MMCF of natural gas during that same year. Thus, the active wells in the proposed CHD accounted for approximately two percent of the county's gas production in 2002.

[223] Letter from Michael Nelson, ConocoPhillips Company, to Field Supervisor, U.S. Fish and Wildlife Service, dated December 18, 2003; Letter from John F. Zent, General Manager - Compliance, Burlington Resources, San Juan Division, to United States Fish and Wildlife Service, Field Supervisor, NMESFO, dated December 18, 2003.

[224] Source: GO-TECH Petroleum Web. Information on the New Mexico Petroleum Industry, http://octane.nmt.edu/data/ongard/county.asp

Exhibit 7-4

Oil and Gas wells in Mexican Spotted Owl Critical Habitat Areas in New Mexico



347. Of the 4,182 wells on record for Conoco Phillips Company in New Mexico, only eight wells are located within the proposed CHD. In addition, those eight wells produced approximately 2.2 MMCF of gas in 2002, which was approximately 0.1 percent of the more than 207 MMCF produced by the company's New Mexico gas wells in that same year.

348. Of the 6,427 wells on record for Burlington Resources in New Mexico, 84 map to locations within the proposed CHD. In addition, those 84 wells produced approximately 2.9

MMCF of gas in 2002, which was approximately 0.7 percent of the more than 415 MMCF total produced by the company's New Mexico gas wells in that same year.

Proposed CHD in Utah

349. The recent oil and gas activity within the proposed CHD in Utah is divided among three units, as mentioned earlier, with the largest concentration of active oil wells being located in CP-12 (the Upper Valley unit, in Garfield County) and a small corner of CP-14; and the majority of active gas wells in the northwestern corner of CP-15 (the Peters Point unit, in Carbon County). Exhibit 7-5 depicts these three units and plots the locations of the active wells.

350. Public comments received concerning the proposed Utah CHD came from four sources: Conoco Phillips Company, the Bill Barrett Corporation (BBC), the Carbon County Commission, and the Independent Association of Mountain States (IPAMS); the last of which endorsed BBC comments.[225] All of the public comments received pertained either specifically to the proposed unit CP-15, or generally to the area in northeastern Utah surrounding that proposed unit.

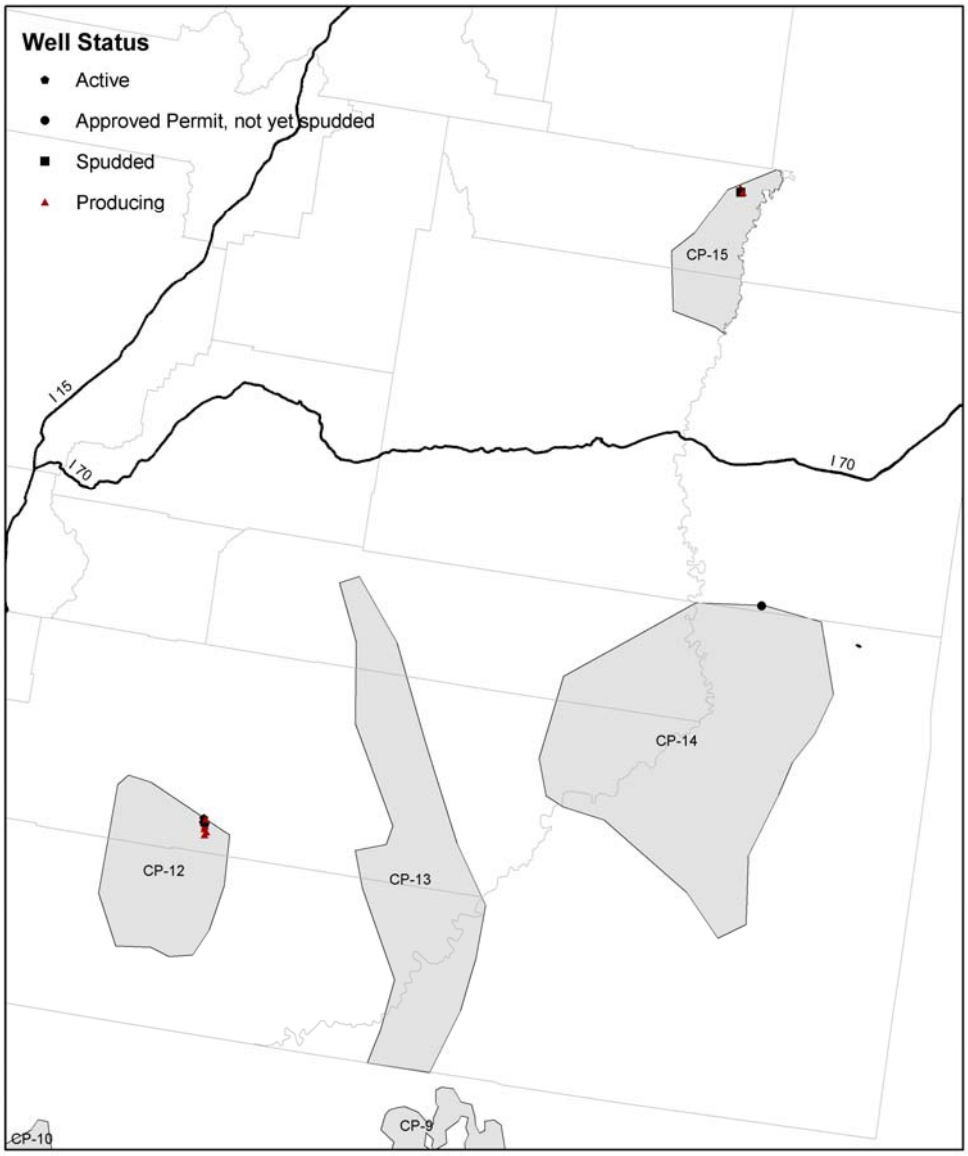
351. Conoco Phillips' position is that the proposed CHD CP-15, while 20 miles west of the company's Drunkards Wash gas field, could possibly interfere with future oil and gas exploration in the area.

352. BBC provided the most extensive comments. BBC has an active interest in the Peters Point area. Along with providing an analysis of the habitat of proposed unit CP-15, arguing that there is no suitable MSO habitat in the area, BBC also asserts that designating the proposed CHD areas will "create further delays or essentially prohibit oil and gas development in certain portions of these proposed MSO critical habitat areas that overlap existing oil and gas fields or areas highly prospective for natural gas." In particular, BBC is concerned that the proposed CHD could further limit the time period during which these activities can take place.

[225] Letter from Michael Nelson, ConocoPhillips Company, to Field Supervisor, U.S. Fish and Wildlife Service, dated December 18, 2003; Letter from Duane Zavadil, Manager of Regulatory and Government Affairs, Bill Barrett Corporation, to U.S. Fish and Wildlife Service, Field Supervisor, dated December 18, 2003; Letter from Steven D. Burge, Commission Chairman, Carbon County Commission, to Field Supervisor, New Mexico Ecological Services Field Office, dated December 17, 2003; Letter from Grant D. Melvin, Manager of Government and Public Affairs, Utah, Colorado, and New Mexico, IPAMS, to U.S. Fish and Wildlife Service, Field Supervisor, dated December 18, 2003.

Exhibit 7-5

Oil and Gas wells in Mexican Spotted Owl Critical Habitat Areas in Utah



7.2.2 Past and Ongoing Impacts to Oil and Gas Activities

353. This section describes efficiency effects, including both administrative costs related to consultation efforts and project modifications, associated with oil and gas activities resulting from MSO conservation efforts in the past. Because past oil and gas activities within the CHD have been limited, regional economic impacts resulting from past MSO conservation efforts are unlikely, and have not been quantified in the analysis. However, based on predictions for rapid growth in oil and gas activity and MSO-related delays within the proposed CHD boundaries in the future, the analysis does estimate future regional economic impacts that could result from MSO conservation efforts.

Economic Impacts Related to the Oil and Gas Industry

Given that the magnitude of potential impacts of MSO conservation efforts on oil and gas activities is small, restrictions on oil and gas activities are not expected to result in national economic efficiency effects. The analysis concludes that:

- Reductions in the supply of oil and gas or increases in the price of these commodities is unlikely given the relatively small role the CHD plays in the total supply of oil and gas and the availability of substitute sources of supply. Of the active wells in Utah and New Mexico, less than one-half of one percent is in the proposed CHD.
- Reductions in producer surplus accrued by producers of oil and gas products are unlikely given the relatively small area likely to be affected as a result of MSO conservation efforts (i.e., substitute sources exist), and the highly competitive nature of this industry.

Thus, national efficiency effects related to a reduction in oil and gas activities are not calculated in the analysis.

While changes in national economic efficiency are not expected, the analysis does estimate future regional economic impacts that could result from MSO conservation efforts based on predictions for rapid growth in oil and gas activity within the proposed CHD boundaries in the future. In addition, the analysis estimates MSO conservation-related administrative and project modification costs associated with oil and gas activities.

Past Administrative Costs

354. Based on available records, since the listing of the MSO, there have been 41 informal consultations relating to oil and gas activity, with five different Action agencies. Exhibit 7-6 shows these consultations by Action agency, and provides an estimate of the total administrative costs incurred for each.

Exhibit 7-6

SUMMARY OF PAST CONSULTATIONS INVOLVING THE OIL & GAS INDUSTRY (1993 – 2003)

Action Agency	Consultations		Present Value of Total Administrative Costs (2003$ discounted at 7%)	
	# Informal	# Formal	Low	High
Dixie NF	5	0	$16,500	$90,800
Manti-La Sal NF	1	0	$3,300	$18,100
USFS	1	0	$3,300	$18,100
BLM Utah	33	0	$108,900	$596,600
DOE	1	0	$3,300	$18,100
Totals:	**41**	**0**	$135,300	$741,300

355. There were two informal consultations relating to oil and gas production issues in New Mexico -- one with USFS Region 3 in September 1993, and one with DOE in September of 1994. Neither of these informal consultations resulted in project modifications. There have been no formal consultations on oil and gas issues in New Mexico. The administrative record indicates that the USFS consultation resulted in concurrence with 'not likely to adversely affect' determination."[226] The DOE consultation was a letter response to the Amended biological assessment for the Infrastructure Support Facility Gas Line townsite Portion Project in Los Alamos.[227]

356. Available records indicate that there were 39 informal consultations related to oil and gas production issues in Utah during the period from 1993 to 2003.

357. Based on historical data, total administrative costs related to oil and gas consultations likely ranged from $135,300 to $741,300 (2003 dollars). These costs are included in the totals shown in Exhibit 7-8.

Past Project Modifications

358. In addition to administrative costs associated with consultations, there have likely been some impacts related to project modifications for oil and gas activities in the proposed CHD. The level of impacts related to past project modifications is likely minimal since to date, few oil and gas projects have been located in MSO habitat due to the steep and rocky nature of this terrain. Impacts related to project modifications other than surveying efforts are more likely to occur in the future, and are analyzed in the next section.

[226] Letter from Jennifer Fowler-Propst, U.S. Fish and Wildlife Service to Larry Henson, USFS, dated September 8, 1993. (MSO Administrative Record XI.B.1.124).

[227] Letter from Jennifer Fowler-Propst, U.S. Fish and Wildlife Service, to Dan Dunham, DOE dated September 7, 1994 (MSO administrative record, XI.C.104).

359. Discussions with Carson NF indicated that drilling in mixed-conifer habitat is restricted for the MSO; however, little drilling has been proposed in these areas to date, therefore past impacts related to this restriction have been minimal.[228] Given available information, the analysis assumes that past project modifications in New Mexico related to MSO conservation are limited to surveying efforts.

360. For oil and gas projects in Utah, a review of consultations to date indicate that past project modifications have been minimal. For example, one operator agreed to install a hospital-grade muffler on a compressor station. However, as operators expand oil and gas operations in the CHD area, the Service expects that additional impacts will result from MSO conservation measures; these are addressed as future impacts.

361. Past project modification costs have primarily resulted from MSO surveying requirements. As discussed in later in Section 7.6, MSO surveys are estimated to cost between $500 - $20,000 annually for each management unit. Costs related to surveying are typically borne by Action agencies, and are included in Exhibit 7-8.

362. Based on comments from various oil and gas companies operating in the proposed CHD, some oil and gas companies have incurred costs for MSO surveying. These costs are likely to be minimal in most cases; however, some companies may have spent up to $100,000 total on these efforts in the past.[229] As another example, Burlington Resources estimates that it has filed approximately two applications for permit to drill (APD) per year in the proposed CHD in the Carson NF, and that it anticipates the same level of APD filings in the future. For each APD filed, the company estimates that it spends approximately $600 for an MSO survey. None of the past surveys have indicated any MSO presence in the area, and thus no other activity modifications have been required.[230]

7.2.3 Future Impacts to Oil and Gas Activities

363. The proposed critical habitat units in Utah are all areas in which there is active ongoing oil and gas exploration. In particular, the area of Utah covering the adjacent corners of Carbon, Emery, Uintah and Duchesne Counties (where the proposed critical habitat unit CP-15 is located) is a very active area of oil and gas exploration. Approximately 98 percent of the 838 APDs issued in Utah in 2003 were issued among three of these counties (Carbon, Emery, Uintah Counties). According to the Carbon County Commission, "Bill Barrett Resources has been rebuilding and improving the facilities [in this area] in anticipation of fluid mineral extraction. They anticipate a large increase in the production of the gas and CBM [coal-bed methane] fields."[231] Based on this information, it is likely that

[228] Personal communications with David Seery, and John Reidinger, Carson NF, Jicarilla District, May 26, 2004.

[229] Letter from Duane Zavadil, Manager of Regulatory and Government Affairs, Bill Barrett Corporation, to the U.S. Fish and Wildlife Service, Field Supervisor, dated December 18, 2003.

[230] Personal communication with John F. Zent, Burlington Resources, San Juan Division, February 25, 2004.

[231] Letter from Steven D. Burge to Field Supervisor, New Mexico Ecological Services Field Office, dated December 17, 2003, p. 2.

the level of future impacts to oil and gas activities in Utah will surpass impacts experienced in the past. However, the oil and gas reserves underlying the proposed CHD are uncertain; therefore, it is difficult to estimate future impacts of MSO conservation on these activities.

364. Given the relatively small role the CHD plays in the total supply of oil and gas nationally, reductions in the supply of oil and gas or increases in the price of these commodities is unlikely. Of the active wells in Utah and New Mexico, less than one-half of one percent is in the proposed CHD. In addition, reductions in producer surplus accrued by producers of oil and gas products are unlikely given the relatively small area likely to be affected as a result of MSO conservation efforts (i.e., substitute sources exist), and the highly competitive nature of this industry. Thus, the analysis does not estimate changes to national economic efficiency. However, MSO related-delays may result in distributive effects, such as shifts in production locations, or delays of production within an area. Therefore, the analysis does estimate future regional economic impacts that could result from MSO conservation efforts based on predictions for rapid growth in oil and gas activity within the proposed CHD boundaries in the future. In addition, the analysis estimates future MSO conservation-related administrative and project modification costs associated with oil and gas activities.

Future Administrative Costs

365. Based on available information, the level of consultations is expected to remain stable, with the exception of BLM Utah lands. Discussion with Carson NF and the Service indicates that the level of consultation related to oil and gas activities in New Mexico is unlikely to increase significantly in the future. However, the level of consultation associated with oil and gas activity on BLM Utah lands is expected to triple over the next ten years.[232] Thus, a total 107 informal consultations related to oil and gas activities are expected over the next ten years. The administrative costs associated with these consultations are included in the totals in Table 7-8.

Future Project Modifications

366. As discussed above, impacts related to project modifications are more likely than in the past since as operators develop an area, they first drill in easily accessible areas, and as development continues, they move into more difficult to develop canyon areas where MSO habitat occurs. In addition to survey efforts, other project modifications related to MSO conservation efforts are expected to result in additional costs to oil and gas operators.

367. Potential project modifications to oil and gas activities resulting from MSO conservation measures include:[233]

[232] Personal communication with Biologist, Utah Field Office, Fish and Wildlife Service, May 28, 2004, and David Mills, BLM Utah, June 1, 2004.

[233] Personal communication with Biologist, Utah Field Office, FWS, May 12, 2004, and David Mills, BLM Utah, June 1, 2004.

- Eliminating access routes created by the project and limiting increased access to and within suitable habitat;
- Re-siting wells outside of suitable habitat;
- Remotely monitoring wells;
- Reducing noise emissions (e.g., installing hospital-grade mufflers or sound walls); and,
- Using directional or multi-lateral drilling to eliminate drilling in canyon habitat.

368. Of these potential conservation measures, changing to directional drilling can cause the most impact. Based on available information, directional drilling has not been required in order to protect MSO or its habitat in the past.[234] Uintah County has indicated that this method has not been widely used in the region.[235] One reason for this is likely because as operators develop a field, they first drill in easily accessible areas, and as development continues, they move into more the difficult to develop canyon areas. Available information indicates there is the possibility that companies will modify their drilling methods to utilize directional drilling in the future in order to protect MSO and its habitat. Directional drilling is more expensive than drilling a vertical well; estimates range from twice as much to three times the cost of a typical vertical well.[236] Because the likelihood and frequency of directional drilling resulting from MSO conservation efforts is entirely unknown, these impacts have not been quantified.

369. The remaining project modifications are expected to be required in approximately one-third of the consultations expected over the next ten years.[237] The costs related to these modifications range from $1,000 to $25,000 depending on the level of conservation efforts required at a particular site.[238] The low end estimate represents minimal efforts to reseed access routes or install a muffler, while the high end estimate incorporates additional costs related to a range of conservation efforts such as site or access route adjustments, noise abatement, and remote monitoring. These project modifications to oil and gas activities over the next ten years are expected to cost from $24,600 to $614,600 (2003 dollars). These costs are included in Table 7-8.

[234] Personal communications with: David Mills, BLM Utah, June 1, 2004; and, Biologist, Utah Field Office, FWS, May 28, 2004.

[235] Personal communication with Uintah County representatives: Commissioner McKee, Darlene Burns, Bill Ryan, and Dave Allison, May 26, 2004.

[236] Personal communications with: David Mills, BLM Utah, June 1, 2004; Brian Mills, DOE, May 13, 2004; Jean Semborski, Conoco Phillips, May 13, 2004; Duane Zavadil, Bill Barrett Corporation, May 12, 2004.

[237] Personal communications with: David Mills, BLM Utah, June 1, 2004; and, Biologist, Utah Field Office, FWS, May 28, 2004.

[238] Personal communication with David Mills, BLM Utah, June 1, 2004 and John Reidinger, Carson NF, Jicarilla District, May 26, 2004.

Future Regional Economic Impacts

370. Based on available information, there is potential for oil and gas projects in the MSO CHD to experience delays resulting from MSO conservation efforts. Survey requirements or other breeding season restrictions may cause delays to drilling projects.

