United States Department of Agriculture

Forest Service

Southwestern Region

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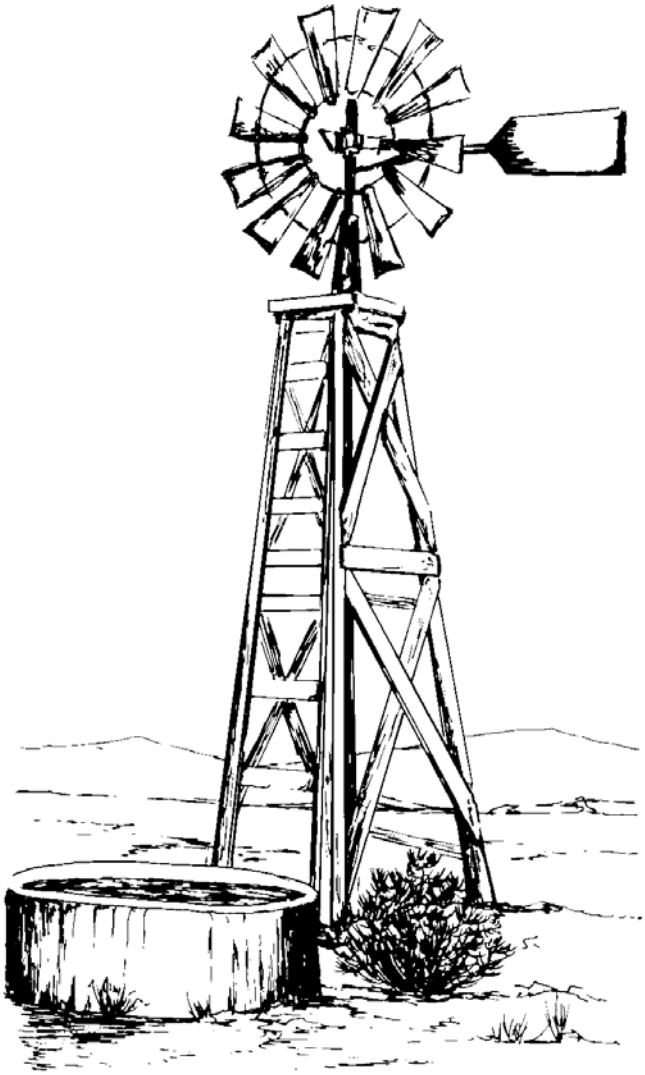
Draft Environmental Impact Statement for Pickett Lake and Padre Canyon Allotments

Mormon Lake Ranger District, Coconino National Forest, Coconino County, AZ



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Draft Environmental Impact Statement
for
Pickett Lake and Padre Canyon Allotments

Mormon Lake Ranger District
Coconino National Forest
Coconino County, Arizona

Lead Agency: USDA Forest Service

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Abstract: The Coconino National Forest proposes to re-authorize grazing on the Pickett Lake and Padre Canyon Allotments. The purpose of this project is to determine whether or not to continue cattle grazing on these two allotments. There is a need to maintain and/or improve rangeland conditions and to maintain and protect seasonal and semipermanent wetlands with emergent vegetation. There is also a need to maintain the permittee's access to their water right and consider current water claims within the allotments. To meet the purpose and need and required National Environmental Policy Act regulations, the Forest Service analyzed four alternatives, including the current grazing management system, no action/no grazing, reduced grazing/livestock numbers (Proposed Action), and an additional reduction in utilization and livestock. The responsible official has identified Alternative 3 (Proposed Action) as the preferred alternative. Alternative 3 would authorize grazing and a 35 percent utilization guideline, while reducing overall cattle use and graze periods and increasing rest periods. Cattle grazing on seasonal and semipermanent wetlands containing emergent vegetation would be restricted from June 1 to July 15 and up to 10 miles of permanent wetland exclosure fencing would be installed. Also, 4 miles of pipeline, 5 drinkers, and 1.5 miles of fence along the Anderson Mesa rim would be installed. The responsible official for this project is the Mormon Lake District Ranger.

Important Notice: Reviewers should provide the Forest Service with their comments during the review period of the draft environmental impact statement (DEIS). Comments for the DEIS will be accepted for 45 days following the date of publication of the Notice of Availability (NOA) in the "Federal Register" pursuant to 40 CFR 1500-1508 (June 4, 2003). The 45-day comment period for proposed actions analyzed and documented in a DEIS begins on the first day after publication of the NOA. Those wishing to be eligible for appeals must provide the following:

1. Name and address
2. Title of the proposed action
3. Specific substantive comments (36 CFR 215.2) on the proposed action, along with support reason that the responsible official should consider in reaching a decision.
4. Signature or other verification of identity upon request; identification of the individual or organization who authored the comment(s) is necessary for appeal eligibility.

This will enable the Forest Service to analyze and respond to the comments at one time and to use information acquired in the preparation of the final environmental impact statement, thus avoiding undue delay in the decisionmaking process. Reviewers have an obligation to structure their participation in the National Environmental Policy Act process so that it is meaningful and alerts the agency to the reviewers' position and contentions (*Vermont Yankee Nuclear Power Corp. v. NRDC*, 435 U.S. 519, 553 [1978]). Environmental objections that could have been raised at the draft stage may be waived if not raised until after completion of the final EIS. (*City of Angoon v. Hodel* (9th Circuit, l986) and *Wisconsin Heritages, Inc. v. Harris*, 490 F. Supp. 1334, 1338 [E.D. Wis. 1980]). Comments on the DEIS should be specific and should address the adequacy of the document and the merits of the alternatives discussed (40 CFR 1503.3).

Because of these court rulings, it is important that those interested in the Proposed Action participate by the close of the 45-day comment period so that substantive comments are made available to the Forest Service at a time when the agency can meaningfully consider and respond to them in the final EIS.

Individuals and organizations who submit substantive comments during the 45-day comment period for a draft EIS may file an appeal (36 CFR 215.6; 40 CFR 1506.10; FSH 1909.25, Chapter 20), except for Federal agencies (who may not appeal). Comments received from an authorized representative(s) of an organization are considered those of the organization only; individual members of that organization do not meet appeal eligibility solely on the basis of membership in an organization. The member(s) must submit substantive comments as an individual in order to meet appeal eligibility. It is the responsibility of persons providing comments to submit them by the close of the comment period. Those who provide substantive comments during this comment period are eligible to appeal the decision under the regulations.

Pursuant to 7 CFR 1.27 (d), any person may request the agency to withhold a submission from the public record by showing how the Freedom of Information Act (FOIA) permits such confidentiality. Persons requesting such confidentiality should be aware that, under the FOIA, confidentiality may be granted in only very limited circumstances, such as to protect trade secrets. The Forest Service will inform the requestor of the agency's decision regarding the request for confidentiality and, where the request is denied, the agency will return the submission and notify the requestor that the comments may be resubmitted with or without name and address within 10 days.