371. Currently, surveys for MSO in oil and gas areas in Utah are conducted over a two-year period. BLM Utah has indicated that in order to allow drilling at a site, the full two-years of surveys must be completed. If the site is in an area considered suitable habitat, BLM may also recommend that the company restrict drilling activities to outside of the MSO breeding season (March 15 – August 31). In New Mexico, Carson NF has indicated that if no owls are located in the first year of surveys, companies may be permitted to begin drilling while the second year of surveys is completed, thus potential delays to drilling projects related to MSO are much less likely. In addition, future projects in New Mexico are unlikely to experience significant impacts related to surveying delays because Carson NF is currently surveying all MSO habitat in the Jicarilla district, where the majority of the oil and gas activity occurs.[239] Therefore, delays are most likely to affect future oil and gas projects in the proposed CHD on BLM lands in Utah.

372. Impacts from delays to oil and gas activities are difficult to forecast because the number of projects likely to experience delays in the future is unknown, as is the number of leases that will be issued. In addition, the success rates for future wells is uncertain. The analysis assumes that a 2-year delay to drilling wells within the CHD is likely. The analysis further assumes that operators are unable to find suitable substitute sites to drill a well within the region. However, very few leases are located entirely in the MSO CHD;[240] if companies are able to relocate a well to an alternative drilling site within the region, this analysis may overstate impacts. In addition, it is possible that labor may find employment in the region, as the CHD represents a small amount of the local oil and gas industry. Given the current high price of natural gas (which is expected to continue), the resources (e.g., equipment and labor) needed to develop this commodity are in high demand. Thus, even if development of certain wells in the CHD is delayed, resources may likely be employed elsewhere, or would only remain unused for a short period of time. To the extent that resources are re-employed within the region, this analysis may overstate impacts.

373. For the purposes of this regional economic impact analysis, the study area includes three counties in Utah: Carbon, Emery and Uintah. The socioeconomic characteristics of these counties are discussed in Section 2.

374. Delays to oil and gas activities are likely to directly affect oil and gas companies and drilling contractors. Decreased operations in this industry would also result in secondary effects on related sectors in the study area. Some of these sectors may be closely associated

[239] Personal communication with John Reidinger, Carson NF, Jicarilla District, May 26, 2004.

[240] Based on discussion with David Mills, BLM Utah, approximately 10% of the leases that intersect the CP-15 CHD unit are entirely within CHD.

with the oil and gas industry, such as maintenance and repair of wells, while others may be less closely associated, such as the eating and drinking sector.

375. This analysis relies on a software package called IMPLAN to estimate the total economic effects of a reduction in oil and gas development in the study area. Background on the IMPLAN model was discussed in the Timber Analysis in Section 3.2.2. IMPLAN translates initial changes in local expenditures into changes for demand for inputs to affected industries. These effects are described as direct, indirect, and induced.

376. 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 changes in timber harvest 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 relationships derived from 1998 data. Thus, this analysis assumes that this historical characterization of the affected counties' economies are a reasonable approximation of current conditions. If significant changes have occurred since 1998 in the structure of the economies of the counties in the study area, the results may be sensitive to this assumption. The magnitude and direction of any such bias are unknown.

377. To estimate the regional economic impact of reduced oil and gas activity, the analysis first estimates the total number of wells that could be delayed by MSO conservation efforts, and calculates the direct effect of a delaying drilling these wells by two years. Next, the analysis utilizes IMPLAN to estimate indirect and induced impacts on the region in terms of output and jobs.

378. Because of the uncertainty associated with the number of wells that may be affected by MSO conservation efforts in the future, the analysis estimates a range. At the low end, the analysis assumes that no wells will be delayed, either because companies are able to find substitute locations within the region, or because delays do not impact wells in CHD. At the upper bound, the analysis estimates that over the next ten years, drilling for approximately five wells will be delayed annually in order to comply with required MSO surveys or breeding restrictions. This estimate is based on the following:

- Information in the Minerals Potential Report for the Price, Utah area indicates that approximately 400 new wells can be drilled in the Book Cliffs Play over the next ten years and that much of the CHD area is considered low occurrence potential;[241]

[241] BLM, Price Field Office, Utah. Minerals Potential Report, 2002. Accessed at http://www.pricermp.com/documents.html.

- Analysis of GIS data which indicates that approximately 25 percent of the Book Cliffs Play overlaps with MSO CHD unit CP-15;[242] and,

- Discussion with BLM Utah indicating that development is only likely in approximately 50 percent of the Book Cliffs area of MSO CHD unit CP-15, because of the steep slope (>60% slope) terrain.[243]

379. The analysis assumes that the cost of delaying a well is equivalent to the amount that would have been spent locally to drill the well. Based on a range of estimates for the cost of drilling a well, the cost to drill one well in this region is estimated to cost $1,775,000 on average.[244] The analysis further assumes that approximately 60 percent of this cost is spent locally, resulting in a direct effect of $1,065,000 per well delayed.[245] The direct impact of future delays to oil and gas activities resulting from MSO conservation in Utah ranges from zero to approximately $5.3 million. This upper bound figure is input into the IMPLAN model to determine corresponding future regional economic impact.

Exhibit 7-7

FUTURE REGIONAL ECONOMIC IMPACT OF DELAYS TO OIL AND GAS ACTIVITIES*
BLM UTAH LANDS
(Annual, Thousands of 2003 dollars)

	Direct Effect		Indirect Effect		Induced Effect		Total Impact	
	Low	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**
Output	$0	$5,325	$0	$2,422	$0	$628	0	$8,376
Employment (jobs)	0	18	0	22	0	12	0	52

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

380. As illustrated in Exhibit 7-7, the total estimated regional economic impact of delaying development of wells in Utah ranges from zero to $8.4 million annually, depending on the number of wells impacted. This limitation on drilling wells could also impact as many as 52 jobs annually, in total. In addition, the delays to drilling projects may also reduce state and local taxes by as much as $0.6 million annually in the study area.

7.3 Impacts on Mining Industry

381. In the past, a minimal level of consultation has occurred related to mining activities and potential impacts to the MSO. The Service has engaged in approximately 23 informal consultations on mining related activities and operations and no formal consultations. Based on historic consultations, project modifications associated with mining activities have been

[242] USGS National Coal Assessment data, accessed at http://energy.cr.usgs.gov/coal/nca/cpgis.html.

[243] Personal communication with David Mills, BLM Utah, June 1, 2004.

[244] Estimates of the cost to drill a well in this area range from $454,000 to $3,4 million, based on information from Bill Barrett Corporation, Conoco Phillips, Independent Petroleum Association of American, and BLM Utah.

[245] Based on the IMPLAN regional purchase coefficient for the Oil and Gas sectors, which is 61.8 percent.

modest, including surveying and monitoring. However, rock quarry operations exist within Colorado that have been impacted by MSO conservation activities (as described below).

7.3.1 Rock Quarry/Aggregate Industry in Colorado

382. Within Colorado, there have been some impacts to a private party operating a quarry within the boundaries of CHD.[246] In this case, a PAC was designated on BLM land adjacent to the existing quarry operations as well as on the adjacent State land where quarry expansion has been proposed. According to the Service, this PAC is one of only twelve PACs in Colorado, and it is one of the most active for MSO (i.e., MSO reproduces most often).[247] The quarry operates on State and private lands, and is permitted through the State. While there is no Federal nexus with BLM, the quarry operator has been in negotiation with the Service for an Incidental Take Permit under section 10 of the Act which would require an inter-Service consultation on the issuance of the section 10 permit.[248] At this time, it is not clear what impacts, if any, are related specifically to critical habitat from the issuance of this incidental take permit. However, the private operator of this quarry expects to incur various costs resulting from MSO conservation activities:

- $40,000 to $75,000 to draft an Environmental Assessment/Habitat Conservation Plan;
- $20,000 to $40,000 for surveying and biological field work;
- $10,000 per year ongoing management to implement the HCP; and
- Some portion of the expected $334,000 for post-quarrying reclamation of the land.[249]

383. In addition, the quarry has planned its quarrying efforts around the "no-take" boundary established by the Service. This party is a small business with approximately $200,000 per year in revenues.[250]

384. To date, MSO conservation activities have only affected the private quarry operation described above. However, there are several other quarry operators in Colorado that could experience impacts if additional MSO were identified in the areas where these quarries operate.[251] However, these impacts would not likely be related to CHD as these quarries are on private or State lands outside the boundaries of CHD.

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[246] Email communication from Biologist, Colorado Field Office, FWS, July 13, 2004.

[247] Personal communication with Biologist, Colorado Field Office, FWS, January 5, 2004.

[248] Email communication with Service, Southwestern Regional Office, July 26, 2004.

[249] This assumes that the State of Colorado Division of Minerals and Geology is holding the quarry to a more stringent standard because of the MSO. Email communication from Keith Doyon, Red Canyon LLC, January 27, 2004.

[250] Email communication from Keith Doyon, Red Canyon LLC, January 27, 2004.

[251] Ibid.

385. The mining industry within the eight Colorado counties containing CHD represents approximately 0.5 percent of collective total annual payroll for the counties ($73.7 million out of $15.0 billion). In addition, the mining industry employs less than 0.3 percent of total employees by industry in the eight counties.[252]

7.4 Impacts to Military Activities

386. Some Department of Defense installation activities have the potential to be affected by MSO conservation activities. Military installation activities consulted on in the past have included helicopter flights, training initiatives, facilities construction, and general base operations. Military installations are also required to complete and consult on their Integrated Natural Resources Management Plans (INRMP), which provide for the conservation and rehabilitation of natural resources and the sustainable multipurpose use of installation resources. In the past, eight informal and seven formal consultations have been conducted related to military activities and potential impacts to the MSO.

387. Military installations containing proposed CHD include Fort Huachuca, Arizona; Fort Carson, New Mexico; Fort Wingate Depot Activity, New Mexico (closed 1993); and the North American Air Defense Command (NORAD) Combat Operation Center, Colorado (currently known as the Cheyenne Mountain Operations Center).

388. In 2001, Fort Huachuca completed a programmatic biological opinion on all installation activities, including its INRMP, which would last next 10 years. The Service recommended in the biological opinion that Fort Huachuca conduct annual surveys and monitor for the MSO. Fort Huachuca currently incurs (and anticipates to continue to incur) the following costs:

- $60,000 per year on surveys and monitoring; and
- $1,000 per year for sign installation and maintenance and public outreach measures.

389. Fort Huachuca does not anticipate any individual projects or activities that may require additional modifications for MSO conservation activities over the next years as most activities occur away from areas where the MSO habitat occurs.[253]

7.5 Impacts to Additional Activities

390. Several additional activities and projects have been affected by MSO conservation activities. Activities likely to trigger section 7 consultation with the Service have included:

- Agency management plans;

[252] U.S. Census Bureau, County Business Patterns, at http://censtats.census.gov/cbpnaic/cbpnaic.shtml.

[253] Personal communication with Fort Huchuca Wildlife Biologist, Sheridan Stone, February 10, 2004.

- Utilities construction and maintenance;
- Road construction and maintenance;
- Resource conservation and restoration;
- Facilities construction and maintenance; and
- Land transfers and sales.

391. In the past, the Service has engaged in 42 formal and 220 informal consultations regarding the activities and projects listed above and potential impacts to the MSO. Action agencies conducting these activities include USFS, BIA, DOE, National Park Service (NPS), BLM, and the Federal Highway Administration/Department of Transportation (FHA/DOT). Each of these additional activities and projects, as well as associated historical consultation levels, are described below.

7.5.1 Land Use Management Plans

392. Federal agencies initiate consultation with the Service on their management plans to ensure that proposed activities do not jeopardize the continued existence of threatened and endangered species, including the MSO. Management plans for agencies in the region typically include proposals for timber sales, fire management programs, grazing, and recreation. A recorded six formal and 23 informal consultations have been triggered related to management plans put forth by Federal agencies.

7.5.2 Utilities Construction and Maintenance

393. Agencies that have requested consultation on utilities-related construction and maintenance projects include USFS, DOE, and NPS. Projects have included the construction and maintenance of powerlines, electric transmission lines, radio towers, telephone, fiber optic, and copper cable lines, and wastewater treatment facilities. A recorded seven formal and 46 informal consultations have been conducted regarding utility projects. Typical project modifications have included monitoring, educational awareness programs and public outreach, restoring disturbed areas on project sites, and seasonal restrictions.

7.5.3 Road Construction and Maintenance

394. Agencies engaging in road construction and maintenance activities include FHA/DOT, USFS, BIA, and NPS. In the past, 15 formal and 55 informal consultations on roads-related projects have occurred. Reasonable and prudent measures and conservation recommendations have included the implementation of noise minimization measures, tree removal minimization measures, monitoring, breeding season restrictions, and restrictions on construction within one-quarter mile of MSO nests.

7.5.4 Resource Conservation and Restoration

395. Federal agencies initiate consultation on projects related to resource conservation and restoration. Activities include watershed rehabilitation and improvement, erosion control, and ecosystem restoration projects, including vegetation management and re-vegetation programs. Agencies have also engaged in species related conservation efforts including species reintroduction and removal. Consultations have also occurred for MSO conservation efforts, including survey protocol, noise impacts studies, and the monitoring of nest and roost areas. Six formal and 71 informal consultations have been conducted regarding activities focusing on resource conservation and restoration. Project modifications typically requested by the Service include surveys and monitoring.

7.5.5 Facilities Construction and Maintenance

396. In the past, Federal agencies have consulted with the Service on the construction and maintenance of various agency facilities, including dams, reservoirs, offices, and stations. Four formal and 14 informal consultations have occurred related to facilities construction and maintenance. Agencies that have consulted with the Service have included USFS, BLM, DOD, and NPS. Project modifications have included conducting surveys and monitoring PACs to determine impacts to MSOs.

7.5.6 Land Transfers and Sales

397. Land transfers and sales involve the exchange of Federal lands (generally USFS land) for non-Federal lands to allow for private acquisition and development. In past cases, the USFS has also sold parcels to private entities (i.e. towns). Agencies initiate consultation with the Service to ensure that the lands transferred do not contain characteristics of MSO nesting and roosting habitat. In the past, four formal and 11 informal consultations have been triggered regarding land transfers and sales. Typical project modifications have included monitoring, education awareness, and breeding season restrictions.

7.6 Summary of Past Costs Associated with Other Activities

398. In the past a total of 64 formal and 382 informal consultations have occurred regarding recreational, oil and gas development, mining, military activities, and the other activities listed above. Total administrative costs associated with past consultations for these collective activities are estimated to have ranged from $2.4 million to $8.9 million (2003 dollars).

399. A survey of past consultations indicates that typical reasonable and prudent measures and conservation recommendations by the Service for these activities have included:

- **Surveys and monitoring** to detect the presence of MSOs and nest sites and to examine potential impacts to the MSO. Costs for conducting surveys and monitoring are estimated at an average of $500 to $20,000 per year.[254]

- **Sign installation and education awareness programs** to indicate sensitivity of area and to alert area restrictions, to promote awareness of sensitive areas through public outreach. Costs associated with installing signs and education the public are estimated at $1,000 per year.

- **Seasonal restrictions** to avoid activities include noise associated with construction, which may affect the MSOs during breeding season.

400. This analysis assumes that on average, project modifications associated with past consultations for the "other" activities addressed in this section result in costs to Action agencies ranging from $1,500 to $21,000 annually per management unit. These costs are not affiliated with a specific consultation but are incorporated into project modification estimates. In total, estimated project modification costs associated with past consultations range from $1.3 to $14.2 million (2003 dollars).

401. Total costs associated with past consultations and project modifications are estimated to range from $3.7 million to $23.1 million, or $0.3 million to $2.1 million dollars per year (2003 dollars). Exhibit 7-8 summarizes past costs associated with these activities by agency.

[254] Cost estimates derived from information provided by NPS.

Exhibit 7-8

PAST IMPACTS ASSOCIATED WITH OTHER ACTIVITIES BY AGENCY (1993 – 2003)

Agency	Management Unit	Consultations		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Informal	Formal	Low	High	Low	High	Low	High
USFS Region 2	Pike-San Isabel	0	0	$6,000	$231,000	$8,000	$331,000	$1,000	$30,000
	Region 2 Subtotal	0	0	$6,000	$231,000	$8,000	$331,000	$1,000	$30,000
USFS Region 3	Apache Sitgreaves	8	3	$62,000	$396,000	$89,000	$568,000	$8,000	$52,000
	Carson NF	1	1	$20,000	$265,000	$29,000	$380,000	$3,000	$35,000
	Cibola NF	10	0	$29,000	$357,000	$41,000	$512,000	$4,000	$47,000
	Coconino NF	13	10	$161,000	$609,000	$232,000	$874,000	$21,000	$79,000
	Coronado NF	19	11	$188,000	$706,000	$269,000	$1,013,000	$24,000	$92,000
	Gila NF	13	0	$35,000	$395,000	$51,000	$566,000	$5,000	$51,000
	Kaibab NF	3	1	$25,000	$290,000	$36,000	$416,000	$3,000	$38,000
	Lincoln NF	25	7	$151,000	$696,000	$217,000	$998,000	$20,000	$91,000
	Prescott	6	2	$45,000	$349,000	$64,000	$501,000	$6,000	$46,000
	Santa Fe NF	16	2	$68,000	$475,000	$97,000	$682,000	$9,000	$62,000
	Tonto NF	5	2	$42,000	$337,000	$61,000	$483,000	$6,000	$44,000
	Region wide	12	3	$65,000	$215,000	$94,000	$309,000	$9,000	$28,000
	Region 3 Subtotal	131	42	$891,000	$5,090,000	$1,278,000	$7,304,000	$116,000	$664,000
USFS Region 4	Dixie NF	114	0	$268,000	$1,667,000	$384,000	$2,393,000	$35,000	$218,000
	Fishlake NF	6	0	$19,000	$307,000	$28,000	$440,000	$3,000	$40,000
	Manti-La Sal NF	13	0	$35,000	$395,000	$51,000	$566,000	$5,000	$51,000
	Region 4 Subtotal	133	0	$322,000	$2,369,000	$463,000	$3,399,000	$42,000	$309,000
USFS TOTAL		**264**	**42**	**$1,219,000**	**$7,690,000**	**$1,749,000**	**$11,034,000**	**$159,000**	**$1,003,000**
BLM	BLM/AZ	3	1	$25,000	$290,000	$36,000	$416,000	$3,000	$38,000
	BLM/CO	0	0	$6,000	$231,000	$8,000	$331,000	$1,000	$30,000
	BLM/NM	1	0	$8,000	$244,000	$11,000	$350,000	$1,000	$32,000
	BLM/UT	63	0	$150,000	$1,025,000	$216,000	$1,470,000	$20,000	$134,000
	District wide	0	0	$0	$0	$0	$0	$0	$0
BLM Total		**67**	**1**	**$189,000**	**$1,790,000**	**$271,000**	**$2,568,000**	**$25,000**	**$233,000**
BIA	BIA/Mescalero	3	1	$25,000	$290,000	$36,000	$416,000	$3,000	$38,000
	BIA/Navajo	7	3	$59,000	$383,000	$85,000	$550,000	$8,000	$50,000
	BIA/San Carlos	0	0	$6,000	$231,000	$8,000	$331,000	$1,000	$30,000
	Other Tribes	2	0	$10,000	$256,000	$14,000	$368,000	$1,000	$33,000
	All Tribes	1	1	$15,000	$34,000	$21,000	$49,000	$2,000	$4,000
BIA Total		**13**	**5**	**$115,000**	**$1,195,000**	**$165,000**	**$1,714,000**	**$15,000**	**$156,000**

Exhibit 7-8

PAST IMPACTS ASSOCIATED WITH OTHER ACTIVITIES BY AGENCY (1993 – 2003)

Agency	Management Unit	Consultations		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Informal	Formal	Low	High	Low	High	Low	High
NPS	Bandelier NM	0	0	$44,000	$44,000	$63,000	$63,000	$6,000	$6,000
	Canyon de Chelly NM	0	0	$6,000	$231,000	$8,000	$331,000	$1,000	$30,000
	Canyonlands NP	0	1	$43,000	$51,000	$61,000	$74,000	$6,000	$7,000
	Capitol Reef NP	0	0	$0	$6,000	$0	$9,000	$0	$1,000
	Chiricahua NM	0	1	$57,000	$65,000	$81,000	$94,000	$7,000	$9,000
	Coronado NM	0	0	$6,000	$6,000	$8,000	$8,000	$1,000	$1,000
	El Malpais NM	0	0	$6,000	$231,000	$8,000	$331,000	$1,000	$30,000
	Glen Canyon NRA	0	0	$6,000	$231,000	$8,000	$331,000	$1,000	$30,000
	Grand Canyon NP	2	1	$23,000	$52,000	$33,000	$75,000	$3,000	$7,000
	Navajo NM	0	0	$6,000	$231,000	$8,000	$331,000	$1,000	$30,000
	Rainbow Bridge NM	0	0	$6,000	$231,000	$8,000	$331,000	$1,000	$30,000
	Saguaro NP	3	0	$227,000	$258,000	$326,000	$370,000	$30,000	$34,000
	Walnut Canyon NM	0	0	$6,000	$231,000	$8,000	$331,000	$1,000	$30,000
	Zion NP	0	0	$310,000	$310,000	$444,000	$444,000	$40,000	$40,000
NPS Total		**5**	**3**	**$741,000**	**$2,178,000**	**$1,063,000**	**$3,125,000**	**$97,000**	**$284,000**
Other Federal Agencies**		**33**	**33**	**$300,000**	**$3,235,000**	**$431,000**	**$4,642,000**	**$39,000**	**$422,000**
TOTALS		**382**	**64**	**$2,564,000**	**$16,088,000**	**$3,679,000**	**$23,083,000**	**$334,000**	**$2,098,000**

* Administrative costs and project modification costs are discounted assuming a rate of seven percent.