Send Comments to:

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Written comments may be hand delivered during business office hours between 7:30 a.m. and 4:30 p.m., Monday through Friday, excluding Federal holidays.

Oral comments must be provided at the agency's office during normal business hours via telephone, in person, or at an official agency function (i.e., public meeting) that is designed to elicit public comments. Please include a physical mailing address.

Electronic comments must be submitted in a format such as an e-mail message, plain text (.txt), rich tech format (.rtf), Adobe (.pdf), or Word (.doc) to: *comments-southwestern-coconino-mormon-lake@fs.fed.us.* Please include a physical mailing address.

Comments must have an identifiable name and address attached, or verification of identity will be required. A scanned signature may serve as verification on electronic comments.

Executive Summary

The Coconino National Forest proposes to re-authorize grazing on the Pickett Lake and Padre Canyon Allotments. The area affected by the proposal includes 55,807 acres of land about 9 miles southeast of Flagstaff, Arizona in the eastern portion of the Mormon Lake Ranger District. The allotments are adjacent to one another and the total area spans from the eastern boundary of the Coconino National Forest, up the Anderson Mesa rim from the south, to about 3 miles west of Forest Highway 3 (Lake Mary Road) on the west, and 3 miles south of the Twin Arrows/I-40 Highway junction on the north.

The purpose of this project is to determine whether or not to continue cattle grazing on the Pickett Lake and Padre Canyon Allotments. There is a need to maintain and/or improve rangeland conditions and to maintain and protect seasonal and semipermanent wetlands with emergent vegetation on the two allotments. There is also a need to maintain the permittee's access to their water right and consider current water claims within the allotments.

The Pickett Lake and Padre Canyon Allotments are scheduled for environmental analysis of grazing use on the Coconino National Forest, as required by the 1995 Burns Amendment. This project was first initiated in December 2000 as an environmental impact statement (EIS) and the proposed action included cattle grazing, pinyon and juniper tree cutting, and broadcast burning. After public scoping and comment, the Forest Service decided to narrow the scope of the project to analyze only cattle grazing under an environmental assessment (EA). A revised proposed action was presented for public scoping in August 2002 and a draft EA published in July 2003.

During the comment period on the draft EA, two issues were identified. The first issue involved wetlands and how the proposed cattle grazing system and utilization levels affect seasonal and semipermanent wetland habitat for ground-nesting birds and riparian vegetative health within wetlands. The second issue was concerned with the proposed utilization level of 35 percent, which may inhibit grass plants' growth, reduce vertical height, and remove too many seed heads. A 35 percent utilization level may also lessen plants' ability to grow to maturity, build necessary root mass, or propagate.

Based on controversy over the effects of cattle grazing on pronghorn habitat on the Anderson Mesa portion of these allotments, the responsible official decided to re-initiate this analysis as an EIS. Issues from the original EA comments described above led to development of the Proposed Action and Alternative 4 for this DEIS. Following are the alternatives analyzed in detail for this project:

- *Alternative 1 (Current Management)*: Continue the current cattle grazing management system on the two allotments.
- *Alternative 2 (No Action/No Grazing)*: Temporarily close Pickett Lake and Padre Canyon Allotments to cattle grazing.
- *Alternative 3 (Proposed Action)*: Authorize grazing on the Pickett Lake and Padre Canyon Allotments while reducing overall cattle use by 14 percent, reducing graze periods, and increasing rest periods. Restrict cattle grazing on seasonal and semipermanent wetlands containing emergent vegetation between June 1 and July 15 and install up to 10 miles of permanent wetland exclosure fencing. Establish a 35 percent utilization guideline; install 4 miles of pipeline and 5 drinkers, and 1.5 miles of fence along the Anderson Mesa rim.
- *Alternative 4 (Reduction in Utilization)*: Similar to Alternative 3, except the utilization guideline would be reduced to 20 percent and cattle numbers would be reduced by 15 percent from the Proposed Action (which is a 29 percent reduction in cattle numbers from current management).

For this project, it has been determined that:

- Continued cattle grazing on the Pickett Lake and Padre Canyon Allotments would have some minimal effects to plant height and cover but little overall effect to rangeland vegetation. There would be some minor effects to unsatisfactory and impaired soils and mycrophytic soil crusts. Range conditions in the project area would continue to be static with an upward trend.
- In Alternatives 3 and 4, cattle would affect wetlands by reducing vegetative cover within the lanes to stock tanks, resulting in minor effects to cinnamon teal. The overall effects of cattle grazing would still maintain or improve wetlands and wetland vegetation in the project area.
- The action alternatives would have some overall effects on pronghorn, a management indicator species for grasslands. Less fencing may have an additive benefit to pronghorn under Alternatives 1 and 2. Late use in key pastures in Alternatives 3 and 4 and less upland use under Alternative 4 could potentially provide greater hiding cover for fawns.
- For other management indicator species and migratory bird species of concern, there would be little to no impact on forest-wide habitat or population trends.
- Findings include a *no effect* determination for bald eagle and black-footed ferret and a *may affect but is not likely to adversely affect* determination for Mexican spotted owl. The determination for peregrine falcon, northern goshawk, and northern leopard frog is *may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability*.
- Continued cattle grazing would have little to no effect on the local economy, cultural resources, air quality, public safety, or the Padre Canyon Inventoried Roadless Area.

The responsible official for this project is the Mormon Lake district ranger. Based upon the effects of the different alternatives, the Mormon Lake district ranger will either decide to implement the Proposed Action, another action alternative, combinations of components from several alternatives, or not to authorize grazing on the allotments at this time.

Contents

List of Tables

List of Figures

Chapter 1. Purpose and Need for Action

Introduction

The Forest Service has prepared this draft environmental impact statement (DEIS) in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations. This DEIS discloses the direct, indirect, and cumulative environmental impacts that would result from the Proposed Action and alternatives. The document is organized into five chapters:

Chapter 1. Purpose and Need for Action - The chapter includes information on the history of the project proposal, the purpose of and need for the project, and the Agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

Chapter 2. Proposed Action and Alternatives - This chapter provides a more detailed description of the Agency's Proposed Action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes mitigation measures. Finally, this section provides a summary of the environmental consequences associated with each alternative.

Chapter 3. Affected Environment and Environmental Consequences - This chapter describes the environmental effects of implementing the Proposed Action and other alternatives. This analysis is organized by significant issues and resource areas.

Chapter 4. Monitoring - This chapter describes the type of monitoring that will occur under all action alternatives during the term of the permit.

Chapter 5. Consultation and Coordination - This chapter provides a list of preparers and agencies consulted during development of the environmental impact statement.

Appendix - The appendix provides more detailed information to support the analyses presented in the environmental impact statement.

Index - The index provides page numbers by document topic.

Additional documentation, including specialist reports, correspondence, and public comments and responses, may be found in the project record document [PRD] located at the Peaks Ranger District in Flagstaff, Arizona. These records are available for public review pursuant to the Freedom of Information Act (5 U.S.C. 552).

Project Background

The Pickett Lake and Padre Canyon Allotments are adjacent allotments located about 9 miles southeast of Flagstaff, Arizona and within the Anderson Mesa Landscape Scale Assessment (USDA 2004b) project boundary (see Figure 1). The Pickett Lake Allotment runs from the eastern boundary of the Coconino National Forest below the Anderson Mesa rim, up the Anderson Mesa rim, and about 3 miles west of Forest Highway 3 (Lake Mary Road) between Upper Lake Mary and Mormon Lake. The Padre Canyon Allotment runs along the eastern edge of the Coconino National Forest boundary from the Pickett Lake Allotment on the south end to 3 miles south of the Twin Arrows/I-40 Highway junction on the north end (see Figure 2).

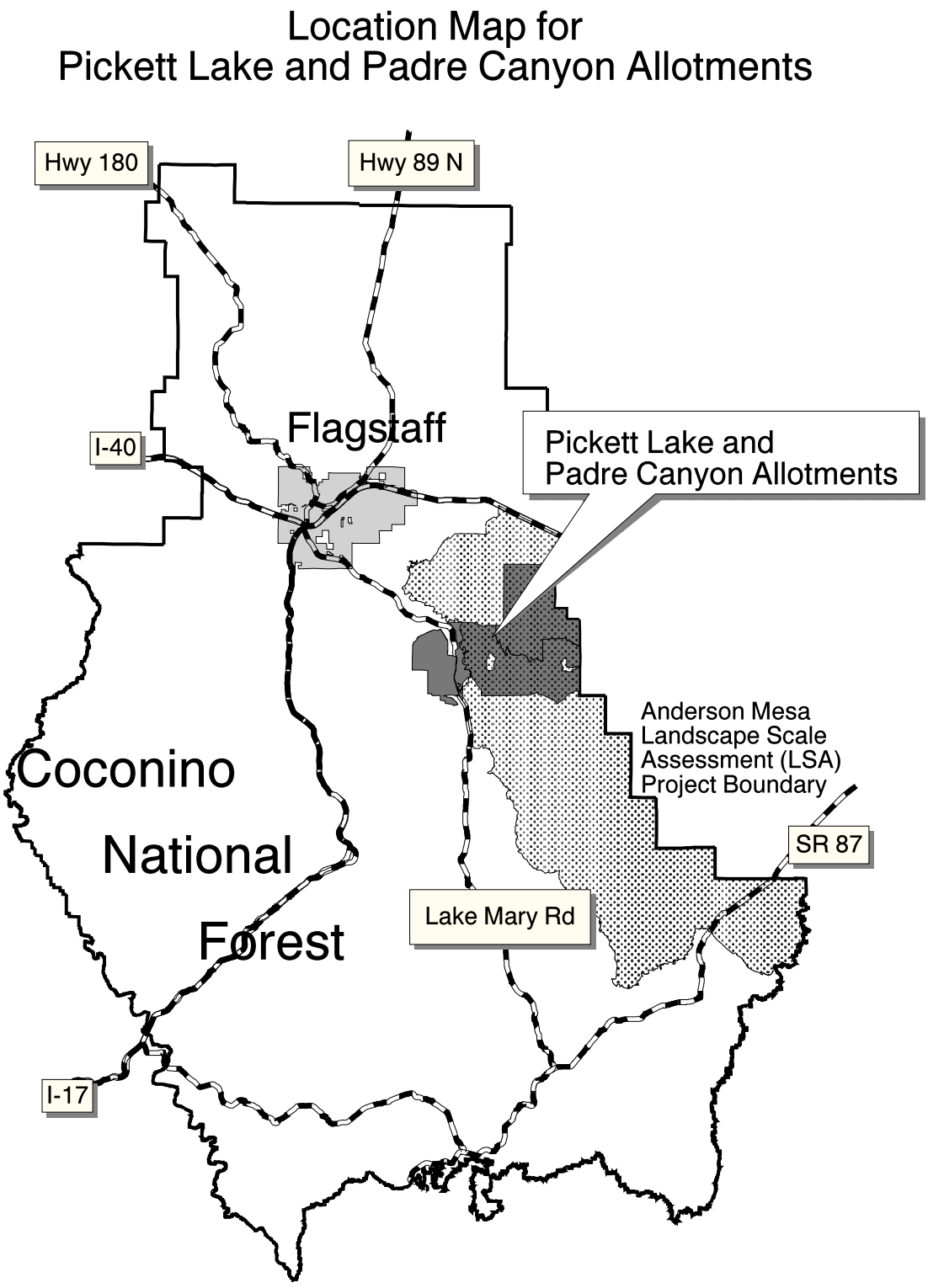


Figure 1. Location of the Pickett Lake and Padre Canyon Allotments on the Coconino National Forest