** Other Federal agencies include consultations with the Department of Defense, Department of Transportation, Department of Energy, Bureau of Reclamation, EPA, and OSM.

Source: U.S. Fish and Wildlife administrative record for the Mexican Spotted Owl, personal communication with Action agencies, IEc cost model.

7.7 Summary of Future Costs Associated with Other Activities

402. This analysis assumes that impacts to recreation, oil and gas development, rock quarrying, military, and additional "other" activities associated with the MSO and proposed CHD are likely to be similar to past impacts. For the most part, Action agencies anticipate that future consultation with the Service will occur at the same rate as in the past and that the Service will continue to recommend similar project modifications. This analysis assumes that consultation activity over the next 10 years will be similar to past levels, except in the cases where the Service or an Action agency has indicated otherwise. In some instances, agencies do not anticipate future consultation with the Service on activities but anticipate implementing specific measures that provide protection to the MSO and its habitat (e.g. surveying and monitoring) on an annual basis. These costs are not affiliated with a specific consultation but are incorporated into project modification estimates. Project modifications are assumed to range from $1,500 to $21,000 annually per management unit. In addition, other project modifications are expected for a third of the consultations related to oil and gas activities in Utah. These oil and gas project modifications are expected to range from $1,000 to $25,000 per consultation.

403. This analysis anticipates that over the next 10 years, approximately 61 formal and 498 informal consultations will occur regarding the activities discussed in this Section and potential impacts to the MSO and its habitat. Total administrative costs stemming from these consultations range from $1.3 million to $5.3 million (2003 dollars). Project modification costs associated with future consultations are estimated to range $1.1 million to $7.2 million (2003 dollars). Thus, total future costs associated with recreation, oil and gas development, rock quarrying, military, and other activities are estimated to range from $2.5 million to $12.5 million over the 10 years, or $0.3 million to $1.3 million annually (2003 dollars). Exhibit 7-9 summarizes future anticipated impacts to the other activities discussed in this section associated with MSO conservation activities.

404. Of the total upper bound estimate of $12.5 million in forecast administrative and project modification costs, approximately 40 percent of costs relate to USFS. Nearly 10 percent of total costs are associated with Dixie NF, Utah, which has engaged in approximately 114 informal consultations with the Service on recreational, oil and gas, mining, and other activities. Consultations triggered by NPS represent 15 percent of total costs. Costs related to BLM in all four states constitute 20 percent of total costs, with BLM consultations in Utah representing 15 percent of total "Other Activities" costs. The majority of future "Other Activities" triggering consultation between BLM Utah and the Service are expected to be related to oil and gas development.

Exhibit 7-9

FUTURE IMPACTS ASSOCIATED WITH OTHER ACTIVITIES BY AGENCY (2004 – 2013)

		Consultations		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)		Annual Costs (2003$)	
Agency	**Management Unit**	**Informal**	**Formal**	**Low**	**High**	**Low**	**High**	**Low**	**High**
USFS Region 2	Pike-San Isabel	0	0	$5,000	$210,000	$4,000	$147,000	$400	$15,000
	Region 2 Subtotal	0	0	$5,000	$210,000	$4,000	$147,000	**$400**	$15,000
USFS Region 3	Apache Sitgreaves	8	3	$61,000	$375,000	$43,000	$263,000	$4,000	$26,000
	Carson NF	1	1	$20,000	$244,000	$14,000	$171,000	$1,000	$17,000
	Cibola NF	10	0	$28,000	$336,000	$20,000	$236,000	$2,000	$24,000
	Coconino NF	13	10	$161,000	$588,000	$113,000	$413,000	$11,000	$41,000
	Coronado NF	19	11	$187,000	$685,000	$132,000	$481,000	$13,000	$48,000
	Gila NF	13	0	$35,000	$374,000	$25,000	$263,000	$2,000	$26,000
	Kaibab NF	3	1	$25,000	$269,000	$17,000	$189,000	$2,000	$19,000
	Lincoln NF	25	7	$151,000	$675,000	$106,000	$474,000	$11,000	$47,000
	Prescott	6	2	$44,000	$328,000	$31,000	$231,000	$3,000	$23,000
	Santa Fe NF	16	2	$67,000	$454,000	$47,000	$319,000	$5,000	$32,000
	Tonto NF	5	2	$42,000	$316,000	$29,000	$222,000	$3,000	$22,000
	Region wide	12	3	$65,000	$215,000	$46,000	$151,000	$5,000	$15,000
	Region 3 Subtotal	131	42	$886,000	$4,859,000	$622,000	$3,413,000	$62,000	$341,000
USFS Region 4	Dixie NF	114	0	$267,000	$1,646,000	$188,000	$1,156,000	$19,000	$116,000
	Fishlake NF	6	0	$19,000	$286,000	$13,000	$201,000	$1,000	$20,000
	Manti-La Sal NF	13	0	$35,000	$374,000	$25,000	$263,000	$2,000	$26,000
	Region 4 Subtotal	133	0	$321,000	$2,306,000	$225,000	$1,619,000	$23,000	$162,000
USFS TOTAL		**264**	**42**	**$1,211,000**	**$7,375,000**	**$851,000**	**$5,180,000**	**$85,000**	**$518,000**
BLM	BLM/AZ	3	1	$25,000	$269,000	$17,000	$189,000	$2,000	$19,000
	BLM/CO	0	0	$160,000	$555,000	$112,000	$390,000	$11,000	$39,000
	BLM/NM	1	0	$7,000	$223,000	$5,000	$156,000	$1,000	$16,000
	BLM/UT	129	0	$330,000	$2,450,000	$232,000	$1,721,000	$23,000	$172,000
	District wide	0	0	$0	$0	$0	$0	$0	$0
BLM Total		**133**	**1**	**$522,000**	**$3,497,000**	**$366,000**	**$2,456,000**	**$37,000**	**$246,000**
BIA	BIA/Mescalero	3	1	$25,000	$269,000	$17,000	$189,000	$2,000	$19,000
	BIA/Navajo	7	3	$59,000	$362,000	$41,000	$255,000	$4,000	$25,000
	BIA/San Carlos	0	0	$5,000	$210,000	$4,000	$147,000	$400	$15,000
	Other Tribes	2	0	$10,000	$235,000	$7,000	$165,000	$1,000	$17,000
	All Tribes	1	1	$15,000	$34,000	$10,000	$24,000	$1,000	$2,000

Exhibit 7-9

FUTURE IMPACTS ASSOCIATED WITH OTHER ACTIVITIES BY AGENCY (2004 – 2013)

		Consultations		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)		Annual Costs (2003$)	
Agency	**Management Unit**	**Informal**	**Formal**	**Low**	**High**	**Low**	**High**	**Low**	**High**
BIA Total		**13**	**5**	**$113,000**	**$1,111,000**	**$79,000**	**$780,000**	**$8,000**	**$78,000**
NPS	Bandelier NM	0	0	$40,000	$40,000	$28,000	$28,000	$3,000	$3,000
	Canyon de Chelly NM	0	0	$5,000	$210,000	$4,000	$147,000	$400	$15,000
	Canyonlands NP	0	0	$30,000	$30,000	$21,000	$21,000	$2,000	$2,000
	Capitol Reef NP	10	0	$23,000	$186,000	$16,000	$131,000	$2,000	$13,000
	Chiricahua NM	0	1	$53,000	$61,000	$37,000	$43,000	$4,000	$4,000
	Coronado NM	0	0	$5,000	$5,000	$4,000	$4,000	$400	$0
	El Malpais NM	0	0	$5,000	$210,000	$4,000	$147,000	$400	$15,000
	Glen Canyon NRA	0	0	$5,000	$5,000	$4,000	$4,000	$400	$0
	Grand Canyon NP	2	1	$22,000	$257,000	$16,000	$180,000	$2,000	$18,000
	Navajo NM	3	0	$12,000	$248,000	$8,000	$174,000	$1,000	$17,000
	Rainbow Bridge NM	0	0	$5,000	$210,000	$4,000	$147,000	$0	$15,000
	Saguaro NP	10	0	$223,000	$326,000	$157,000	$229,000	$16,000	$23,000
	Walnut Canyon NM	0	0	$5,000	$210,000	$4,000	$147,000	$400	$15,000
	Zion NP	30	0	$351,000	$660,000	$246,000	$463,000	$25,000	$46,000
NPS Total		**55**	**2**	**$783,000**	**$2,657,000**	**$550,000**	**$1,866,000**	**$55,000**	**$187,000**
Other Federal Agencies**		**33**	**33**	**$870,000**	**$3,151,000**	**$611,000**	**$2,213,000**	**$61,000**	**$221,000**
TOTALS		**498**	**61**	**$3,499,000**	**$17,792,000**	**$2,457,000**	**$12,496,000**	**$246,000**	**$1,250,000**

* Administrative costs and project modification costs are discounted assuming a rate of seven percent.

** Other Federal agencies include consultations with the Department of Defense, Department of Transportation, Department of Energy, Bureau of Reclamation, EPA, and OSM.

Source: U.S. Fish and Wildlife administrative record for the Mexican Spotted Owl, personal communication with Action agencies, IEc cost model.

POTENTIAL IMPACTS ON SMALL ENTITIES SECTION 8

405. This section considers the extent to which the analytic results presented above reflect future 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. As discussed earlier, impacts from MSO conservation on the timber industry (Section 3) and livestock grazing industry (Section 4), including small business impacts, are primarily limited to USFS Region 3 (Arizona and New Mexico). The following summarizes the sources of potential future impacts on small businesses related to the proposed CHD. As noted previously, these impacts may be overstated where impacts related to MSO could not be separated from impacts related to other factors, such as the declining timber market, changes in USFS management practices, or drought.

- ***Reduced Federal timber sales***. Continued restrictions on the area where timber sales can occur on USFS Region 3 lands has reduced the volume of timber available to the industry. As discussed in Section 3, the impacts of these restrictions result in a forecast annual reduction in timber harvest of 60 MMBF; this represents a volume of timber harvest that would have been available but for MSO related conservation efforts. Because harvest restrictions have been occurring since USFS Region 3 implemented Recovery Plan guidance, the regional timber industry has likely already absorbed and adjusted to the reduced timber supply. However, given the current status of the regional industry, any additional reductions in timber supply from NFs resulting from future MSO conservation efforts would directly impact timber-related businesses in the region, all of whom are likely to be small businesses.

- ***Reduced livestock grazing on Federal lands***. Limitations on livestock grazing on Federal lands are expected to impact ranchers in the region. As discussed in Section 4, MSO conservation activities are expected to result in a reduction in the number of AUMs authorized under grazing permits on USFS Region 3 lands. The expected reduction in AUMs has the potential to impact between three and 15 ranchers on an annual basis. If the impacts of a reduction in AUMs were evenly distributed across all 850 permittees in the proposed CHD, this would result in an annual reduction of 4 to 19 AUMs per permittee (out of an average of about 1,000 AUMs per operation).

- ***Impacts to oil and gas companies from MSO conservation efforts***. Impacts to oil and gas activities resulting from MSO conservation activities have the potential to affect some small businesses operating in the proposed CHD in New Mexico and Utah. As

discussed in Section 7.2, expected future impacts on the oil and gas industry include administrative costs, project modification costs, and delay impacts. Estimated impacts related to project modifications and administrative efforts are likely to be minimal on a per-business basis. The analysis also estimates regional economic impacts related to delays in oil and gas drilling activities in MSO CHD unit CP-15 (on BLM lands in Utah), forecasting that up to five wells per year could be impacted by delays. While regional economic impacts are possible, it is likely that producers will be able to shift production to other locations, if not in the region then elsewhere. However, if oil and gas producers are unable to shift production elsewhere, up to five companies could be impacted per year, assuming each delayed well belonged to a unique company. The impact of the loss of one well would depend on the finances of the company. Most of the oil and gas companies that operate in New Mexico and Utah are headquartered outside of the region and have operations in multiple locations; therefore, the relevant area for purposes of this small business analysis is the United States. Given the large number of oil and gas small businesses nationwide, only a small portion of these are expected to be affected.

- ***Increased administrative efforts for rock quarry operators***. A private rock quarry operation in Colorado may experience increased administrative costs resulting from MSO conservation activities. As discussed in Section 7 of this report, the estimated impacts to this individual quarry operation related to preparation of a HCP are likely to be considerable.

406. The Small Business Administration size standards for various types of businesses likely to be affected, and the geographic region used in this small business analysis, for each of these industries are provided in Exhibit 8-1.

407. The remainder of this section addresses the potential impacts to small business in each of these industries.

Exhibit 8-1

SMALL BUSINESS SIZE STANDARDS AND APPLICABLE GEOGRAPHIC REGION FOR SMALL BUSINESS IMPACTS ANALYSIS

NAICS Code/Industry	Size Standard	Affected Region
Timber Industry		
113110: Timber Tract Operations	$750,000	Counties containing proposed critical habitat in Arizona and New Mexico
113310 Logging	500 employees	
115310: Support Activities for Forestry	$6,000,000	
Subsector 321: Wood Product Manufacturing (Including sawmills	500 employees	
322110: Pulpmills	750 employees	
Livestock Grazing Industry		
112111: Beef Cattle Ranching and Farming	$750,000	Counties containing proposed critical habitat in Arizona and New Mexico
Oil and Gas Industry		
Subsector 211: Oil and Gas Extraction	500 employees	United States
Rock Quarry Industry		
21231: Stone Mining & Quarrying	500 employees	Counties containing proposed critical habitat in Colorado

Source: Size standards based on SBA's Table of Small Business Size Standards based on NAICS 2002 (http://www.sba.gov/size/indextableofsize.html).

8.1 Timber Industry Small Business Impacts

408. Limited data are available on the number of timber-related small businesses in the region or the average revenues of small businesses in this industry. Available data suggest that approximately 84 percent of timber-related businesses in the affected region are small businesses.[255]

409. As discussed in Section 2.2, the timber industry in the southwest has declined over the past 10 years due to a variety of factors, including MSO related conservation activities. These factors include changes in the USFS forest timber sales program at the national level, injunctions that halted timber sales in the region, and changes in regional USFS forest management objectives. Since 1992, at least 15 mills have closed in the region, leaving approximately 15 sawmills currently operating in Arizona and New Mexico with an annual capacity of 61 MMBF (see Exhibit 2-9).[256] Timber harvest within USFS Region 3 forests has declined over the past 15 years (see Exhibit 2-10), from an annual harvest of 148 MMBF per year over the past 15 years, to the current level of 20 MMBF harvested in 2002. Lumber

[255] Information based on a Dialog search of file 516 Dun and Bradstreet, "Dun's Market Identifiers," updated in November 2003.

[256] Major Mill Closure Summary, Arizona and New Mexico, August 2003. Email communication from Paul Fink, Region 3, USFS, January 8, 2004.

production in the region has seen similar declines (see Exhibit 2-7). Current lumber production in the four corners region was 187 MMBF in 2002.[257]

410. Without MSO-related conservation efforts, up to an additional 60 MMBF per year in timber harvest could have been available to the timber industry from USFS Region 3 forests. This forecast high-end impact translates into approximately 78 MMBF in lost lumber production per year. As these are ongoing annual impacts related to past conservation actions, the timber industry has likely already adjusted to the reduced level of timber harvest from NFs. Thus, future impacts to existing timber-related businesses in the region, all of whom are likely to be small businesses, are unlikely. These impacts would only occur if MSO conservation efforts resulted in additional reductions in timber supply, above the forecast upper bound estimates. Given the current level of timber sales from USFS Region 3 NFs, it is worth noting that sawmills operating in the region are likely dependent on either Tribal or private timber sources for their supply.[258]

8.2 Livestock Grazing Small Business Impacts

411. Approximately 1,500 permittees grazed cattle on USFS Region 3 forests during the past three years (2000 to 2002) and most of these operations are small businesses.[259] Of these, approximately 850 permittees graze in the proposed CHD in USFS Region 3 national forests.[260] For purposes of this analysis, these are all assumed to be small entities. A number of these ranchers will be impacted by ongoing MSO conservation activities, which, along with other factors including drought, result in limitations on the number of authorized AUMs permitted on USFS Region 3 lands.

412. As discussed in Section 4, the expected reduction in AUMs is based on an examination of historical grazing levels and section 7 consultations. The number of AUMs grazing in proposed MSO CHD is assumed to be proportional by acreage to the total number of AUMs grazed in a particular NF.[261] The economic analysis finds that reductions in AUMs

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[257] Western Wood Products Association. 2002 Statistical Yearbook of the Western Lumber Industry.

[258] Personal communication with the New Mexico Forestry Department, February 2, 2004. Mills reliance on timber from National Forests had been up to 90 percent of their supply in the early 1990s, but switched to 90 percent from private suppliers in the late 1990s.