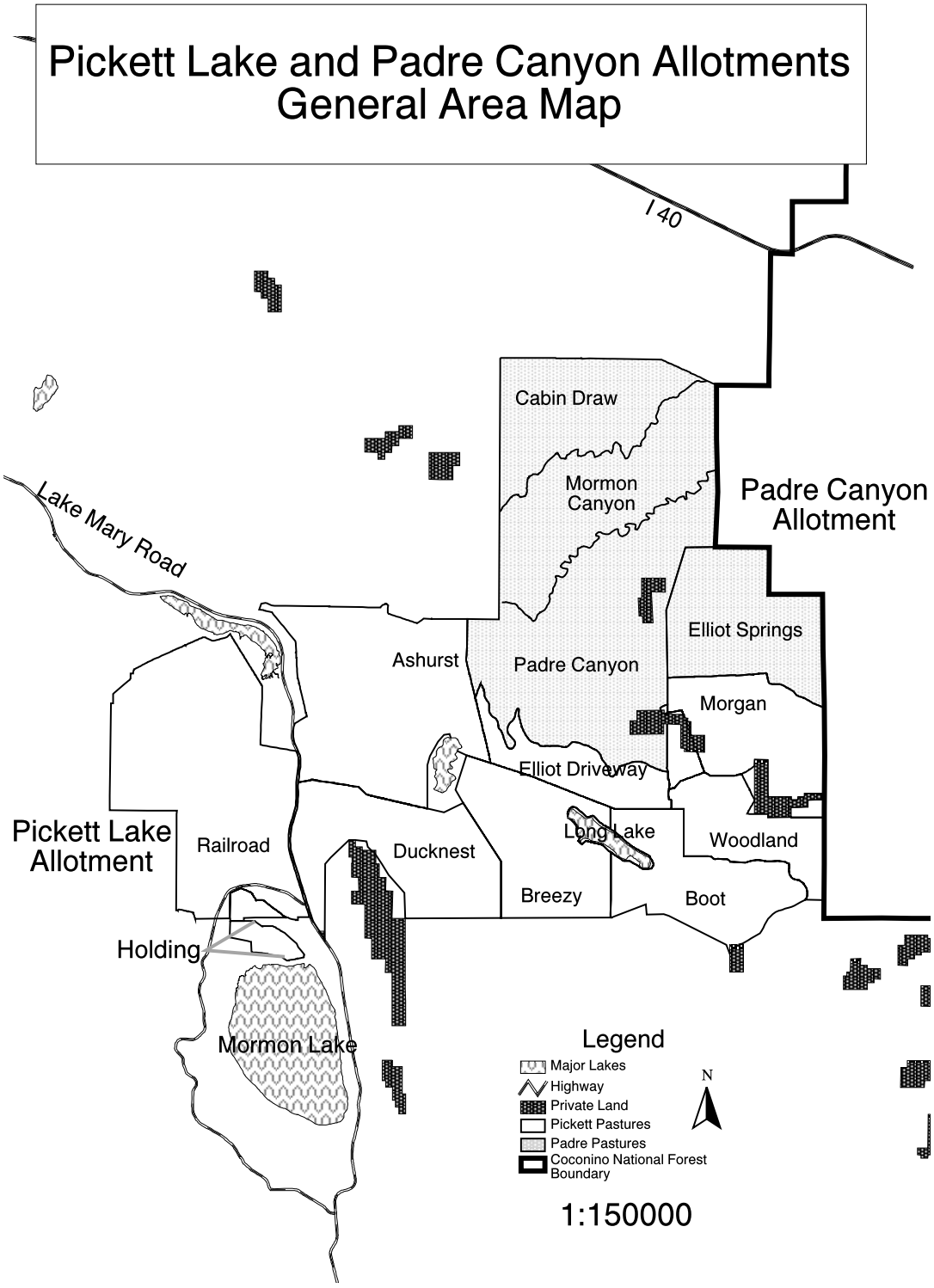


Figure 2. Map of the Pickett Lake and Padre Canyon grazing allotment pastures

The Pickett Lake and Padre Canyon Allotments consist of 34,814 and 20,993 acres, respectively. These acres lie in the eastern portion of the Mormon Lake Ranger District of the Coconino National Forest. The Pickett Lake and Padre Canyon Allotments are located within all or portions of T20N, R10E, Sections 7-10, 15-22, 27-35; T19N, R10E, Sections 1-36; T19N, R9E, Sections 1-36; T19N, R8E, Sections 12-14, 23, 24; and T18N, R10E, Sections 1-3; T18N, R9E, Sections 4-5. The boundary area of the two grazing allotments is referred to as the *project area* in this DEIS.

Most of the Padre Canyon Inventoried Roadless Area (IRA) is located within the Padre Canyon Allotment (8,810 acres). No new roads or structural improvements or maintenance within the Padre IRA is proposed in this project and cattle grazing will not affect the area's roadless characteristic (see "Inventoried Roadless Area" analysis in Chapter 3). There are no wild and scenic rivers or research natural areas within or near the Pickett Lake and Padre Canyon Allotments. There are no designated wilderness areas within or near the allotments and no designated parklands or prime farmlands. A full roads analysis process was not completed for the purpose of cattle grazing, because the only change to the existing road system was tied to wetland fencing. A roads analysis was completed for these wetland road segments [PRD 15].

The current Pickett Lake Allotment permit is for 758 cattle from June 1 to October 31. The current Padre Canyon Allotment permit is for 87 cattle from June 1 to October 31. Both Pickett Lake and Padre Canyon grazing permits are issued to the same permittee. This joint ownership makes management coordination between the two allotments possible.

Grazing has occurred continuously on the Pickett Lake and Padre Canyon Allotments since the mid-1880s. Since this time, the Forest Service reduced cattle numbers and has managed cattle grazing periods more strictly. Cattle grazing management has improved over time through adaptive management, as well as construction of fences and waters by the Forest Service and permittees.

During the last 10 years, cattle numbers on the Pickett Lake Allotment have varied from a high of 758 cattle (May 20 to October 20) in 1994 to a low of 293 head from July 9 to August 25, and 283 from August 26 to September 1 in 2002 (see Table 1). During the last 10 years, cattle numbers on the Padre Canyon Allotment have varied from a high of 87 (June 1 to October 31) in 1995 to non-use in 1996, 1998, 2000, 2003, and 2004 (see Table 2). Specific dates of use over the last 15 years are located in the range specialist report in the project record document [PRD 57].

Utilization from cattle grazing has been within the 35 percent guideline on the Pickett Lake and Padre Canyon Allotments during the last 10 years. There has also been no trespass of cattle on these allotments or other incidents. The end-of-season inspections that document this are in the range specialist report [PRD 57].

The Pickett Lake and Padre Canyon Allotments are scheduled for environmental analysis of grazing use on the Coconino National Forest, as required by the Burns Amendment (1995). This project was initiated in December 2000 as an EIS and the Proposed Action included cattle grazing changes, pinyon and juniper tree cutting, and broadcast burning. After initial public comment, the Forest Service narrowed the scope of the project to analyze only cattle grazing under an EA. A revised Proposed Action was presented in August 2002 and a draft EA published in July 2003. However, based on controversy over the effects of cattle grazing on pronghorn habitat on the Anderson Mesa portion of these allotments, the responsible official decided to re-initiate this analysis as an EIS.

Table 1. Actual use, season of use, head months, and AUMs for the Pickett Lake Allotment from 1994 through 2004

Year Grazed	Number of Livestock	Number of Days	Dates	Head Months[1]	AUMS[2]
1994	758	154	5/20-10/20	3,838	5,066
1995	730	154	5/20-10/20	3,696	4,879
1996	560	154	5/20-10/20	2,835	3,743
	190	49	5/20-7/7	306	404
(1996 Total)				3,141	4,147
1997	708	30	5/15-6/13	698	922
	352	98	6/26-10/1	1,134	1,497
(1997 Total)				1,832	2,419
1998	700	153	6/1-10/31	3,521	4,648
1999	758	62	6/1-8/1	1,545	2,039
	703	61	8/2-10/1	1,410	1,861
(1999 Total)				2,955	3,900
2000	758	153	6/1-10/31	3,813	5,033
2001	758	153	6/1-10/31	3,813	5,033
2002	293		7/8-8/18	405	534
			8/19-9/20	307	405
(2002 Total)				712	939
2003	469	2	6/5-6/7	46	61
	496	68	6/8-8/15	1,125	1,485
	468	37	8/16-9/22	585	772
	27	59	8/4-10/2	53	70
(2003 Total)				1,809	2,388
2004	542	29	8/1-8/30	535	706
	29	9	8/31-9/8	9	11
	513	33	9/9-10/11	557	735
(2004 Total)				1,101	1,452

[1] The calculation for head months is derived by multiplying the number of cattle by the number of months the cattle are on the forest.