[259] Approximately 92 percent of livestock grazing businesses in the affected region are considered small businesses. Based on a Dialog search of file 516 Dun & Bradstreet, "Dun's Market Identifiers," updated in November 2003, 92 percent of businesses in the affected counties in Arizona and New Mexico in NAICS 112111, 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 (http://www.sba.gov/size/indextableofsize.html). Available information indicates that impacts to grazing in Colorado and Utah have been very limited; therefore, the affected region is defined as USFS Region 3 (Arizona and New Mexico).

[260] Based on IEc analysis of USFS GIS information provided by USFS Region 3, December 2003, and assuming that each permittee ID represents an individual permittee.

[261] For the purposes of the grazing impacts analysis, MSO habitat was defined as only that acreage included in MSO protected activity centers (PACs). The number of AUMs authorized by forest for is available from USDA Forest Service website accessed at http://www.fs.fed.us/rangelands/infocenter/library.shtml.

as a result of MSO conservation measures, elk, and other threatened and endangered species may range from 10 percent to 50 percent for allotments that cross MSO PACs. In addition, future impacts are limited to those allotments that have yet to undergo NEPA analysis and associated consultation. Based on these assumptions, the estimated annual reduction is approximately 3,100 to 15,600 AUMs on USFS Region 3 lands.

413. Because information is not available on the specific permittees most likely to experience a reduction in authorized AUMs,[262] the analysis uses two approaches to estimate impacts on small businesses related to reductions in AUMs. First, this analysis estimates the number of permittees that could possibly experience a complete reduction in their authorized AUMs. Second, the analysis estimates the impact on each permittee in the proposed CHD, if the impacts were evenly distributed.

- Based on information on authorized AUMs and number of permittees on USFS Region 3 lands, the typical permittee grazes approximately 1,070 AUMs. Given this, a forecast annual reduction in AUMs of 3,100 to 15,600 is equivalent to the total AUMs grazed by three to 15 permittees. Thus, if the total impacts were to affect the smallest number of permittees, less than two percent of grazing permittees in the proposed CHD would be affected.

- If the impacts of a reduction in AUMs were evenly distributed across all 850 permittees in the proposed CHD, this would result in an annual reduction of 4 to 19 AUMs per permittee. Given that permittees typically graze approximately 1,070 AUMs, this represents a reduction of less than two percent of AUMs per permittee.

414. To illustrate the areas where these small business impacts are most likely to occur, Exhibit 8-2 shows the estimated reduction in authorized AUMs on USFS Region 3 NFs, by forest.

415. As illustrated in Exhibit 8-2, the area likely to experience the highest small business impacts related to reductions in grazing is around the Gila NF in New Mexico.

[262] Email communication with Ray Suazo, USFS Region 3, January 22, 2004.

Exhibit 8-2

FORECAST ANNUAL REDUCTIONS IN AUMS ON USFS REGION 3 FORESTS (SORTED BY LOST AUMs)

Management Unit (Federal Agency/Unit)	Critical Habitat Unit(s)	Location (Counties, State)	Estimated Annual Loss in AUMs
Gila NF	UGM-5, UG-M-6, UGM-7	Catron, Grant, Hidalgo, Sierra, NM	778 –3,892
Coronado NF	BR-W-8, BR-W-9, BR-W-10, BR-W-11, BR-W-12, BR-W-13, BR-W-14, BR-W-15, BR-W-16, BR-W-17, BR-W-18, BR-W-19	Cochise, Graham, Pima, Pinal, Santa Cruz, AZ & Hidalgo, NM	576 – 2,880
Cibola NF	UGM-1, UGM-2, UGM-3, UGM-4, BR-E-5, BR-E-6, BR-E-7, CP-2, OP-1	Catron, Cibola, McKinley, Socorro, Sierra, Sandoval, Bernalillo, Torrance, Lincoln, Valencia, NM	323 – 1,616
Lincoln NF	BR-E-1, BR-E-2, BR-E-3, BR-E-4	Lincoln, Otero, NM	296 – 1,481
Carson NF	SRM-NM-9, SRM-NM-10, SRM-NM-11, SRM-NM-12, SRM-NM-13	Colfax, Mora, Rio Arriba, San Juan, Taos, NM	224 – 1,122
Coconino NF	UGM-10, UGM-11, UGM-12, UGM-14, UGM-15	Coconino, Yavapai, AZ	216 – 1,080
Santa Fe NF	SRM-NM-1, SRM-NM-2, SRM-NM-3, SRM-NM-4, SRM-NM-5, SRM-NM-10	Los Alamos, Mora, Rio Arriba, Sandoval, San Miguel, Santa Fe, NM	212 – 1,059
Apache Sitgreaves NF	UGM-7, UGM-10	Apache, Navajo, Greenlee, AZ & Catron, NM	198 – 992
Tonto NF	BR-W-4, BR-W-5, BR-W-6, UGM-10	Gila, Maricopa, Pinal, Yavapai, AZ	161 – 807
Kaibab NF	UGM-13, UGM-15, UGM-17	Coconino, AZ	69 – 343
Prescott NF	BR-W-1, BR-W-2, BR-W-3, UGM-13	Coconino, Yavapai, AZ	68 – 342
Region 3 Subtotal			**3,122 – 15,613**

8.3 Oil and Gas Industry Small Business Impacts

416. Impacts to oil and gas extraction from MSO conservation activities have the potential to impact some small businesses operating in the New Mexico and Utah region. Based on historical consultation records, impacts on oil and gas operations in the past as a result of MSO conservation efforts have been limited. However, given expected growth of oil and gas operations and exploration in the proposed CHD in Utah, there is some potential for small businesses to experience greater impacts in the future. As discussed in Section 7.2,

expected future impacts on the oil and gas industry include administrative costs, project modification costs, and regional impacts resulting from delays to drilling activities.

417. Estimated impacts related to administrative efforts and project modifications are likely to be minimal on a per-business basis. Project modifications specific to oil and gas activities are forecast to range from $1,000 to $25,000 per company. However, some small businesses in this industry will likely experience localized impacts related to MSO and CHD. For example, as discussed in its comments, Bill Barrett Corporation (BBC) spent approximately $94,000 to conduct surveys for MSO in a project area within previously finalized MSO critical habitat in Utah. This corporation estimates that MSO surveys cost them from $3 to $6 an acre.

418. As discussed in Section 7.2, there is also some potential for future project modifications to include directional drilling, which could mean greater impacts to small businesses in the New Mexico and Utah area. However, the extent to which directional drilling may be required in order to protect MSO and its habitat is currently unknown; this drilling method has not been required in the past, and is not widely used in the region.

419. Estimated impacts related to delays caused by MSO surveying efforts or breeding season restrictions could affect operators in the CP-15 CHD unit in Utah, on BLM lands. While regional economic impacts resulting from MSO-related delays are estimated, the analysis expects that producers will likely shift production to other locations, if not in the region than elsewhere; thus, producer surplus losses are not expected. However, if oil and gas producers are unable to shift production elsewhere, up to five companies could be impacted per year, assuming each delayed well belonged to an individual company. The impact of the loss of one well would depend on the finances of the company. Currently, the majority of the leases in the area are held by BBC, a small business, based in Denver, Colorado.[263] BBC estimates that a typical well in the area has a net present value of $400,000.[264] If five wells are delayed each year, this could be considered the equivalent of precluding drilling of five wells if substitute drilling locations are unavailable. If all five wells belonged to BBC, this could result in an annual impact of $2.0 million. In comparison, BBC estimates that its revenues from production in one area (the Southern Uintah Basin) are in excess of $65 million per year.[265]

420. Based on a review of operators in Carbon County, Utah, the majority of operators in this industry are headquartered outside of Utah. Oil and gas companies operating in Carbon County, Utah, likely to be directly impacted by MSO related conservation efforts are located

[263] Based on a Dialog search of file 516 Dun and Bradstreet, "Dun's Market Identifiers," updated in November 2003, Bill Barrett Corporation meets the small business standard of 500 or fewer employees. Personal communication with David Mills, BLM Utah, indicates that 90% of the leases in the CHD unit CP-15 are currently held by BBC.

[264] Public comment letter from Duane Zavadil, Manager of Regulatory and Government Affairs, Bill Barrett Corporation, to U.S. Fish and Wildlife Service, Field Supervisor, dated April 26, 2004.

[265] Public Comment Letter from Duane Zavadil, Manager of Regulatory and Government Affairs, Bill Barrett Corporation, to U.S. Fish and Wildlife Service, Field Supervisor, dated December 18, 2003.

in a variety of states, including Texas, Oklahoma and Alabama, among others. Therefore, the relevant area for purposes of this analysis is the United States.

421. There are approximately 7,680 small businesses in the oil and gas extraction sector in the U.S.[266] The total number of oil and gas businesses operating in the proposed CHD in New Mexico and Utah is likely in the range of 150 operators.[267] Given the large number of oil and gas businesses nationwide, the number of potentially affected small businesses is only a small portion of small oil and gas businesses nationwide.

8.4 Stone Mining and Quarrying Industry Small Business Impacts

422. Impacts to small businesses in this industry resulting from MSO conservation efforts are likely to be limited to one rock quarry operator. The quarry project area falls within the CHD and is permitted through the State; however, private lands are excluded from the CHD by definition. At this time, it is not clear whether impacts to the quarry operator may be found on adjacent lands that are within the CHD. While there is no Federal nexus, the quarry operator has been in negotiation with the Service for an Incidental Take Permit under section 10 of the Act. This activity is voluntary, and while it is related to the MSO, it would likely occur with or without the proposed CHD. The private operator of this quarry expects to incur various costs resulting from MSO conservation activities, including $60,000 to $450,000 in one time costs and $10,000 per year in ongoing monitoring costs. Because this party is a small business with limited revenues, these expenditures represent a considerable impact to this business.[268] Available information indicates that this operator is one of 11 businesses (of which nine are small businesses) in this industry in the affected Colorado counties.[269]

423. Based on the experience of this operator, there is some likelihood that other quarries adjacent to MSO habitat may experience impacts related to MSO conservation activities. However, a review of consultation records and communication with Service staff indicate other quarry operations are not occurring in the CHD. Therefore, additional small businesses in the stone mining industry are not expected to experience impacts resulting from MSO conservation efforts.

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[266] U.S. Census Bureau, County Business Patterns data, accessed at http://censtats/census.gov/epcd/cbp/view/cbpview.html.

[267] This estimate is based on the number of active oil and gas wells in the proposed designation; there are 235 active wells, of which 84 are operated by Burlington Resources.

[268] Email communication with Keith Doyon, Red Canyon LLC, January 2004. The high end estimate includes all of the reclamation costs, of which only a portion would be attributable to the MSO. This business has annual revenues of approximately $200,000.

[269] Based on a Dialog search of file 516 Dun and Bradstreet, "Dun's Market Identifiers," updated in November 2003, nine businesses in the affected counties in Colorado in NAICS 21231, Stone Mining and Quarrying, are small (less than 500 employees).

424. 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."[270] 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 (BBLS) per day;
- Reductions in fuel production in excess of 4,000 BBLS per day;
- Reductions in coal production in excess of 5 million tons per year;
- Reductions in natural gas production in excess of 25 MMCF per year;
- Reductions in electricity production in excess of 1 billion kilowatt 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.[271]

425. None of these criteria is relevant to this analysis. The total active productive capacity of oil wells within the proposed CHD is below 4,000 BBLS per day. The total active productive capacity of natural gas wells within the proposed CHD is below 25 MMCF per year.

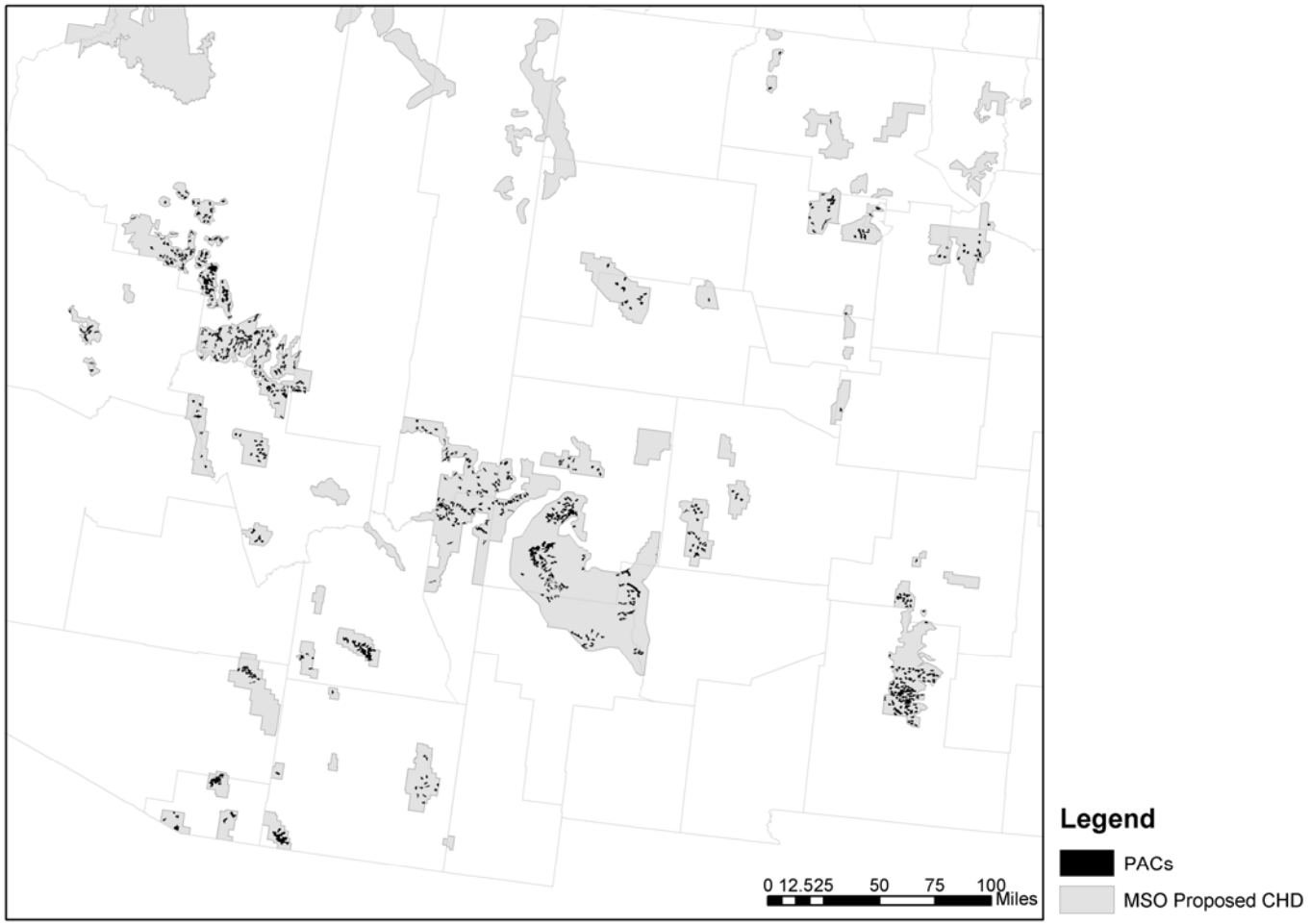
[270] Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance for Implementing E.O. 13211, M-01-27, Office of Management and Budget, July 13, 2001, http://www.whitehouse.gov/omb/memoranda/m01-27.html.

[271] Ibid.

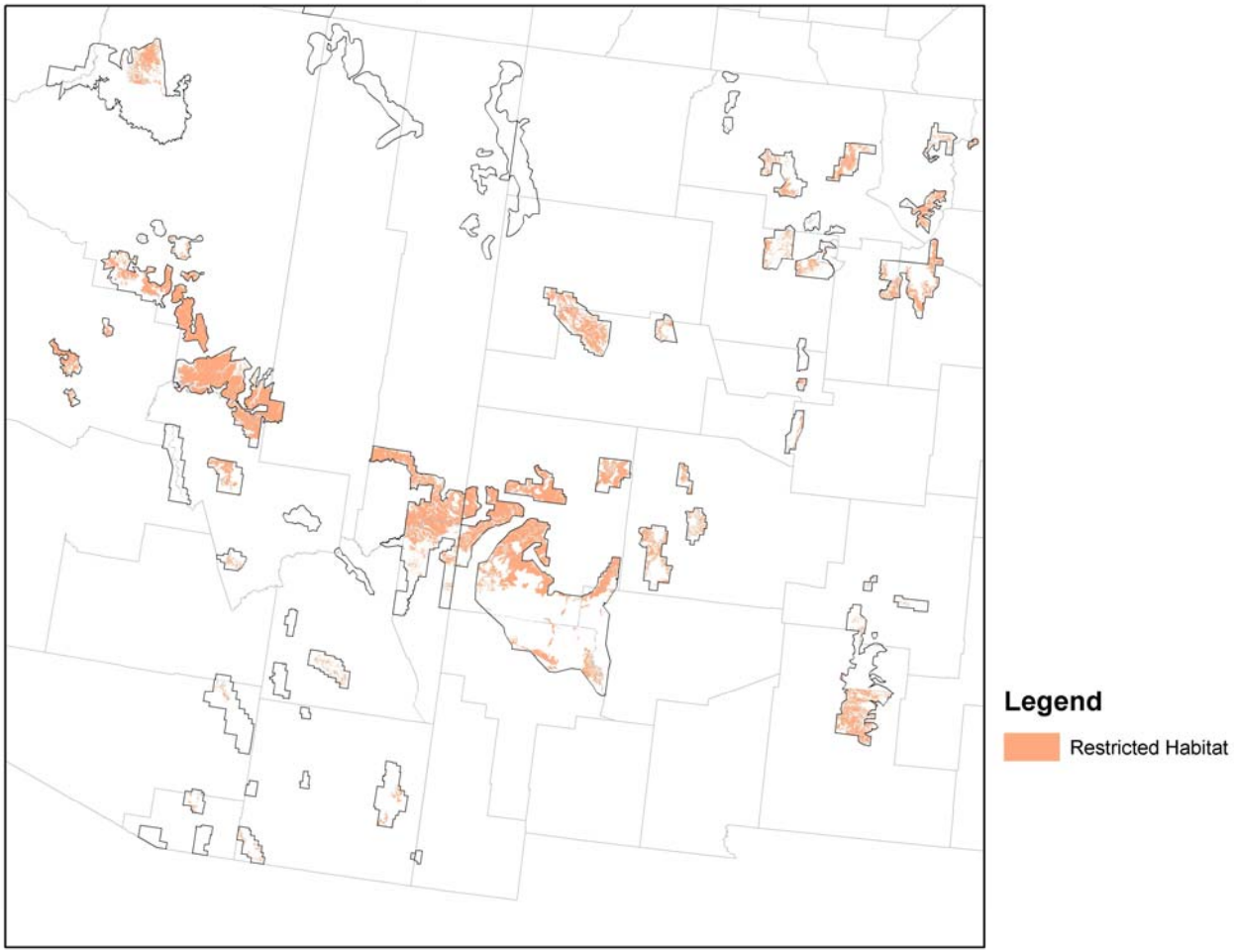
APPENDIX A.

GIS MAPS

MSO Protected Activity Centers in USFS Region 3
(New Mexico and Arizona)



Restricted Areas in MSO Critical Habitat that are
less than 40 % slope and not in Wilderness Areas

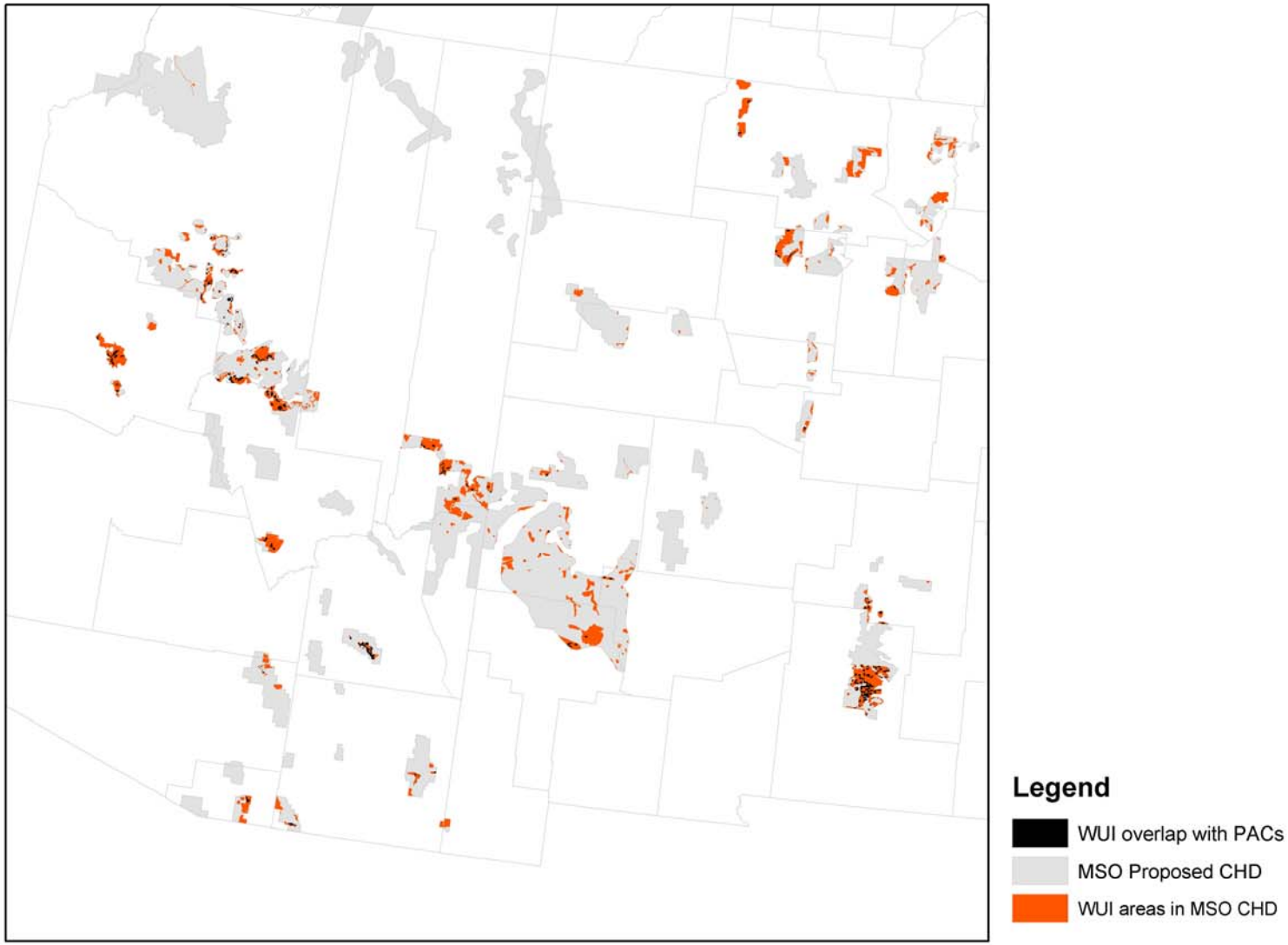


USFS Region 3 Grazing Allotments in MSO Critical Habitat

Legend

Allotments in MSO CHD

Wildland and Urban Interface Areas in USFS Region 3
that Overlap MSO Protected Activity Centers



APPENDIX B

MEXICAN SPOTTED OWL CRITICAL HABITAT ECONOMIC ANALYSIS RESULTS: POTENTIAL IMPACTS PRESENTED AT 3 PERCENT DISCOUNT RATE

426. The main body of this report presents economic impact estimates using a discount rate of seven percent. Office and Management and Budget (OMB) guidance recommends sensitivity analysis using other discount rates in addition to using a seven percent discount rate.[283] Based on OMB recommendations, this Appendix (Exhibits B-1 to B-11) provides the estimates presented in the main body of the report at a discount rate of three percent. Exhibits that appear the main body of the report which correlate to exhibits in this Appendix are presented in parentheses.

Exhibit B-1 (ES-2)

SUMMARY OF FUTURE EFFICIENCY IMPACTS (2004 – 2013)

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Efficiency Effects		
			Grazing Industry –Estimated Loss in Permit Values* (Annual, 2003$)	All Activities -- Administrative and Project Modification Costs (other than permit value)* (Annual, 2003$)	Fire Management Impacts – Acres of WUI in PACs (percent of Total WUI Acres)
US Forest Service Region 2					
Pike-San Isabel	SRM-C-1 SRM-C-2	Custer, Douglas, El Paso, Jefferson, Teller, CO	$0 - $0	$19,000 - $55,000	Not assessed[a]
US Forest Service Region 3					
Apache Sitgreaves NF	UGM-7 UGM-10	Apache, Navajo, Greenlee, AZ & Catron, NM	$13,000 - $66,000	$39,000 - $103,000	0 (0%)
Carson NF	SRM-NM-9 SRM-NM-10 SRM-NM-11 SRM-NM-12 SRM-NM-13	Colfax, Mora, Rio Arriba, San Juan, Taos, NM	$15,000 - $75,000	$22,000 - $64,000	1,451 (0.2%)

[283] U.S. Office of Management and Budget, "Guidelines to Standardize Measures of Costs and Benefits and the Format of Accounting Statements," *Appendix 4: Report to Congress on the Costs and Benefits of Federal Regulations*, March 22, 2000.

Exhibit B-1 (ES-2)

SUMMARY OF FUTURE EFFICIENCY IMPACTS (2004 – 2013)

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Efficiency Effects		
			Grazing Industry –Estimated Loss in Permit Values* (Annual, 2003$)	All Activities -- Administrative and Project Modification Costs (other than permit value)* (Annual, 2003$)	Fire Management Impacts – Acres of WUI in PACs (percent of Total WUI Acres)
Cibola NF	UGM-1 UGM-2 UGM-3 UGM-4 BR-E-5 CP-2 OP-1 BR-E-7 BR-E-6 UGM-1	Catron, Cibola, McKinley, Socorro, Sierra, Sandoval, Bernalillo, Torrance, Lincoln, Valencia, NM	$21,000 - $108,000	$21,000 - $69,000	725 (0.8%)
Coconino NF	UGM-10 UGM-11 UGM-12 UGM-14 UGM-15	Coconino, Yavapai, AZ	$14,000 - $72,000	$57,000 - $150,000	10,476 (4.4%)
Coronado NF	BR-W-8 BR-W-9 BR-W-10 BR-W-11 BR-W-12 BR-W-13 BR-W-14 BR-W-15 BR-W-16 BR-W-17 BR-W-18 BR-W-19	Cochise, Graham, Pima, Pinal, Santa Cruz, AZ & Hidalgo, NM	$38,000 - $192,000	$40,000 - $106,000	16,838 (5.8%)
Gila NF	UGM-5 UG-M-6 UGM-7	Catron, Grant, Hidalgo, Sierra, NM	$52,000 - $259,000	$24,000 - $86,000	15,691 (2.8%)
Kaibab NF	UGM-13 UGM-15 UGM-17	Coconino, AZ	$5,000 - $23,000	$27,000 - $78,000	5,469 (4.8%)
Lincoln NF	BR-E-1 BR-E-2 BR-E-3 BR-E-4	Lincoln, Otero, NM	$20,000 - $99,000	$41,000 - $123,000	42,229 (15.3%)
Prescott NF	BR-W-1 BR-W-2 BR-W-3 UGM-13	Coconino, Yavapai, AZ	$5,000 - $23,000	$2400 - $69,000	9,103 (3.2%)

Exhibit B-1 (ES-2)

SUMMARY OF FUTURE EFFICIENCY IMPACTS (2004 – 2013)

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Efficiency Effects		
			Grazing Industry –Estimated Loss in Permit Values* (Annual, 2003$)	All Activities -- Administrative and Project Modification Costs (other than permit value)* (Annual, 2003$)	Fire Management Impacts – Acres of WUI in PACs (percent of Total WUI Acres)
Santa Fe NF	SRM-NM-1 SRM-NM-2 SRM-NM-3 SRM-NM-4 SRM-NM-5 SRM-NM-10	Los Alamos, Mora, Rio Arriba, Sandoval, San Miguel, Santa Fe, NM	$14,000 - $70,000	$31,000 $97,000	5,388 (2.5%)
Tonto NF	BR-W-4 BR-W-5 BR-W-6 UGM-10	Gila, Maricopa, Pinal, Yavapai, AZ	$11,000 - $54,000	$33,000-$90,000	27,027 (7.8%)
Region wide				$36,000 - $73,000	Not assessed[a]
US Forest Service Region 4					
Dixie NF	CP-12 CP-13	Garfield, Wayne, UT	$0 - $0	$48,000 - $221,000	Not assessed[a]
Fishlake NF	CP-13	Wayne, UT	$0 - $0	$19,000 - $62,000	Not assessed[a]
Manti-La Sal NF	CP-14	San Juan, UT	$0 - $0	$20,000 - $66,000	Not assessed[a]
USFS TOTAL			**$208,000 - $1,039,000**	**$500,000 - $1,511,000**	**134,397 (4.3%)[b]**
Bureau of Land Management					
BLM/AZ	BR-W-6 BR-W-7 BR-W-9 BR-W-18 UGM-7	Cochise, Gila, Graham, Greenlee, AZ	$0 - $0	$20,000 - $59,000	Not assessed[a]
BLM/CO	SRM-C-1 SRM-C-2	Custer, Douglas, El Paso, Fremont, Huerfano, Jefferson, Pueblo, Teller, CO	$100 - $300	$32,000 - $84,000	Not assessed[a]
BLM/NM	SRM-NM-10 UGM-5	Catron, Rio Arriba, Socorro, Taos, NM	$0 - $100	$19,000 - $55,000	Not assessed[a]

Exhibit B-1 (ES-2)

SUMMARY OF FUTURE EFFICIENCY IMPACTS (2004 – 2013)

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Efficiency Effects		
			Grazing Industry –Estimated Loss in Permit Values* (Annual, 2003$)	All Activities -- Administrative and Project Modification Costs (other than permit value)* (Annual, 2003$)	Fire Management Impacts – Acres of WUI in PACs (percent of Total WUI Acres)
BLM/UT	CP-11 CP-12 CP-13 CP-14 CP-15	Carbon, San Juan, Garfield, Grand, Emery, Kane, Washington, Wayne, Uintah UT	$2,000 - $12,000	$58,000 - $311,000	Not assessed[a]
BLM Total			**$2,000 - $12,000**	**$129,000 - $509,000**	**--**
Bureau of Indian Affairs					
BIA/Mescalero	BR-E-1 BR-E-2	Lincoln, Otero, NM	*	$2,000 - $25,000	*
BIA/Navajo	CP-3 CP-4 CP-5 CP-6 CP-7 CP-8 CP-9 CP-10 CP-13	Apache, Coconino, Navajo, AZ; San Juan, McKinley, NM; San Juan, UT	*	$16,000 - $56,000	*
BIA/San Carlos	BR-W-7 UGM-9	Apache, Gila, Graham, Greenlee, AZ	*	$1,000 - $20,000	*
Other Tribes			*	$3,000 - $34,000	*
All Tribes			*	$1,000 - $3,000	*
BIA Total			*	**$24,000 - $138,,000**	*****
National Park Service					
Bandelier NM	SRM-NM-4	Los Alamos, Sandoval, NM	$0	$14,000 - $24,000	Not assessed[a]
Canyon de Chelly NM	CP-6 CP-7	Apache, AZ	$0	$9,000 - $35,000	Not assessed[a]
Canyonlands NP	CP-14	Garfield, San Juan, Wayne, UT	$0	$11,000 - $20,000	Not assessed[a]
Capitol Reef NP	CP-13	Garfield, Wayne, UT	$0	$10,000 - $33,000	Not assessed[a]
Chiricahua NP	BR-W-18	Cochise, AZ	$0	$15,000 - $27,000	Not assessed[a]
Coronado NM	BR-W-15	Cochise, AZ	$0	$9,000 - $17,000	Not assessed[a]
El Malpais NM	CP-2	Cibola, NM	$0	$9,000 - $36,000	Not assessed[a]

Exhibit B-1 (ES-2)

SUMMARY OF FUTURE EFFICIENCY IMPACTS (2004 – 2013)

Agency / Management Unit	Critical Habitat Unit(s)	Location (County, State)	Efficiency Effects		
			Grazing Industry –Estimated Loss in Permit Values* (Annual, 2003$)	All Activities -- Administrative and Project Modification Costs (other than permit value)* (Annual, 2003$)	Fire Management Impacts – Acres of WUI in PACs (percent of Total WUI Acres)
Glen Canyon NRA	CP-13 CP-14	Garfield, San Juan, UT	$0	$9,000 - $17,000	Not assessed[a]
Grand Canyon NP	CP-10	Coconino, Mohave, AZ	$0	$17,000 - $50,000	Not assessed[a]
Navajo NM	CP-9	Coconino, Navajo, AZ	$0	$10,000 - $38,000	Not assessed[a]
Rainbow Bridge NP	CP-13	San Juan, NM	$0	$9,000 - $35,000	Not assessed[a]
Saguaro NP	BR-W-11	Pima, AZ	$0	$28,000 - $47,000	Not assessed[a]
Walnut Canyon NP	UGM-12	Coconino, AZ	$0	$9,000 - $35,000	Not assessed[a]
Zion NP	CP-11	Iron, Kane, Washington, UT	$0	$38,000 - $73,000	Not assessed[a]
NPS Total			**$0**	**$198,000 - $488,000**	**--**
Other Federal Agencies**			$0	$87,000 - $294,000	Not assessed[a]
TOTALS			**$210,000 – $1,051,000**	**$938,000 - $2,940,000**	**134,397 (4.3%)[b]**
GRAND TOTAL, EFFICIENCY EFFECTS					**$1,148,000 - $3,991,000**

Notes: * Loss in permit values, administrative costs and project modification costs are discounted assuming a rate of seven percent. Totals may not sum due to rounding.

** Includes administrative and project modification costs for Federal Agencies (e.g., Department of Defense, Department of Transportation) engaging in consultation for "Other Activities". See Section 7.

[a] Data not available to conduct assessment of acres of WUI in PACs; direct fire management costs are included under "All Activities" column.

[b] Weighted average.

Exhibit B-2 (3-3)

SUMMARY OF PAST ADMINISTRATIVE COSTS RELATED TO TIMBER SALES (1993-2003)

Agency	Management Unit	Consultations		Total Administrative (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Informal	Formal	Low	High	Low	High	Low	High
USFS Region 2	Pike-San Isabel	1	0	$2,300	$12,600	$3,000	$15,000	$240	$1,000
	Region 2 Subtotal	1	0	$2,300	$12,600	$3,000	$15,000	$240	$1,000
USFS Region 3	Apache Sitgreaves	10	2	$48,200	$168,800	$56,000	$197,000	$5,000	$18,000
	Carson NF	3	0	$6,900	$37,800	$8,000	$44,000	$730	$4,000
	Cibola NF	4	0	$9,200	$50,400	$11,000	$59,000	$1,000	$5,000
	Coconino NF	21	3	$86,100	$328,800	$100,000	$383,000	$9,000	$35,000
	Coronado NF	0	0	$0	$0	$0	$0	$0	$0
	Gila NF	15	0	$34,500	$189,000	$40,000	$220,000	$4,000	$20,000
	Kaibab NF	7	0	$16,100	$88,200	$19,000	$103,000	$2,000	$9,000
	Lincoln NF	14	0	$32,200	$176,400	$37,000	$205,000	$3,000	$19,000
	Prescott	0	1	$12,600	$21,400	$15,000	$25,000	$1,000	$2,000
	Santa Fe NF	9	2	$45,900	$156,200	$53,000	$182,000	$5,000	$17,000
	Tonto NF	9	2	$45,900	$156,200	$53,000	$182,000	$5,000	$17,000
	Region wide*	9	8	$1,956,500	$2,119,600	$2,278,000	$2,468,000	$207,000	$224,000
	Region 3 Subtotal	101	18	$2,294,100	$3,492,800	$2,671,000	$4,067,000	$243,000	$370,000
USFS Region 4	Dixie NF	28	0	$64,400	$352,800	$75,000	$411,000	$7,000	$37,000
	Fishlake NF	2	0	$4,600	$25,200	$5,000	$29,000	$490	$3,000
	Manti-La Sal NF	0	0	$0	$0	$0	$0	$0	$0
	Region 4 Subtotal	30	0	$69,000	$378,000	$80,000	$440,000	$7,300	$40,000
USFS TOTAL		132	18	$2,365,400	$3,883,400	$2,754,000	$4,522,000	$250,000	$411,000
BLM		1	0	$2,300	$12,600	$3,000	$15,000	$240	$1,000
BIA		22	1	$63,200	$298,600	$74,000	$348,000	$7,000	$32,000
DOD- Navy		1	0	$2,300	$12,600	$3,000	$15,000	$0	$1,000
TOTALS		**156**	**19**	**$2,433,200**	**$4,207,200**	**$2,833,000**	**$4,899,000**	**$258,000**	**$445,000**

Sources: IEc analysis based on data from the Federal Government General Schedule Rates, Office of Personnel Management, 2002, a review of consultation records from Service field offices, and communications with Biologists in the Albuquerque, New Mexico and Flagstaff, Colorado FWS Field Offices.

Notes: * USFS Region 3 includes costs associated with past recovery planning efforts and estimated costs for the Service associated with reviewing the current LRMPs Biological Assessment. This exhibit does not include spending tracked in USFS' Wildlife, Fish and Rare Plants Report because it likely overlaps with other USFS administrative costs.