[2] Animal Unit Months (AUMs) are calculated by multiplying head months by 1.32 (the unit used for cattle). Head months are used for billing; AUMs are used for capacity.

Table 2. Actual use, season of use, head months, and AUMs for the Padre Canyon Allotment from 1994 through 2004

Year Grazed	Number of Livestock	Number of Days	Dates	Head Months[1]	AUMs[2]
1994	67	122	6/1-9/30	269	355
1995	87	153	6/1-10/31	438	578
1996	0	0	0	0	0
1997	87	137	6/1-10/15	392	517
1998	0	0	0	0	0
1999	100	93	7/15-10/15	306	404
2000	0	0	0	0	0
2001	100	153	6/1-10/31	503	644
2002	283	0	9/2-9/18	0	0
2003	0	0	0	0	0
2004	0	0	0	0	0

[1] The calculation for head months is derived by multiplying the number of cattle by the number of months the cattle are on the forest.

[2] Animal Unit Months (AUM) are calculated by multiplying head months by 1.32 (the unit used for cattle). Head months are used for billing; AUMs are used for capacity.

Anderson Mesa Landscape Scale Assessment

Between release of the draft EA in 2003 and this DEIS, the Anderson Mesa Landscape Scale Assessment (AMLSA) was completed (USDA 2004b). The AMLSA was a multiagency and public planning effort to examine existing conditions, desired future conditions, and possible strategies for managing the Anderson Mesa portion of the Coconino National Forest. Anderson Mesa is a large area covering about 263,500 acres (refer to Figure 1) of diverse vegetation and wildlife species, an extensive and unique wetlands component, and offers a multitude of recreational opportunities. The Pickett Lake and Padre Canyon Allotments are included within the north-northeastern portion of the Anderson Mesa LSA boundary.

The assessment was completed in November 2004 with the publication of a final report (currently available at *www.fs.fed.us/r3/coconino/projects/index.shtml*). The final report is not a decision document, but rather provides guidance for further actions occurring on Anderson Mesa. The report identifies existing conditions and desired future conditions for the mesa and a set of possible management actions to move existing conditions toward desired conditions. The report also checks whether the proposed management actions are consistent with the 1987 Coconino National Forest Plan (Forest Plan) and all subsequent amendments.

Due to the geographical overlap of Pickett Lake and Padre Canyon Allotments with the AMLSA boundary, some existing and desired future conditions identified in the landscape assessment are relevant to this project analysis. Therefore, the Forest Service interdisciplinary team (IDT) reviewed the AMLSA final report and information from the assessment, where applicable, has been referenced and integrated into this DEIS.

Purpose and Need for Action

The purpose of this project is to determine whether or not to continue cattle grazing on the Pickett Lake and Padre Canyon Allotments. There is a need to maintain and/or improve rangeland conditions and to maintain and protect seasonal and semipermanent wetlands with emergent vegetation on the two allotments. Each of these needs responds to direction from the Forest Plan. There is also a need to maintain the permittee's access to their water right and consider current water claims within the allotments, as per Arizona State law.

New fencing and water installation is needed for better cattle distribution on these allotments. Fence improvements would keep cattle from leaving the north side of Elliot pasture and walking down the Anderson Mesa rim to unscheduled pastures. If needed, these fences would also keep cattle from grazing Billy Back and Boot Springs. Water improvements would provide water to cattle and wildlife, and improve cattle distribution on the Padre Canyon Allotment where there is currently no reliable water source.

The purpose and need is consistent with applicable Forest Plan standards and guidelines, as detailed in the "Management Direction" section in this chapter.

Proposed Action

To meet the purpose and need, the Forest Service would re-authorize grazing on the Pickett Lake and Padre Canyon Allotments while reducing overall cattle use and graze periods and increasing rest periods. The authorization would be through a term grazing permit for 913 cattle between June 1 and September 30.

Grazing rotations would be adjusted so that cattle do not graze on seasonal and semipermanent wetlands containing emergent vegetation (plants rooted underwater that grow above the surface of the water) from June 1 to July 15. The Proposed Action would establish a 35 percent *utilization* guideline by cattle and/or wildlife. The Proposed Action also includes a 35 percent *seasonal utilization* guideline, which is measured before the end of the growing season and is used when determining pasture moves.

The Proposed Action will help bring existing conditions toward desired conditions on the Pickett Lake and Padre Canyon Allotments. Existing and desired conditions, by vegetation type, were identified through the Anderson Mesa Landscape Scale Assessment process (USDA 2004b). The AMLSA suggests several possible management actions, related to cattle grazing, to help bring the area into its desired future condition. The IDT reviewed the AMLSA and determined the following actions (**in bold**) could be integrated into the Proposed Action for this project.

Fence and provide lanes to stock ponds: Exclosure fences would be built to protect the hardstem bulrush and surrounding upland buffer at Post and Perry Lakes, with a lane to access the stock tank water and the permittee's water right at Perry Lake. Two short road segments would be obliterated with construction of these exclosures. Exclosure fences would also be built around the emergent vegetation and surrounding upland buffer at Ducknest and Indian Tank Lakes, with a lane to access the stock tank water and the permittee's current water claim at Indian Tank Lake.

The Proposed Action includes an adaptive management option to fence Boot, Breezy, West Breezy and Indian Lakes, with a lane to the stock tank waters and the permittee's current water claims at Boot and Indian Lakes. To maintain rangeland condition, or for increased flexibility in pasture rotations, the emergent vegetation and surrounding upland buffer would be fenced at these four wetlands. Fencing would be completed as funding becomes available. These wetlands would likely be fenced within 3 years.

Create additional waters to improve distribution of grazing animals: Four miles of pipeline (connected to a well on private land) and five drinkers would be constructed to improve water distribution below the Anderson Mesa rim on the Padre Canyon Allotment.

Improved grazing strategy (rotations and deferred grazing until soil is improved): Cattle numbers on the Pickett Lake and Padre Canyon Allotments would be reduced 14 percent from current management by combining the two allotments and shortening the grazing season (currently June 1 to October 31) from June 1 to September 30. Combining the allotments would reduce the pasture graze periods from 5 to 3 months above the Anderson Mesa rim and from 5 months to 1 month below the rim. Grazing rotations would be adjusted so that cattle do not graze on seasonal and semipermanent wetlands containing emergent vegetation from June 1 to July 15. No cattle grazing would occur at all between May 1 and May 31.

Use structural and nonstructural improvements to improve distribution of cattle and control use of understory plants especially in years with low herbaceous productivity: Up to one and a half miles of fence, in sections, would be constructed along the Anderson Mesa rim to keep cattle from moving past the rim, and for a small holding pasture in the western corner of the Elliot Driveway pasture. The proposed wetland exclosure fences, pipeline, drinkers, and improved grazing strategy described above will also help achieve this objective.