** Administrative costs and project modification costs are discounted assuming a rate of seven percent.

Exhibit B-3 (3-11)

SUMMARY OF FUTURE ADMINISTRATIVE EFFORTS RELATED TO TIMBER SALES (2004-2013)

Agency	Management Unit	Consultations		Total Administrative (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Informal	Formal	Low	High	Low	High	Low	High
USFS Region 2	Pike-San Isabel	1	0	$2,300	$12,600	$2,000	$11,000	$200	$1,100
	Region 2 Subtotal	**1**	**0**	$2,300	$12,600	$2,000	$11,000	**$200**	**$1,100**
USFS Region 3	Apache Sitgreaves	10	2	$48,200	$168,800	$41,000	$144,000	$4,000	$14,000
	Carson NF	3	0	$6,900	$37,800	$6,000	$32,000	$600	$3,000
	Cibola NF	4	0	$9,200	$50,400	$8,000	$43,000	$800	$4,000
	Coconino NF	21	3	$86,100	$328,800	$73,000	$280,000	$7,300	$28,000
	Coronado NF	0	0	$0	$0	$0	$0	$0	$0
	Gila NF	15	0	$34,500	$189,000	$29,000	$161,000	$3,000	$16,000
	Kaibab NF	7	0	$16,100	$88,200	$14,000	$75,000	$1,000	$8,000
	Lincoln NF	14	0	$32,200	$176,400	$27,000	$150,000	$3,000	$15,000
	Prescott	0	1	$12,600	$21,400	$11,000	$18,000	$1,100	$2,000
	Santa Fe NF	9	2	$45,900	$156,200	$39,000	$133,000	$4,000	$13,000
	Tonto NF	9	2	$45,900	$156,200	$39,000	$133,000	$4,000	$13,300
	Region wide*	9	8	$271,500	$434,600	$232,000	$371,000	$23,000	$37,000
	Region 3 Subtotal	**101**	**18**	$609,100	$1,807,800	$520,000	$1,542,000	$52,000	$154,000
USFS Region 4	Dixie NF	28	0	$64,400	$352,800	$55,000	$301,000	$5,000	$30,000
	Fishlake NF	2	0	$4,600	$25,200	$4,000	$21,000	$400	$2,000
	Manti-La Sal NF	0	0	$0	$0	$0	$0	$0	$0
	Region 4 Subtotal	**30**	**0**	$69,000	$378,000	$59,000	$322,000	$6,000	$32,000
USFS TOTAL		**132**	**18**	**$680,400**	**$2,198,400**	**$580,000**	**$1,875,000**	**$58,000**	**$188,000**
BLM		**1**	**0**	$2,300	$12,600	$2,000	$11,000	**$200**	**$1,100**
BIA		**22**	**1**	$63,200	$298,600	$54,000	$255,000	$5,000	$25,000
DOD- Navy		**1**	**0**	$2,300	$12,600	$2,000	$11,000	$200	$1,100
TOTALS		**156**	**19**	$748,200	$2,522,200	$638,000	$2,151,000	$64,000	$215,000

Sources: IEc analysis based on data from the Federal Government General Schedule Rates, Office of Personnel Management, 2002, a review of consultation records from Service field offices, and communications with Biologists in the Albuquerque, New Mexico and Flagstaff, Arizona U.S. Fish and Wildlife Service Field Offices.

Exhibit B-4 (3-5)

PAST EFFICIENCY EFFECTS FOR TIMBER ATIVITIES ASSOCIATED WITH MSO CONSERVATION EFFORTS: 1993 – 2003
(Millions of 2003 dollars)

Administrative Costs	Project Modification Costs	Total
$2.8 - $4.9	None	$2.8 - $4.9
	Annualized @ 3% (1993-2003):	$0.3 - $0.5

Note: This exhibit does not include spending tracked in USFS' Wildlife, Fish and Rare Plants Report because it likely overlaps with other USFS administrative costs.

Exhibit B-5 (3-12)

FORECAST FUTURE EFFICIENCY EFFECTS FOR TIMBER ACTIVITIES ASSOCIATED WITH MSO CONSERVATION EFFORTS: 2004 - 2013
(Millions of 2003 dollars)

Administrative Costs	Project Modification Costs	Total
$0.6 - $2.2	Minimal	$0.6 - $2.2
	Annualized @ 3 % (2004-2013):	$0.06 - $0.2

Exhibit B-6 (4-5)

PAST IMPACTS OF MSO CONSERVATION EFFORTS ON LIVESTOCK GRAZING (1993-2003)

Agency	Management Unit	Total Estimated Loss in Permit Value (Nominal $)		Consultations*		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Low	High	Informal	Formal	Low	High	Low	High	Low	High
USFS Region 2	Pike-San Isabel	$0	$0	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	Region 2 Subtotal	$0	$0	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
USFS Region 3	Apache Sitgreaves	$362,000	$1,811,000	1	4	$415,000	$1,580,000	$483,000	$1,840,000	$44,000	$167,000
	Carson NF	$79,000	$396,000	0	0	$165,000	$496,000	$192,000	$578,000	$17,000	$53,000
	Cibola NF	$844,000	$4,220,000	0	0	$698,000	$3,161,000	$813,000	$3,680,000	$74,000	$335,000
	Coconino NF	$175,000	$875,000	5	3	$281,000	$957,000	$328,000	$1,115,000	$30,000	$101,000
	Coronado NF	$277,000	$1,382,000	0	1	$316,000	$1,204,000	$367,000	$1,402,000	$33,000	$127,000
	Gila NF	$631,000	$3,154,000	2	0	$555,000	$2,443,000	$646,000	$2,845,000	$59,000	$259,000
	Kaibab NF	$70,000	$354,000	0	0	$159,000	$467,000	$185,000	$544,000	$17,000	$49,000
	Lincoln NF	$195,000	$973,000	1	2	$274,000	$953,000	$318,000	$1,110,000	$29,000	$101,000
	Prescott	$22,000	$108,000	0	0	$125,000	$295,000	$146,000	$343,000	$13,000	$31,000
	Santa Fe NF	$112,000	$558,000	1	0	$190,000	$622,000	$222,000	$724,000	$20,000	$66,000
	Tonto NF	$44,000	$225,000	1	1	$156,000	$411,000	$182,000	$479,000	$17,000	$44,000
	Region wide	$0	$0	3	3	$45,000	$102,000	$52,000	$119,000	$5,000	$11,000
	Region 3 Subtotal	$2,811,000	$14,056,000	14	14	$3,378,000	$12,692,000	$3,933,000	$14,778,000	$358,000	$1,343,000
USFS Region 4	Dixie NF	$0	$0	9	1	$143,000	$355,000	$167,000	$413,000	$15,000	$38,000
	Fishlake NF	$0	$0	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	Manti-La Sal NF	$0	$0	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	Region 4 Subtotal	$0	$0	9	1	$363,000	$795,000	$423,000	$925,000	$38,000	$84,000
USFS TOTAL		**$2,811,000**	**$14,056,000**	**23**	**15**	$3,851,000	$13,707,000	**$4,484,000**	**$15,959,000**	**$408,000**	**$1,451,000**
BLM	BLM/AZ	$0	$0	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	BLM/CO	$0	$0	1	0	$112,000	$233,000	$131,000	$271,000	$12,000	$25,000
	BLM/NM	$0	$0	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	BLM/UT	$0	$0	59	0	$246,000	$963,000	$286,000	$1,122,000	$26,000	$102,000
	District wide	$0	$0	0	0	$0	$0	$0	$0	$0	$0
BLM Total		**$0**	**$0**	**60**	**0**	$578,000	$1,636,000	**$673,000**	**$1,905,000**	**$61,000**	**$173,000**
TOTALS		**$2,811,000**	**$14,056,000**	**83**	**15**	**$4,429,000**	**$15,343,000**	**$5,157,000**	**$17,864,000**	**$469,000**	**$1,624,000**

* Administrative costs and project modification costs are discounted assuming a rate of three percent.

Source: US Fish and Wildlife administrative record for the Mexican Spotted Owl, personal communication with Action Agencies, IEc cost model.

Exhibit B-7 (4-6)

FUTURE IMPACTS OF MSO CONSERVATION EFFORTS ON LIVESTOCK GRAZING (2004-2013)

Agency	Management Unit	Total Estimated Loss in Permit Value (Nominal $)		Consultations*		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Low	High	Informal	Formal	Low	High	Low	High	Low	High
USFS Region 2	Pike-San Isabel	$0	$0	0	1	$100,000	$200,000	$96,000	$189,000	$10,000	$19,000
	Region 2 Subtotal	**$0**	**$0**	**0**	**1**	**$100,000**	**$200,000**	**$96,000**	**$189,000**	**$10,000**	**$19,000**
USFS Region 3	Apache Sitgreaves	$155,000	$774,000	1	5	$255,000	$974,000	$273,000	$933,000	$27,000	$93,000
	Carson NF	$175,000	$875,000	0	0	$275,000	$1,075,000	$235,000	$917,000	$23,000	$92,000
	Cibola NF	$252,000	$1,261,000	0	0	$352,000	$1,461,000	$300,000	$1,246,000	$30,000	$125,000
	Coconino NF	$169,000	$843,000	6	4	$269,000	$1,043,000	$284,000	$1,027,000	$28,000	$103,000
	Coronado NF	$449,000	$2,246,000	0	1	$549,000	$2,446,000	$479,000	$2,105,000	$48,000	$210,000
	Gila NF	$607,000	$3,035,000	2	0	$707,000	$3,235,000	$607,000	$2,781,000	$61,000	$278,000
	Kaibab NF	$53,000	$267,000	0	0	$153,000	$467,000	$131,000	$398,000	$13,000	$40,000
	Lincoln NF	$231,000	$1,155,000	1	2	$331,000	$1,355,000	$306,000	$1,203,000	$31,000	$120,000
	Prescott	$53,000	$267,000	0	0	$153,000	$467,000	$131,000	$398,000	$13,000	$40,000
	Santa Fe NF	$165,000	$826,000	1	0	$265,000	$1,026,000	$228,000	$886,000	$23,000	$89,000
	Tonto NF	$126,000	$629,000	1	1	$226,000	$829,000	$205,000	$736,000	$21,000	$74,000
	Region wide			4	4	$0	$0	$51,000	$116,000	$5,000	$12,000
	Region 3 Subtotal	**$2,435,000**	**$12,178,000**	**16**	**17**	**$3,535,000**	**$14,378,000**	**$3,230,000**	**$12,747,000**	**$323,000**	**$1,275,000**
USFS Region 4	Dixie NF	$0	$0	9	0	$100,000	$200,000	$103,000	$267,000	$10,000	$27,000
	Fishlake NF	$0	$0	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	Manti-La Sal NF	$0	$0	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	Region 4 Subtotal	**$0**	**$0**	**9**	**0**	**$300,000**	**$600,000**	**$274,000**	**$609,000**	**$27,000**	**$61,000**
USFS TOTAL		**$2,435,000**	**$12,178,000**	**25**	**18**	**$3,935,000**	**$15,178,000**	**$3,599,000**	**$13,544,000**	**$360,000**	**$1,354,000**
BLM	BLM/AZ	$0	$0	0	1	$100,000	$200,000	$96,000	$189,000	$10,000	$19,000
	BLM/CO	$1,000	$3,000	1	1	$101,000	$203,000	$99,000	$202,000	$10,000	$20,000
	BLM/NM	$0	$1,000	0	1	$100,000	$201,000	$96,000	$190,000	$10,000	$19,000
	BLM/UT	$27,000	$137,000	59	1	$127,000	$337,000	$235,000	$940,000	$23,000	$94,000
	District wide	$0	$0	0	0	$0	$0	$0	$0	$0	$0
BLM Total		**$28,000**	**$141,000**	**60**	**4**	**$428,000**	**$941,000**	**$526,000**	**$1,521,000**	**$53,000**	**$152,000**
TOTALS		**$2,463,000**	**$12,319,000**	**85**	**22**	**$4,363,000**	**$16,119,000**	**$4,125,000**	**$15,065,000**	**$412,000**	**$1,507,000**

* Administrative costs and project modification costs are discounted assuming a rate of three percent.

Source: US Fish and Wildlife administrative record for the Mexican Spotted Owl, personal communication with Action Agencies, IEc cost model.

Exhibit B-8 (5-5)

PAST IMPACTS OF MSO CONSERVATION EFFORTS ON FIRE MANAGEMENT (1993-2003)

Agency	Management Unit	Consultations*		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Informal	Formal	Low	High	Low	High	Low	High
USFS Region 2	Pike-San Isabel	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	Region 2 Subtotal	**0**	**0**	**$110,000**	**$220,000**	**$128,000**	**$256,000**	**$12,000**	**$23,000**
USFS Region 3	Apache Sitgreaves	4	4	$170,000	$356,000	$197,000	$415,000	$18,000	$38,000
	Carson NF	7	1	$139,000	$330,000	$161,000	$384,000	$15,000	$35,000
	Cibola NF	6	0	$124,000	$296,000	$144,000	$344,000	$13,000	$31,000
	Coconino NF	8	8	$229,000	$492,000	$267,000	$573,000	$24,000	$52,000
	Coronado NF	6	3	$162,000	$360,000	$188,000	$419,000	$17,000	$38,000
	Gila NF	6	0	$124,000	$296,000	$144,000	$344,000	$13,000	$31,000
	Kaibab NF	5	4	$172,000	$369,000	$200,000	$429,000	$18,000	$39,000
	Lincoln NF	8	3	$166,000	$385,000	$194,000	$448,000	$18,000	$41,000
	Prescott	2	1	$127,000	$267,000	$148,000	$310,000	$13,000	$28,000
	Santa Fe NF	13	2	$165,000	$427,000	$192,000	$497,000	$17,000	$45,000
	Tonto NF	8	4	$179,000	$406,000	$208,000	$473,000	$19,000	$43,000
	Region wide	5	1	$24,000	$84,000	$28,000	$98,000	$3,000	$9,000
	Region 3 Subtotal	**78**	**31**	**$1,780,000**	**$4,066,000**	**$2,073,000**	**$4,734,000**	**$188,000**	**$430,000**
USFS Region 4	Dixie NF	19	0	$154,000	$459,000	$179,000	$535,000	$16,000	$49,000
	Fishlake NF	2	0	$115,000	$245,000	$133,000	$285,000	$12,000	$26,000
	Manti-La Sal NF	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	Region 4 Subtotal	**21**	**0**	**$378,000**	**$925,000**	**$440,000**	**$1,077,000**	**$40,000**	**$98,000**
USFS TOTAL		**99**	**31**	**$2,268,000**	**$5,211,000**	**$2,641,000**	**$6,067,000**	**$240,000**	**$552,000**
BLM	BLM/AZ	1	0	$112,000	$233,000	$131,000	$271,000	$12,000	$25,000
	BLM/CO	1	0	$112,000	$233,000	$131,000	$271,000	$12,000	$25,000
	BLM/NM	1	0	$112,000	$233,000	$131,000	$271,000	$12,000	$25,000
	BLM/UT	2	0	$115,000	$245,000	$133,000	$285,000	$12,000	$26,000
	District wide	0	0	$0	$0	$0	$0	$0	$0
BLM Total		**5**	**0**	**$452,000**	**$943,000**	**$526,000**	**$1,098,000**	**$48,000**	**$100,000**
BIA	BIA/Mescalero	0	0	$0	$0	$0	$0	$0	$0
	BIA/Navajo	2	0	$115,000	$245,000	$133,000	$285,000	$12,000	$26,000

Exhibit B-8 (5-5)

PAST IMPACTS OF MSO CONSERVATION EFFORTS ON FIRE MANAGEMENT (1993-2003)

Agency	Management Unit	Consultations*		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Informal	Formal	Low	High	Low	High	Low	High
	BIA/San Carlos	0	0	$0	$0	$0	$0	$0	$0
	Other Tribes	0	0	$0	$0	$0	$0	$0	$0
	All Tribes	0	0	$0	$0	$0	$0	$0	$0
BIA Total		**2**	**0**	**$115,000**	**$245,000**	**$133,000**	**$285,000**	**$12,000**	**$26,000**
NPS	Bandelier NM	0	1	$123,000	$241,000	$143,000	$281,000	$13,000	$26,000
	Canyon de Chelly NM	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	Canyonlands NP	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	Capitol Reef NP	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	Chiricahua NM	2	1	$127,000	$267,000	$148,000	$310,000	$13,000	$28,000
	Coronado NM	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	El Malpais NM	2	0	$115,000	$245,000	$133,000	$285,000	$12,000	$26,000
	Glen Canyon NRA	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	Grand Canyon NP	1	4	$163,000	$318,000	$189,000	$370,000	$17,000	$34,000
	Navajo NM	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	Rainbow Bridge NM	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
	Saguaro NP	8	0	$128,000	$321,000	$150,000	$374,000	$14,000	$34,000
	Walnut Canyon NM	1	0	$112,000	$233,000	$131,000	$271,000	$12,000	$25,000
	Zion NP	0	0	$110,000	$220,000	$128,000	$256,000	$12,000	$23,000
NPS Total		**14**	**6**	**$1,648,000**	**$3,385,000**	**$1,919,000**	**$3,941,000**	**$174,000**	**$358,000**
Other Federal Agencies**		**1**	**2**	**$28,000**	**$55,000**	**$32,000**	**$65,000**	**$3,000**	**$6,000**
TOTALS		**121**	**39**	**$4,510,000**	**$9,839,000**	**$5,251,000**	**$11,456,000**	**$477,000**	**$1,041,000**

** Administrative costs and project modification costs are discounted assuming a rate of three percent.

Source: US Fish and Wildlife administrative record for the Mexican Spotted Owl, personal communication with Action Agencies, IEc cost model.

Exhibit B-9 (5-6)

FUTURE IMPACTS OF MSO CONSERVATION EFFORTS ON FIRE MANAGEMENT (2004-2013)

		Consultations*		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)		Annual Costs (2003$)	
Agency	**Management Unit**	**Informal**	**Formal**	**Low**	**High**	**Low**	**High**	**Low**	**High**
USFS Region 2	Pike-San Isabel	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	Region 2 Subtotal	**0**	**0**	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
USFS Region 3	Apache Sitgreaves	1	6	$178,000	$341,000	$152,000	$291,000	$15,000	$29,000
	Carson NF	2	2	$130,000	$268,000	$111,000	$229,000	$11,000	$23,000
	Cibola NF	2	0	$105,000	$225,000	$89,000	$192,000	$9,000	$19,000
	Coconino NF	2	12	$256,000	$482,000	$218,000	$411,000	$22,000	$41,000
	Coronado NF	2	5	$168,000	$332,000	$143,000	$283,000	$14,000	$28,000
	Gila NF	2	0	$105,000	$225,000	$89,000	$192,000	$9,000	$19,000
	Kaibab NF	2	6	$180,000	$354,000	$154,000	$302,000	$15,000	$30,000
	Lincoln NF	2	5	$168,000	$332,000	$143,000	$283,000	$14,000	$28,000
	Prescott	1	2	$128,000	$255,000	$109,000	$218,000	$11,000	$22,000
	Santa Fe NF	4	3	$147,000	$315,000	$125,000	$268,000	$13,000	$27,000
	Tonto NF	2	6	$180,000	$354,000	$154,000	$302,000	$15,000	$30,000
	Region wide	2	2	$30,000	$68,000	$25,000	$58,000	$3,000	$6,000
	Region 3 Subtotal	**24**	**49**	$1,773,000	$3,551,000	$1,512,000	$3,029,000	$151,000	$303,000
USFS Region 4	Dixie NF	6	0	$114,000	$276,000	$97,000	$235,000	$10,000	$24,000
	Fishlake NF	1	0	$102,000	$213,000	$87,000	$181,000	$9,000	$18,000
	Manti-La Sal NF	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	Region 4 Subtotal	**7**	**0**	$316,000	$688,000	$270,000	$587,000	$27,000	$59,000
USFS TOTAL		**31**	**49**	**$2,189,000**	**$4,439,000**	**$1,867,000**	**$3,787,000**	**$187,000**	**$379,000**
BLM	BLM/AZ	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	BLM/CO	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	BLM/NM	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	BLM/UT	1	0	$102,000	$213,000	$87,000	$181,000	$9,000	$18,000
	District wide	0	0	$0	$0	$0	$0	$0	$0
BLM Total		**1**	**0**	**$402,000**	**$813,000**	**$343,000**	**$693,000**	**$34,000**	**$69,000**
BIA	BIA/Mescalero	0	0	$0	$0	$0	$0	$0	$0

Exhibit B-9 (5-6)

FUTURE IMPACTS OF MSO CONSERVATION EFFORTS ON FIRE MANAGEMENT (2004-2013)

		Consultations*		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)		Annual Costs (2003$)	
Agency	**Management Unit**	**Informal**	**Formal**	**Low**	**High**	**Low**	**High**	**Low**	**High**
	BIA/Navajo	1	0	$102,000	$213,000	$87,000	$181,000	$9,000	$18,000
	BIA/San Carlos	0	0	$0	$0	$0	$0	$0	$0
	Other Tribes	0	0	$0	$0	$0	$0	$0	$0
	All Tribes	0	0	$0	$0	$0	$0	$0	$0
BIA Total		**1**	**0**	**$102,000**	**$213,000**	**$87,000**	**$181,000**	**$9,000**	**$18,000**
NPS	Bandelier NM	0	2	$125,000	$243,000	$107,000	$207,000	$11,000	$21,000
	Canyon de Chelly NM	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	Canyonlands NP	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	Capitol Reef NP	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	Chiricahua NM	1	2	$128,000	$255,000	$109,000	$218,000	$11,000	$22,000
	Coronado NM	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	El Malpais NM	1	0	$102,000	$213,000	$87,000	$181,000	$9,000	$18,000
	Glen Canyon NRA	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	Grand Canyon NP	0	6	$176,000	$328,000	$150,000	$280,000	$15,000	$28,000
	Navajo NM	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	Rainbow Bridge NM	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	Saguaro NP	2	0	$105,000	$225,000	$89,000	$192,000	$9,000	$19,000
	Walnut Canyon NM	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
	Zion NP	0	0	$100,000	$200,000	$85,000	$171,000	$9,000	$17,000
NPS Total		**4**	**10**	**$1,535,000**	**$3,064,000**	**$1,310,000**	**$2,614,000**	**$131,000**	**$261,000**
Other Federal Agencies**		**0**	**4**	**$150,000**	**$286,000**	**$128,000**	**$244,000**	**$13,000**	**$24,000**
TOTALS		**37**	**63**	**$4,379,000**	**$8,814,000**	**$3,735,000**	**$7,519,000**	**$374,000**	**$752,000**

** Administrative costs and project modification costs are discounted assuming a rate of three percent.
Source: U.S. Fish and Wildlife administrative record for the Mexican Spotted Owl, personal communication with Action Agencies, IEc cost model.

Exhibit B-10 (7-8)

PAST IMPACTS ASSOCIATED WITH OTHER ACTIVITIES BY AGENCY (1993 – 2003)

Agency	Management Unit	Consultations		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Informal	Formal	Low	High	Low	High	Low	High
USFS Region 2	Pike-San Isabel	0	0	$6,000	$231,000	$6,000	$269,000	$1,000	$24,000
	Region 2 Subtotal	0	0	$6,000	$231,000	$6,000	$269,000	$1,000	$24,000
USFS Region 3	Apache Sitgreaves	8	3	$62,000	$396,000	$72,000	$461,000	$7,000	$42,000
	Carson NF	1	1	$20,000	$265,000	$24,000	$309,000	$2,000	$28,000
	Cibola NF	10	0	$29,000	$357,000	$33,000	$416,000	$3,000	$38,000
	Coconino NF	13	10	$161,000	$609,000	$188,000	$709,000	$17,000	$64,000
	Coronado NF	19	11	$188,000	$706,000	$219,000	$822,000	$20,000	$75,000
	Gila NF	13	0	$35,000	$395,000	$41,000	$460,000	$4,000	$42,000
	Kaibab NF	3	1	$25,000	$290,000	$29,000	$338,000	$3,000	$31,000
	Lincoln NF	25	7	$151,000	$696,000	$176,000	$810,000	$16,000	$74,000
	Prescott	6	2	$45,000	$349,000	$52,000	$407,000	$5,000	$37,000
	Santa Fe NF	16	2	$68,000	$475,000	$79,000	$554,000	$7,000	$50,000
	Tonto NF	5	2	$42,000	$337,000	$49,000	$392,000	$4,000	$36,000
	Region wide	12	3	$65,000	$215,000	$76,000	$251,000	$7,000	$23,000
	Region 3 Subtotal	131	42	$891,000	$5,090,000	$1,037,000	$5,927,000	$94,000	$539,000
USFS Region 4	Dixie NF	115	0	$270,000	$1,680,000	$314,000	$1,956,000	$29,000	$178,000
	Fishlake NF	6	0	$19,000	$307,000	$22,000	$357,000	$2,000	$32,000
	Manti-La Sal NF	13	0	$35,000	$395,000	$41,000	$460,000	$4,000	$42,000
	Region 4 Subtotal	134	0	$325,000	$2,381,000	$378,000	$2,773,000	$34,000	$252,000
USFS TOTAL		**265**	**42**	**$1,221,000**	**$7,703,000**	**$1,422,000**	**$8,969,000**	**$129,000**	**$815,000**
BLM	BLM/AZ	3	1	$25,000	$290,000	$29,000	$338,000	$3,000	$31,000
	BLM/CO	0	0	$6,000	$231,000	$6,000	$269,000	$1,000	$24,000
	BLM/NM	1	0	$8,000	$244,000	$9,000	$284,000	$1,000	$26,000
	BLM/UT	63	0	$150,000	$1,025,000	$175,000	$1,193,000	$16,000	$108,000
	District wide	0	0	$0	$0	$0	$0	$0	$0
BLM Total		**67**	**1**	**$189,000**	**$1,790,000**	**$220,000**	**$2,084,000**	**$20,000**	**$189,000**
BIA	BIA/Mescalero	3	1	$25,000	$290,000	$29,000	$338,000	$3,000	$31,000
	BIA/Navajo	7	3	$59,000	$383,000	$69,000	$446,000	$6,000	$41,000
	BIA/San Carlos	0	0	$6,000	$231,000	$6,000	$269,000	$1,000	$24,000
	Other Tribes	2	0	$10,000	$256,000	$12,000	$298,000	$1,000	$27,000
	All Tribes	1	1	$15,000	$34,000	$17,000	$40,000	$2,000	$4,000

Exhibit B-10 (7-8)

PAST IMPACTS ASSOCIATED WITH OTHER ACTIVITIES BY AGENCY (1993 – 2003)

Agency	Management Unit	Consultations		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)*		Annual Costs (2003$)	
		Informal	Formal	Low	High	Low	High	Low	High
BIA Total		**13**	**5**	**$115,000**	**$1,195,000**	**$134,000**	**$1,391,000**	**$12,000**	**$126,000**
NPS	Bandelier NM	0	0	$44,000	$44,000	$51,000	$51,000	$5,000	$5,000
	Canyon de Chelly NM	0	0	$6,000	$231,000	$6,000	$269,000	$1,000	$24,000
	Canyonlands NP	0	1	$43,000	$51,000	$50,000	$60,000	$5,000	$5,000
	Capitol Reef NP	0	0	$0	$6,000	$0	$7,000	$0	$1,000
	Chiricahua NM	0	1	$57,000	$65,000	$66,000	$76,000	$6,000	$7,000
	Coronado NM	0	0	$6,000	$6,000	$6,000	$6,000	$1,000	$1,000
	El Malpais NM	0	0	$6,000	$231,000	$6,000	$269,000	$1,000	$24,000
	Glen Canyon NRA	0	0	$6,000	$231,000	$6,000	$269,000	$1,000	$24,000
	Grand Canyon NP	2	1	$23,000	$52,000	$26,000	$61,000	$2,000	$6,000
	Navajo NM	0	0	$6,000	$231,000	$6,000	$269,000	$1,000	$24,000
	Rainbow Bridge NM	0	0	$6,000	$231,000	$6,000	$269,000	$1,000	$24,000
	Saguaro NP	3	0	$227,000	$258,000	$264,000	$300,000	$24,000	$27,000
	Walnut Canyon NM	0	0	$6,000	$231,000	$6,000	$269,000	$1,000	$24,000
	Zion NP	0	0	$310,000	$310,000	$361,000	$361,000	$33,000	$33,000
NPS Total		**5**	**3**	**$741,000**	**$2,178,000**	**$863,000**	**$2,536,000**	**$78,000**	**$231,000**
Other Federal Agencies**		**33**	**13**	**$300,000**	**$3,235,000**	**$350,000**	**$3,767,000**	**$32,000**	**$342,000**
TOTALS		**383**	**64**	**$2,566,000**	**$16,101,000**	**$2,988,000**	**$18,746,000**	**$272,000**	**$1,704,000**

* Administrative costs and project modification costs are discounted assuming a rate of three percent.

** Other Federal agencies include consultations with the Department of Defense, Department of Transportation, Department of Energy, Bureau of Reclamation, EPA, and OSM.

Source: U.S. Fish and Wildlife administrative record for the Mexican Spotted Owl, personal communication with Action agencies, IEc cost model.

Exhibit B-11 (7-9)

FUTURE IMPACTS ASSOCIATED WITH OTHER ACTIVITIES BY AGENCY (2004 – 2013)

		Consultations		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)		Annual Costs (2003$)	
Agency	**Management Unit**	**Informal**	**Formal**	**Low**	**High**	**Low**	**High**	**Low**	**High**
USFS Region 2	Pike-San Isabel	0	0	$5,000	$210,000	$4,000	$179,000	$400	$18,000
	Region 2 Subtotal	0	0	$5,000	$210,000	$4,000	$179,000	**$400**	$18,000
USFS Region 3	Apache Sitgreaves	8	3	$61,000	$375,000	$52,000	$320,000	$5,000	$32,000
	Carson NF	1	1	$20,000	$244,000	$17,000	$208,000	$2,000	$21,000
	Cibola NF	10	0	$28,000	$336,000	$24,000	$287,000	$2,000	$29,000
	Coconino NF	13	10	$161,000	$588,000	$137,000	$501,000	$14,000	$50,000
	Coronado NF	19	11	$187,000	$685,000	$160,000	$584,000	$16,000	$58,000
	Gila NF	13	0	$35,000	$374,000	$30,000	$319,000	$3,000	$32,000
	Kaibab NF	3	1	$25,000	$269,000	$21,000	$230,000	$2,000	$23,000
	Lincoln NF	25	7	$151,000	$675,000	$129,000	$576,000	$13,000	$58,000
	Prescott	6	2	$44,000	$328,000	$38,000	$280,000	$4,000	$28,000
	Santa Fe NF	16	2	$67,000	$454,000	$57,000	$388,000	$6,000	$39,000
	Tonto NF	5	2	$42,000	$316,000	$36,000	$269,000	$4,000	$27,000
	Region wide	12	3	$65,000	$215,000	$56,000	$184,000	$6,000	$18,000
	Region 3 Subtotal	131	42	$886,000	$4,859,000	$755,000	$4,145,000	$76,000	$415,000
USFS Region 4	Dixie NF	114	0	$267,000	$1,646,000	$228,000	$1,404,000	$23,000	$140,000
	Fishlake NF	6	0	$19,000	$286,000	$16,000	$244,000	$2,000	$24,000
	Manti-La Sal NF	13	0	$35,000	$374,000	$30,000	$319,000	$3,000	$32,000
	Region 4 Subtotal	133	0	$321,000	$2,306,000	$274,000	$1,967,000	$27,000	$197,000
USFS TOTAL		**264**	**42**	**$1,211,000**	**$7,375,000**	**$1,033,000**	**$6,291,000**	**$103,000**	**$629,000**
BLM	BLM/AZ	3	1	$25,000	$269,000	$21,000	$230,000	$2,000	$23,000
	BLM/CO	0	0	$160,000	$555,000	$136,000	$473,000	$14,000	$47,000
	BLM/NM	1	0	$7,000	$223,000	$6,000	$190,000	$1,000	$19,000
	BLM/UT	129	0	$330,000	$2,450,000	$281,000	$2,090,000	$28,000	$209,000
	District wide	0	0	$0	$0	$0	$0	$0	$0
BLM Total		**133**	**1**	**$522,000**	**$3,497,000**	**$445,000**	**$2,983,000**	**$44,000**	**$298,000**
BIA	BIA/Mescalero	3	1	$25,000	$269,000	$21,000	$230,000	$2,000	$23,000
	BIA/Navajo	7	3	$59,000	$362,000	$50,000	$309,000	$5,000	$31,000
	BIA/San Carlos	0	0	$5,000	$210,000	$4,000	$179,000	$400	$18,000

Exhibit B-11 (7-9)

FUTURE IMPACTS ASSOCIATED WITH OTHER ACTIVITIES BY AGENCY (2004 – 2013)

		Consultations		Total Administrative and Project Modification Costs (Nominal $)		Present Value of Total Costs (2003$)		Annual Costs (2003$)	
Agency	**Management Unit**	**Informal**	**Formal**	**Low**	**High**	**Low**	**High**	**Low**	**High**
	Other Tribes	2	0	$10,000	$235,000	$8,000	$201,000	$1,000	$20,000
	All Tribes	1	1	$15,000	$34,000	$13,000	$29,000	$1,000	$3,000
BIA Total		13	5	$113,000	$1,111,000	$96,000	$948,000	$10,000	$95,000
NPS	Bandelier NM	0	0	$40,000	$40,000	$34,000	$34,000	$3,000	$3,000
	Canyon de Chelly NM	0	0	$5,000	$210,000	$4,000	$179,000	$400	$18,000
	Canyonlands NP	0	0	$30,000	$30,000	$26,000	$26,000	$3,000	$3,000
	Capitol Reef NP	10	0	$23,000	$186,000	$20,000	$159,000	$2,000	$16,000
	Chiricahua NM	0	1	$53,000	$61,000	$45,000	$52,000	$4,000	$5,000
	Coronado NM	0	0	$5,000	$5,000	$4,000	$4,000	$400	$0
	El Malpais NM	0	0	$5,000	$210,000	$4,000	$179,000	$400	$18,000
	Glen Canyon NRA	0	0	$5,000	$5,000	$4,000	$4,000	$400	$0
	Grand Canyon NP	2	1	$22,000	$257,000	$19,000	$219,000	$2,000	$22,000
	Navajo NM	3	0	$12,000	$248,000	$10,000	$211,000	$1,000	$21,000
	Rainbow Bridge NM	0	0	$5,000	$210,000	$4,000	$179,000	$0	$18,000
	Saguaro NP	10	0	$223,000	$326,000	$190,000	$278,000	$19,000	$28,000
	Walnut Canyon NM	0	0	$5,000	$210,000	$4,000	$179,000	$400	$18,000
	Zion NP	30	0	$351,000	$660,000	$299,000	$563,000	$30,000	$56,000
NPS Total		**55**	**2**	**$783,000**	**$2,657,000**	**$668,000**	**$2,267,000**	**$67,000**	**$227,000**
Other Federal Agencies**		**33**	**11**	**$870,000**	**$3,151,000**	**$742,000**	**$2,688,000**	**$74,000**	**$269,000**
TOTALS		**498**	**61**	**$3,499,000**	**$17,792,000**	**$2,984,000**	**$15,177,000**	**$298,000**	**$1,518,000**

** Administrative costs and project modification costs are discounted assuming a rate of three percent.

Source: US Fish and Wildlife administrative record for the Mexican Spotted Owl, personal communication with Action Agencies, IEc cost model.

REFERENCES

16 U.S.C. §§ 670a - 670o

16 U.S.C. 1532

16 U.S.C. 1533 (b) (2)

16 U.S.C. 1538

5 U.S.C. §601 *et seq*.

Beck Group. 2003. San Carlos Apache Tribe, San Carlos, Arizona, Small Log Development Project, Draft. Project Report, July.

Bureau of Economic Analysis. *Regional Economic Accounts*, http://www.bea.doc.gov/bea/regional/data.htm.

Bureau of Indian Affairs. 2001. Catalog of Forest Acres. Compiled by USDI, Bureau of Indian Affairs, Division of Forestry, Branch of Forest Resources Planning. September 30.

Bureau of Indian Affairs. 2000. Memorandum to Field Supervisor, New Mexico Ecological Service Field Office, U.S. Fish and Wildlife Service, from Regional Director, Bureau of Indian Affairs, Southwest Region, dated September 19, 2000 re: Biological Assessment (BA), Mexican Spotted Owl Management Plan for Mescalero Apache Reservation.

Bureau of Land Management (Arizona State Office). 2003. "Comments on Proposed Rule Designating Critical Habitat for the Mexican Spotted Owl, dated November 18, 2003", Deputy State Director, December 17.

Bureau of Land Management (Price Field Office, Utah). Minerals Potential Report, 2002. Accessed at http://www.pricermp.com/documents.html.

Bureau of Land Management (Royal Gorge Field Office, Colorado). 2003. Royal Gorge Field Office, Colorado BLM, Public comment, December 10.

Bureau of Land Management (Utah State). 2003. "Comments on the Proposed Rule Designating Critical Habitat for the Mexican Spotted Owl," Deputy State Director, Division of Natural Resources, December 16.

Choudhary, Trib. 1995. “Economic Impact of Designating Critical Habitat For Mexican Spotted Owl”. April 11.

Choudhary, Trib. 2003. 2002-2003 Comprehensive Economic Development Strategy. Prepared by Trib Choudhary, Support Services Department, Division of Economic Development, the Navajo Nation.

Coconino County FY04 Annual Adopted Budget, p. 30, available on the web at http://co.coconino.az.us/planningandbudget/index.asp.

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

Dun and Bradstreet. 2003. "Dun's Market Identifiers," file 516, updated November.

Ekstrand, Earl et. al. 1995. "Economic Analysis of Critical Habitat Designation for the Mexican Spotted Owl, May 1995." Prepared for the U.S. Fish and Wildlife Service, New Mexico State Ecological Services Office, Albuquerque, New Mexico.

Email communication from Biologist, Flagstaff, Arizona, Field Office, FWS, December 2003.

Email communication from Biologist, Colorado Field Office, FWS, July 13, 2004.

Email communication from Jeff Cole, Navajo Fish and Wildlife Department, Navajo Nation, March 2, 2004.

Email communication from Keith Doyon, Red Canyon LLC, January 27, 2004.

Email communication from Larry Cosper, Region 3, USFS, February 5, 2004. Data from USFS Wildlife, Fish & Rare Plants Report.