Manage cattle grazing and make adjustments in grazing schedules through annual operating instructions (AOI) when monitoring displays a need for change: Up to 20 percent use by cattle on emergent and woody vegetation at Boot and Billy Back Springs would be allowed. If use by cattle exceeds this guideline, a fence would be constructed by the permittee to exclude cattle at these two springs.

Cattle and/or elk fencing when necessary: The proposed wetland exclosure fences described earlier will help achieve this objective. Managing elk grazing is outside the scope of this project.

Monitor use in all wetland types, including vegetative ground cover: Condition and trend monitoring plots were established at the following lakes using photo point and plant inventories in the fall of 2003: Indian Lake, Long Lake, Al's Lake, Antelope Tank, Pickett Lake, Boot Lake, Ducknest Lake, Grass Lake, Indian Tank Lake, Long Lake, Perry Lake, Deep Lake, West Breezy Lake, and Breezy Lake. Additional monitoring of these plots may occur in the next 10 years if funding is available. Canopy cover, frequency and composition plots were established at Perry Lake, Boot Lake, Ducknest Lake, Breezy Lake, West Breezy Lake, Indian Lake, Post Lake, Long Lake, Deep Lake, and Prime Lake. Additional monitoring of these plots may also occur in the next 10 years if funding is available.

The Proposed Action meets the purpose and need by: continuing cattle grazing on the Pickett Lake and Padre Canyon Allotments; maintaining and/or improving rangeland conditions where cattle grazing occurs; maintaining and protecting seasonal and semipermanent wetlands with emergent vegetation; and by maintaining access to the permittee's water right and considering their filed water claims. Furthermore, Alternative 3 would provide new fencing and water improvements for better cattle distribution on these allotments.

Additional details of the Proposed Action are provided in Chapter 2 of this DEIS.

Management Direction

This action responds to the goals and objectives outlined in the 1987 Coconino National Forest Plan (Forest Plan) and all subsequent amendments. The Forest Plan provides direction for all resource management programs, practices, uses, and protection measures for the Coconino

National Forest. The Proposed Action will help move the project area toward desired conditions described in both the Forest Plan and the Anderson Mesa Landscape Scale Assessment (USDA 2004b).

This project is consistent with direction listed in the forest-wide standards and guidelines and in the standards and guidelines for the following management areas (MA): MA 3 Ponderosa Pine and Mixed Conifer on slopes less than 40 percent; MA 4 Ponderosa Pine and Mixed Conifer on slopes greater than 40 percent; MA 6 Unsuitable Timber Land; MA 7 Pinyon-Juniper on less than 40 percent slopes; MA 8 Pinyon-Juniper on greater than 40 percent slopes; MA 9 Mountain Grassland; MA 10 Transition Grassland; and MA 12 Riparian [PRD 53]. Table 3 lists the Forest Plan emphasis of each of these management areas.

Table 3. Coconino Forest Plan emphasis on management areas within the Pickett Lake and Padre Canyon Allotments

Management Area (MA)	Forest Plan Emphasis
MA-3: Ponderosa pine and mixed conifer, less than 40 percent slopes	Sustained yield of timber and firewood production, wildlife habitat, livestock grazing, high quality water, and dispersed recreation.
MA-4: Ponderosa pine and mixed conifer, greater than 40 percent slopes	Wildlife habitat, watershed condition, and dispersed recreation.
MA-6: Unproductive timber lands	Wildlife habitat, watershed condition, and livestock grazing.
MA-7: Pinyon-juniper woodland, less than 40 percent slopes	Firewood production, watershed condition, wildlife habitat, and livestock grazing.
MA-8: Pinyon-juniper woodland, greater than 40 percent slopes	Wildlife habitat, watershed condition, and dispersed recreation.
MA-9: Mountain grassland	Livestock grazing, visual quality, and wildlife habitat
MA-10: Grassland and sparse pinyon-juniper above the rim	Range management, watershed condition, and wildlife habitat.
MA-12: Riparian and open water	Wildlife habitat, visual quality, fish habitat, and watershed condition on the wetlands, riparian forest, and riparian scrub.

Consistency with the Forest Plan applies only to the specific activities described in the alternatives. Not all desired conditions or emphasis in the Forest Plan can be achieved with a single, on-the-ground action. Often, many actions are necessary in order to meet the desired conditions identified by management direction.

This project is also consistent with the following:

- Congressional intent to allow grazing on suitable lands (Multiple Use-Sustained Yield Act of 1960, Forest and Rangeland Renewable Resources Planning Act of 1974, Federal Land Policy and Management Act of 1976, National Forest Management Act of 1976).
- Forest Service policy on rangeland management (FSM 2202.1, FSM 2203.1).
- Federal regulation (36 CFR 222.2 (c)) which states that National Forest System lands would be allocated for livestock grazing and allotment management plans (AMP) would be prepared consistent with land management plans.
- Authorization of livestock grazing permits for a 10-year period is required by law (FLPMA Sec. 402 (a)&(b) (3) and 36 CFR 222.3), unless there is pending disposal, or it

would be devoted to other uses prior to the end of 10 years, or it would be in best interest of sound land management to specify a shorter term.

Applicable Laws and Regulations

The planning and decisionmaking process for this project was conducted in accordance with all applicable laws, regulations, policies and plans. Shown below is a partial list of Federal laws and executive orders pertaining to project-specific planning and environmental analysis on Federal lands. This project is consistent with the following:

Clean Air Act of 1955: Cattle grazing is not anticipated to cause disproportionate adverse human health or environmental effects to air quality [PRD 58].

Clean Water Act of 1948, as amended: This project complies with Arizona State laws regarding natural resource protection, including but not limited to water quality [PRD 58].

Multiple Use-Sustained Yield Act of 1960: This project is consistent with applicable Coconino Forest Plan standards and guidelines [PRD 53].

National Historic Preservation Act (NHPA) of 1966, as amended: An archeological survey and cultural resources clearance report has been completed for this project [PRD 20] and concludes under the Programmatic Agreement for Compliance with Section 106 of the NHPA that the project will have no effect on cultural properties and values. Native American tribes and communities were contacted for comments. These allotments are permitted to the Hopi Tribe, who submitted comments.

National Environmental Policy Act (NEPA) of 1969, as amended: The effects of the Proposed Action and alternatives have been analyzed and are disclosed in this DEIS.

Endangered Species Act (ESA) of 1973, as amended: The Endangered Species Act (ESA, PL 93-205), Forest Service Manual (FSM) 2670.11, 2670.21 and 2670.31 direction, and the Coconino National Forest Plan standards and guidelines (replacement pages 23 and 64) all require that National Forest System lands are not only managed for endangered, threatened and proposed (TEP) species, but also to recover TEP species. The ESA states that all Federal departments and agencies shall seek to conserve TEP species. FSM 2670 directs forests to manage National Forest System habitats to achieve recovery of TEP species and to avoid the need to implement special protection measures under the ESA.

The analysis and disclosure of effects to endangered, threatened, and proposed species is complete. Section 7(a)(2) of the Endangered Species Act requires that Federal agencies consult with the U.S. Fish and Wildlife Service (USFWS), as appropriate, to ensure that our actions do not jeopardize the continued existence of species listed as threatened or endangered under the ESA, or destroy or adversely modify designated critical habitat. Consultation with USFWS for effects to threatened and endangered species within the project area was completed [PRD 17]. The USFWS concurred with the Forest Service's determination that the project will have *no effect* on bald eagle and *may affect but will not likely adversely affect* the Mexican spotted owl [PRD 17].

Forest and Rangeland Renewable Resources Planning Act (RPA) of 1974, as amended: This project is consistent with applicable Coconino Forest Plan standards and guidelines [PRD 53].

National Forest Management Act (NFMA) of 1976, as amended: This project complies with the Coconino National Forest Plan and associated amendments [PRD 53]. This project incorporates all applicable Forest Plan forest-wide standards and guidelines and management area

direction as they apply to the project area. This project is also in compliance with Forest Plan goals and objectives. All required interagency review and coordination has been accomplished.

American Indian Religious Freedom Act of 1979: This project would not deny American Indians access to land within the project area for traditional and cultural purposes.

Archeological Resource Protection Act of 1980: The effects on archaeological sites have been analyzed and disclosed in the cultural resources report [PRD 20].

Executive Order 11593 (cultural resources): An archeological survey and cultural resources clearance report has been completed for this project [PRD 20].

Executive Order 12898 (environmental justice): Implementation of this project is not anticipated to cause disproportionate adverse human health or environmental effects to minority or low-income populations (see "Environmental Justice" analysis in Chapter 3).

Executive Order 11990 (wetland protection): Executive Order 11990 directs all Federal agencies to minimize the destruction, loss, or degradation of wetlands, and preserve and enhance the natural benefits of wetlands when:

- acquiring, managing, and disposing of Federal lands and facilities;
- providing federally-undertaken, financed, or assisted construction and improvements; and
- conducting Federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulating, and licensing activities.

The basic requirements of E.O. 11990 is that a Federal agency avoid construction or management practices that would adversely affect wetlands unless that agency finds that (1) there is no practical alternative, and (2) the Proposed Action includes all practical measures to minimize harm to the wetlands. There is no proposed construction within wetlands (besides a minimum disturbance in fence construction), or disposition of wetlands to other ownership, nor easement through wetlands [PRD 58].

Executive Order 11990 does not apply to the issuance by Federal agencies of permits, licenses, or allocations to private parties for activities involving wetlands on non-Federal property. These actions are, however, covered by other Federal statutes and regulations. The project area was inventoried for wetlands classified as "seasonal" or higher (i.e. seasonal and semipermanent) in 2002 and 2003 [PRD 10]. These wetlands will be managed consistent with MA 12 in the Forest Plan.

Executive Order 13186 (migratory birds): On January 10, 2001, President Clinton signed Executive Order 13186 for the "Responsibilities of Federal Agencies to Protect Migratory Birds" which directed Federal agencies to develop a memorandum of understanding with the U.S. Fish and Wildlife Service to promote conservation of migratory birds. Agencies shall identify potential impacts to migratory birds and their habitats, avoid or minimize adverse impacts, restore and enhance habitats, and evaluate the effects of actions on migratory birds. Where they exist, other analyses should be used, such as the Arizona Partners in Flight Conservation Plan.

This project is consistent with the Migratory Bird Treaty Act of 1918, as well as agency guidelines for conformance with the act [PRD 58]. Implementing standards and guidelines tied to MA 12 will provide opportunities to restore and enhance habitat for migratory bird species of concerns in seasonal and semipermanent wetland areas also tied to precipitation.

Forest Service Sensitive Species: Forest Service Manual 2621.2 directs managers to display findings under the various management alternatives considered for individual projects. This

assessment is based on the current geographic range of sensitive species on the Coconino National Forest and the area affected by the project. This assessment considers, as appropriate for the species and area, factors that may affect the current trend for the species' population.

Sensitive species are defined as "those plant and animal species identified by a regional forester for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, or significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution (FSM 2670.5(19))."

It is the policy of the Forest Service regarding sensitive species to:

- assist states in achieving their goals for conservation of endemic species;
- as part of the National Environmental Policy Act process, review programs and activities through a biological evaluation to determine their potential effect on sensitive species;
- avoid or minimize impacts to species whose viability has been identified as a concern;
- if impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole (the line officer, with project approval authority, makes the decision to allow or disallow impacts, but the decision must not result in loss of species viability or create significant trends toward Federal listing); and
- Establish management objectives in cooperation with the state when projects on National Forest System lands may have a significant effect on sensitive species population numbers or distributions.

Effects to Forest Service sensitive species were considered and a biological assessment and biological evaluation have been completed for the 15 sensitive species found within the Pickett Lake and Padre Canyon Allotments [PRD 17].

Management Indicator Species: The Forest Plan was prepared under planning regulations issued in 1982. In 2000, new planning regulations were issued that revised the Code of Federal Regulations (CFR) 36 Part 219, eliminating management indicator species (MIS) requirements, while continuing to emphasize maintenance of species diversity, distribution, and viability in the planning area (e.g. national forest). These regulations are under review and have not replaced the 1982 regulations and, therefore, the following discussion is tiered to the 1982 regulations and existing Forest Service policy. The Forest Service is required to address MIS in compliance with various regulations and Agency policy (36 CFR 219, Forest Service Manual (FSM) 2621 and 1920), which are, themselves, tiered to the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the NFMA.

Forest Service Manual (FSM) 2621 provides specific direction for management of MIS species. Forest Service policy and direction regarding species selection, habitat analysis, monitoring and evaluation, and other habitat and planning evaluation considerations regarding MIS at the Forest Plan and project level are given in FSM 2620 which tiers to the CFR 219.9. FSM 2630 provides guidance on improving MIS habitat, conducting habitat examinations, and conducting project level evaluations of MIS and their habitat within the project area.

Effects to management indicator species were considered and a biological assessment and biological evaluation have been completed for MIS found within the Pickett Lake and Padre Canyon Allotments [PRD 17].

Other guidance: Where other guiding documents exist, they are cited for the resource where they specifically apply. Examples include the Mexican Spotted Owl Recovery Plan (USDI 1995) and the Southwest Bald Eagle Recovery Plan (USDI 1982).