Email communication from Norma Cady, Planner for Navajo Nation Department of Agriculture and Department of Natural Resources, March 24, 2004.

Email communication from Paul Fink, Region 3 USFS, January 8, 2004. Summary of Mill Closures, Arizona and New Mexico, August 2003.

Email communication with Service, Southwestern Regional Office, July 26, 2004.

Email communication from San Carlos Apache Tribe, March 2, 2004.

Email communication from Thora Padilla, Resource Management & Protection, Mescalero Apache Tribe, January 2, 2004 and January 5, 2004.

Email communication with Larry Lichthardt, Range Management Lead, Utah BLM, February 6, 2004.

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.

Gardner, Dr. Delworth. Brigham Young University, Peer review comments on Draft MSO Economic Analysis, February 27, 2004.

Gentner, Bradley J. and John Tanaka. 2002. "Classifying Federal public land grazing permittees," Journal of Range Management 55(1), January.

GO-TECH Petroleum website. Information on the New Mexico petroleum industry available at: http://octane.nmt.edu/data/ongard/county.asp.

Godfrey, E. Bruce and Verl L. Bagley, "Alternative Measures of Livestock Dependency." Current Issues in Rangeland Economics, Western Research Coordinating Committee 55, Range Economics, 1994.

Gramlich, Edward M. 2000. *A Guide to Benefit-Cost Analysis (2nd Ed.)*, Prospect Heights, Illinois: Waveland Press, Inc., 1990; and U.S. 240-R-00-003, September. Available at http://yosemite.epa.gov/ee/epa/eed.nsf/ webpages/Guidelines.html.

H.R. 2696, July 10, 2003.

Hanscom, Greg. 1997. "Injunction shakes Forests." High Country News, September 1. http://www.hcn.org/servlets/hcn.printableArticle/article-id=3594.

Haynes, Richard W. 2003. "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.

Hutchinson, Howard. 2003. Public comment on the Proposed Critical Habitat Designation for the Mexican Spotted Owl, for the Coalition of New Mexico and Arizona Counties. December 22.

Independent Petroleum Association of American. Oil and gas industry statistics, accessed at http://www.ipaa.org/info/econreports/StateInformation.asp.

"Joint Counterpart Endangered Species Act Section 7 Consultation Regulations," 68 FR No 235, p. 68254, December 8.

Kalt, Professor Joseph P. 1993. "Economic Analysis of Proposed Designation of Critical Habitat for the Saliz Arizonica (Arizona Willow) on the Fort Apache Indian Reservation." Submitted to the White Mountain Apache Tribe, April. Redacted Version.

Letter from Albert Hale, President, Navajo Nation, to Earl Eckstrand, NBS, MESC, dated May 2, 1995 (Included in MSO Administrative Record XI.A.4.17).

Letter from Bruce Baizel, Legal Counsel for Dine Care, to Field Supervisor, New Mexico Ecological Services Field Office, dated April 23, 2004.

Letter from Donald DeLorenzo, Director for Wildlife, Fish and Rare Plants, USFS Region 3, on the Draft Environmental Assessment of MSO Critical Habitat. Undated.

Letter from Duane Zavadil, Manager of Regulatory and Government Affairs, Bill Barrett Corporation, to U.S. Fish and Wildlife Service, Field Supervisor, dated December 18, 2003.

Letter from Grant D. Melvin, manager of Government and Public Affairs, Utah, Colorado, and New Mexico, IPAMS, to U.S. Fish and Wildlife Service, Field Supervisor, dated December 18, 2003.

Letter from John F. Zent, General Manager - Compliance, Burlington Resources, San Juan Division, to United States Fish and Wildlife Service, Field Supervisor, NMESFO, dated December 18, 2003.

Letter from Kenneth S. McDaniel, City of Alamogordo, New Mexico. "Re: C.F.R. Part 17, Designation of critical habitat for the Mexican Spotted Owl," dated December 17, 2003.

Letter from Michael Nelson, ConocoPhillips Company, to Field Supervisor, U.S. Fish and Wildlife Service, dated December 18, 2003.

Letter from Raymond Stanley, Chairman, San Carlos Apache Tribe to Jennifer Fowler-Propst, State Supervisor, New Mexico Ecological Services State Office, dated March 10, 1995.

Letter from Sheldon Kipp, Acting Regional Director, BIA Southwestern Region, to Joy Nicholopoulos, U.S. Fish and Wildlife Service, received December 29, 2003.

Letter from Steven D. Burge, Commission Chairman, Carbon County Commission, to Field Supervisor, New Mexico Ecological Services Field Office, dated December 17, 2003.

Mescalero Apache Tribe. 2003. Socioeconomic information provided by Thora Padilla, Resource Management & Protection, Mescalero Apache Tribe.

MSO Administrative Record items XI.A.3.1, XI.A.3.4, XI.A.4.17, XI.B.1.56, XI.B.1.65, XI.B.1.106, XI.B.1.124, XI.B.7.68, XI.C.64, XI.C.104.

National Agricultural Statistics Service, State Office Websites. http://www.usda.gov/nass/sso-rpts.htm, accessed February 6, 2004.

National Interagency Fire Center, Historical Wildland Fire Statistics, www.nifc.gov/stats/historicalstats.html, accessed February 16, 2004.

Navajo Times. 2003. "Jobs, revenue, water at stake in Mohave power plan talks," article, December 4.

New Mexico Department of Agriculture. 2002. Report to the Governor of New Mexico from the Public Land Grazing Task Force. Prepared by George A. Douds. 2002.

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.

Rowan, R. C., and J.P. Workman. "Factors affecting Utah ranch prices." Journal of Range Management. Volume 45 (263-266), 1992.

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

San Carlos Apache Tribe. 2003. *Mexican Spotted Owl Conservation Plan for the San Carlos Apache Indian Reservation*, November. Redacted copy.

San Carlos Apache Tribe. 2003. *San Carlos Apache Tribe Forest Management Plan*. Draft. Planning Period January 1, 2003 – December 31, 2015, October.

Small Business Administration. Table of Small Business Size Standards based on NAICS 2002 Available on the web at: http://www.sba.gov/size/indextableofsize.html.

Smith, Brad W. et. al. 2001. "Forest Resources of the United States 1997." USDA, Forest Service.

Spahr, R. and M.A. Sunderman. "Additional evidence on the homogeneity of the value of government grazing leases and changing attributes for ranch value." Journal of Real Estate Research, Volume 10 (601-616), 1995.

State of Utah, Department of Natural Resources, Division of Oil Gas and Mining, accessed at: http://www.dogm.nr.state.ut.us/oilgas/STATISTICS/permits/APDcount/YtdApd2004.htm

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

Sunderman, M. A., and R. Spahr. "Valuation of government grazing leases." Journal of Real Estate Research, Volume 9 (179-196), 1992.

Tiller, Veronica E. Velarde (ed.). 1996. *Tiller's Guide to Indian Country*, BowArrow Publishing Company, Albuquerque, NM.

Torell, L. Allen and S.A. Bailey. "Public land policy and the value of grazing permits." Western Journal of Agricultural Economics, Volume 16 (174-184), 1991.

Torell, L. Allen and M.E. Kincaid. "Public land policy and the market value of New Mexico ranches, 1979-1994." Journal of Range Management, Volume 49 (270-276), 1996.

Torell, L. Allen 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.

Torell, L. Allen 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.

Torell, L. Allen, et al. "The Market Value of Public Land Forage Implied from Grazing Permits." Current Issues in Rangeland Economics, Western Research Coordinating Committee 55, Range Economics, 1994.

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.

U.S Department of Agriculture. Grazing Statistical Summary, FY2002, USDA, Forest Service Range Management, January 2003.

U.S. Census Bureau. 2001 County Business Patterns, accessed at http://censtats.census.gov/cbpnaic/cbpnaic.shtml.

U.S. Census Bureau. Poverty level thresholds information. Available on the web at: http://www.census.gov/hhes/poverty/threshld/thresh99.html.

U.S. Census Bureau. *Census 2000 and State & County QuickFacts*. Available on the web at: http://quickfacts.census.gov/qfd.

U.S. Department of Agriculture, Forest Service Southwestern Region. 2003. "Draft Biological Assessment of 11 Land & Resource Management Plans," submitted to the U.S. Fish and Wildlife Service, November.

U.S. Department of Agriculture, National Agricultural Statistics Service. 2001 Data for AZ, CO, NM, and UT, accessed at http://www.usda.gov/nass/sso-rpts.htm.

U.S. Department of Agriculture. 2002. "Economic Effects of the Four Corners Sustainability Partnership Demonstration Projects in the Apache-Sitgreaves, Fishlake, Lincoln and San Juan Working Circles." Technical Report No. 101. Prepared by Gregory S. Alward, Michael J. Niccolucci, Susan A. Winter, USDA Forest Service Inventory and Monitoring Institute, November.

U.S. Department of Agriculture. Forest Service website accessed at http://www.fs.fed.us/rangelands/infocenter/library.shtml.

U.S. Department of Interior, Bureau of Land Management. 2002 Public Land Statistics.

U.S. Energy Information Administration. Oil and gas well production data accessed at http://www.eia.doe.gov.

U.S. Fish and Wildlife Service, New Mexico Ecological Services Field Office. 2004. "Biological Opinion on the Effects to the Mexican spotted owl, Sacramento Mountains thistle, and Sacramento Mountains prickly poppy from the proposal to issue a permit for the Sacramento Grazing allotment, Sacramento Ranger District, Lincoln National Forest, Otero County, New Mexico," February 4.

U.S. Fish and Wildlife Service, New Mexico Ecological Services Office. 2003. Final Biological Opinion on the effects to the Mexican Spotted Owl from the Penasco wildfire suppression activities, Sacramento Ranger District, Otero County, New Mexico," May 5.

U.S. Fish and Wildlife Service, Phoenix Field Office. 2002. Untitled Biological Opinion on the 10-year livestock grazing permit for the Udall Allotment and ongoing grazing activity and management on the P.S. and Hayground Allotments, February 28.

U.S. Fish and Wildlife Service, Phoenix Field Office. 2003. Biological opinion on suppression and emergency rehabilitation activities on the Pack Rat Fire in Gila and Coconino Counties, September 19.

U.S. Fish and Wildlife Service, Phoenix Field Office. 2003. Biological opinion on wildfire suppression actions for the Tram Fire on the Coconino National Forest, Coconino County, April 4.

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

U.S. Fish and Wildlife Service. Written comments from field office and Region 2 representatives, February 26, 2004.

U.S. Fish and Wildlife Service. 1995. Recovery Plan for the Mexican spotted owl: Vol. I. Albuquerque, New Mexico. 172 pp.

U.S. Fish and Wildlife Service. 1999. Biological opinion on the Carr Canyon fuel reduction project in Coronado National Forest, February 10.

U.S. Fish and Wildlife Service. 2000. *Proposed Determination of Critical Habitat for the Mexican Spotted Owl*, July 21 (65 FR 45336).

U.S. Fish and Wildlife Service. 2001. Biological Opinion on the "USFS Proposed Wildland/Urban Interface (WUI) Fuel treatments in New Mexico and Arizona and their effects on listed and proposed species in accordance with section 7 of the Endangered Species Act," April.

U.S. Fish and Wildlife Service. 2003. Formal biological opinion on the proposed rates of implementation of the grazing standards and Guidelines (S&Gs) in the June 1996 Forest Plan Amendments for National Forests in Arizona and New Mexico, and its effects on the Mexican spotted owl," From Susan MacMullin at the Service to Harv Forsgren, USFS Region 3, January 17, 2003.

U.S. Fish and Wildlife Service. Coronado National Forest Grazing consultation. Available at: http://www.fs.fed.us/r3/coronado/grazing_bo/mso.htm accessed on January 27, 2004.

U.S. Fish and Wildlife Service. "Fedlands" National GIS layer of Federal lands, provided by Service GIS technicians, December, 2003.

U.S. Forest Service, Southwestern Region. 1996. Record of Decision for Amendments of Forest Plans: Arizona and New Mexico.

U.S. Forest Service. "National Forest Boundaries in USDA FS Southwestern Region" GIS layer, downloaded from http://www.fs.fed.us/r3/maps/gis/datasets.shtml#regional, December 2003.

U.S. Forest Service. 1998. Sales Tracking and Reporting System (STARS). Periodic Timber Sale Activity Report (PTSAR). Available on the web at: www.fs.fed.us/forestmanagement/reports/saledata/1998/r03.shtml

U.S. Forest Service. 2004. "Changing Economics of the National Forest Timber Sale Program." Available at www.fs.fed.us/forestmanagement/reports/tspirs/1997/index.shtm

U.S. Geological Survey. National Coal Assessment data, accessed at http://energy.cr.usgs.gov/coal/nca/cpgis.html

U.S. Office of Management and Budget. 2000. "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.

U.S. Office of Management and Budget. 2001. Memorandum For Heads of Executive Department Agencies, and Independent Regulatory Agencies, Guidance for Implementing E.O. 13211, M-01-27, July 13. Accessed at http://www.whitehouse.gov/omb/memoranda/m01-27.html.

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

U.S. Office of Management and Budget. 2003. "Draft 2003 Report to Congress on the Costs and Benefits of Federal Regulations; Notice," 68 Federal Register 5492, February 3.

Western Wood Products Association (WWPA). 1993. Statistical Yearbook of the Western Lumber Industry.

Western Wood Products Association (WWPA). 2002. 2002 Statistical Yearbook of the Western Lumber Industry.

Wichner, David. 2002. "Rodeo-Chediski Costs Rank 2nd", Arizona Daily Star, July 16.

"Wildfire history and ecology," www/cpluhna.nau.edu/biota/wildfire.htm, accessed February 17, 2004.

Yavapai County FY04 Adopted Budget, p. 4, available on the web at http://www.co.yavapai.az.us/departments/bos/Budget/03-04/Budget03-04.pdf.

Personal communication with:

Arizona BLM State Office, January 28, 2004.

Bandelier National Monument, February 2004.

Bill Hornsby, Mescalero Agency, BIA, February 27, 2004.

Biologist, Albuquerque Field Office, FWS, February 3, 2004.

Biologist, Colorado Field Office, FWS, January 5, 2004.

Biologist, Utah Field Office, FWS, May 12, 2004.

Biologist, Utah Field Office, FWS, May 28, 2004.

Brian Mills, DOE, May 13, 2004.

Bruce Raden, Senior District Aide, Congressman John Shadegg, Stakeholder meeting, Service Office, Phoenix, Arizona, November 7, 2003.

Buck McKenney, Range Management Specialist, Tonto National Forest, February 4, 2004.

Canyonlands National Park, February 10, 2004.

Coronado National Monument, February 2004.

Craig Wilcox, Forest Manager, Tribal Forestry Program, San Carlos Apache Tribe, February 5, 2004.

David Mills, BLM Utah, June 1, 2004.

Dick Stevens, Coconino National Forest, USFS, February 10, 2004.

Don Pollock, Wildlife Biologist, Tonto National Forest, February 3, 2004.

Duane Zavadil, Bill Barrett Corporation, May 12, 2004.

Ed Scherick, San Juan County Planner, Utah, January 28, 2004.

Erik Brekke, Colorado BLM, January 14, 2004.

Fort Huchuca wildlife biologist, February 10, 2004.

George Garcia, Biologist, Lincoln National Forest, USFS, January 29, 2004.

Glen Canyon National Park, February 2004.

Greg Montgomery, USFS, Manti La Sal National Forest, January 29, 2004.

Heather Musclow, USFS, Manti LaSal National Forest, January 6, 2004.

Jean Semborski, Conoco Phillips, May 13, 2004.

Jimmy Bridge, General Manager, Mescalero Forest Products, February 13, 2004.

John Andrews, BIA Mescalero Forestry, January 6, 2004 and March 3, 2004.

John Reidinger, Carson NF, Jicarilla District, May 26, 2004.

John F. Zent, Burlington Resources, San Juan Division, February 25, 2004.

John Stucker, Navajo Minerals Department, December 8, 2003.

Keith Menasco, Region 3, USFS, Stakeholder meeting, Albuquerque, New Mexico, November 7, 2003.

Kevin Binan, Western Wood Products Association, February 10, 2004.

Larry Cosper, Region 3, USFS, February 5, 2004.

Larry Lichthardt, Ranger Management Lead, Utah BLM, January 29, 2004.

Marlin Johnson, Region 3, USFS, February 6, 2004 and February 9, 2004.

Mescalero Apache Tribe, December 3, 2003.

Michael Ray, Region 3, USFS, February 9, 2004.

Mike Smith, USFS, Pike and San Isabel National Forest, January 21, 2004.

Mike Wrigley, USFS, Pike and San Isabel National Forest, January 8, 2004.

Navajo Nation, December 8, 2003.

New Mexico Forestry Department, February 2, 2004.

New Mexico State University, Agricultural Extension, January 14, 2004, February 4, 2004.

Nick Ashcroft, New Mexico State University, Agricultural Extension, January 14, 2004 and February 4, 2004.

Paul Fink Region 3, USFS, January 22, 2004 and January 29, 2004.

Pike-San Isabel NF, January 21, 2004.

Range Management Specialist, Tonto National Forest, February 4, 2004.

Ranger Management Lead, Utah Bureau of Land Management, January 29, 2004, February 6, 2004.

Ray Suazo, Region 3 USFS, January 17, 2004.

Regis Cassidy, Regional Silviculturist, Region 3, USFS, January 7, 2004, January 22, 2004, January 26, 2004, and February 3, 2004.

Ron Bolander, Utah BLM, January 15, 2004 and January 28, 2004.

Royal Gorge Field Office, Colorado Bureau of Land Management, December 10, 2003.

Saguaro National Monument, February 2004.

San Juan County Planner, Utah, January 28, 2004.

Ted Cordery, Arizona BLM State Office, January 28, 2004.

Tim Darden, Water and Natural Resources Policy Analyst, New Mexico Department of Agriculture, May 24, 2004.

Trib Choudhary, Navajo Nation, January 28, 2004.

Uintah County representatives: Commissioner McKee, Darlene Burns, Bill Ryan, and Dave Allison, May 26, 2004.

U.S. Forest Service Biologist, Pike-San Isabel National Forest, Colorado, January 21, 2004.

U.S. Forest Service Region 3, January 17, 2004.

U.S. Forest Service Region 3, January 22, 2004.

U.S. Forest Service Region 3, November 7, 2003.

Utah Bureau of Land Management, January 28, 2004.

Wildlife Biologist, Tonto National Forest, February 3, 2004.

William Block, Rocky Mountain Research Station, USFS, February 3, 2004.

Zion National Park, February 2004.

Public comment on Draft Economic Analysis of Critical Habitat for the MSO:

New Mexico Department of Agriculture (April 26, 2004)

Nick Ashcroft, New Mexico State University, Agricultural Extension (April 28, 2004)

New Mexico Public Lands Council (April 26, 2004)

Coalition of Arizona/New Mexico Counties for Stable Economic Growth (April 25, 2004)

New Mexico Wool Growers, Inc (April 26, 2004)

New Mexico Cattle Growers Association (April 26, 2004)

New Mexico Farm and Livestock Bureau (April 26, 2004)

Ric Frost (April 28, 2004)