Decision Framework

This DEIS documents the results of analyzing the Proposed Action and alternatives. The Mormon Lake Ranger District is the responsible official for deciding whether or not lands on the Pickett Lake and Padre Canyon Allotments currently authorized for grazing would be authorized in the future and in what manner. Items in this decision include: number of cattle, season of use, grazing system, and improvements such as fencing, pipelines and drinkers. The decision is based on a consideration of the area's existing resource conditions, desired conditions, environmental issues, and the environmental effects of implementing the various alternatives. The district ranger may select any of the alternatives analyzed in detail, or may modify and select an alternative, as long as the resulting effects are within the range of effects displayed in this document.

This document is not a decision document. Rather, it discloses the environmental consequences for implementation of the Proposed Action or alternatives to that action.

After release of the final EIS, a record of decision, signed by the Mormon Lake district ranger, will document the decisions made as a result of this analysis. Should the decision result in cattle grazing, any and all grazing practices adopted in the decision would be further detailed in the terms and conditions of a new AMP and grazing permit.

Public Involvement

This project was originally proposed as an EIS and was first listed in the Coconino National Forest's Schedule of Proposed Actions (SOPA) on December 15, 2000 and has been published in all SOPAs thereafter. The permittee was involved early-on in development of this project. A Notice of Intent (NOI) to prepare an EIS was published in the "Federal Register" and the proposed action was mailed in January 2001 to a list of people who expressed interest in the project, or who were otherwise determined to be affected (permittee, adjacent landowners, organizations, and agencies). The Proposed Action included cattle grazing, pinyon and juniper tree cutting, and broadcast burning. After public scoping and comment, the Forest Service decided to narrow the scope of the project to analyze only cattle grazing under an EA.

A revised Proposed Action was mailed on August 10, 2002. Comments related to cattle grazing proposals from both Proposed Actions were considered in the analysis and development of a draft EA. A legal notice alerting the public to availability of the draft EA was published on July 29, 2003 in the Arizona Daily Sun. Nine comment letters were received in response and two issues were identified during the draft EA comment analysis.

The first issue involved wetlands and how the proposed cattle grazing system and utilization levels affect seasonal and semipermanent wetlands habitat for ground-nesting birds and riparian vegetative health within wetlands. The second issue was concerned with the proposed utilization level of 35 percent, which may inhibit grass plants' growth, reduce vertical height, remove too many seed heads, lessen plants' ability to grow to maturity, build necessary root mass, or propagate.

Based on controversy over the effects of cattle grazing on pronghorn habitat on the Anderson Mesa portion of these allotments, the responsible official decided to re-initiate this analysis as an EIS. The issues of wetlands and utilization, from the original EA comments described above, led to development of the Proposed Action and Alternative 4 for this DEIS.

The NOI for this DEIS was published in the "Federal Register" on November 3, 2004 and mailed to 42 interested citizens or organizations the same day. The NOI indicated that the Forest Service was initially considering four alternatives: current management, no action/no grazing, proposed action (wetland management), and reduction in utilization. The NOI asked for public comment on the proposal until December 3, 2004. In addition, the Agency sent a press release announcing the DEIS comment period to 34 local media sources including local television, newspaper and radio outlets. No significant issues were identified during this public scoping period.

Issues

There were no significant issues identified during public comment (scoping) of the Proposed Action for this EIS. Significant issues are defined as those directly or indirectly caused by implementing the Proposed Action. Nonsignificant issues are identified as those: (1) outside the scope of the project; (2) already decided by law, regulation, Forest Plan, or other higher level decision; (3) irrelevant to the decision to be made; or (4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations direct agencies to "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review" (Sec. 1506.3). Responses to nonsignificant issues and other comments are included in the project record [Comment Analysis, PRD 50].

Chapter 2. Proposed Action and Alternatives

This chapter describes and compares the alternatives considered for grazing management on the Pickett Lake and Padre Canyon Allotments. It includes a description of each alternative considered in this analysis. This section also presents the alternatives in comparative form, defining the differences between each alternative and providing a clear basis for choice among options by the decision maker. Some of the information used to compare the alternatives is based upon the design of the alternative (i.e., establishing a 35 percent utilization guideline versus a 20 percent guideline), and some of the information is based upon the environmental, social, and economic effects of implementing each alternative (i.e., authorizing or not authorizing cattle grazing).

Alternatives Considered in Detail

The Forest Service analyzed four alternatives, including the No Action and Proposed Action alternatives. A comparison of the design features and environmental effects for all alternatives are found in Tables 4 through 8 at the end of this chapter.

Alternative 1

Current Management

As per the Forest Service Grazing Permit Administration Handbook (FSH 2209.13), current management should be analyzed in detail as an alternative to the proposed action (Chapter 92.31).

Alternative 1 would authorize cattle grazing on the Pickett Lake and Padre Canyon Allotments under the current grazing management system (see Table 6) for cattle numbers and season of use. Grazing rotations would be adjusted so cattle do not graze on seasonal and semipermanent wetlands containing emergent vegetation from June 1 to July 15.

Alternative 1 would maintain a 35 percent utilization guideline by cattle and/or wildlife. Alternative 1 also has a 35 percent *seasonal utilization* guideline which is measured before the end of the growing season and is used when determining pasture moves. *Utilization* is measured at the end of the growing season when the total annual production can be accounted for and the effects of grazing in the whole management unit can be assessed. Utilization data will not be used alone, but would be used along with climate and condition/trend data, to set stocking levels and pasture rotations for future years.

Cattle will move from one pasture to another when seasonal utilization in a pasture reaches 35 percent. Seasonal utilization is an approximate value because it takes into account any additional growth which might occur later that year and considers season of use, wildlife use, weather conditions, availability of forage, and water in pastures. For example, if wildlife use exceeds this guideline in a pasture, cattle would skip this pasture and move to the next pasture in the rotation.

Adjustments in the AOI would need to be made if graze periods are adjusted more than 1 week. As the new allotment management plan is implemented, cattle numbers would be adjusted annually to meet any particular resource issues such as drought.

Up to 20 percent seasonal utilization by cattle on woody vegetation at Boot and Billy Back Springs would be allowed. The pasture that these springs are within is a driveway so cattle only pass through this area. Because the permittee would be moving cattle through the area and their time would be limited in grazing, fencing would not be needed at these springs. If seasonal utilization by cattle does exceed this guideline, cattle would be driven through this pasture more quickly in subsequent years.

No new improvements would be installed. Maintenance would continue, as needed, by the permittee on all existing structural improvements including barbwire fences, trick tanks, drinkers, stock tanks, and cattle guards (see Table 4). The stock tanks within seasonal and semipermanent wetlands would not be maintained for the next 10 years. In pronghorn habitat, the bottom wire of new and reconstructed fences would be smooth and a minimum height of 18 inches to facilitate wildlife movement.

Pickett Lake Allotment Proposed Grazing Schedule: The Pickett Lake herd would graze a maximum number of 758 head (3,790 head months) of cattle from June 1 through October 31. The cattle would run in an 8-pasture rest-rotation grazing system. One to two pastures would receive yearlong rest each year. The cattle would start below the Anderson Mesa rim in the Woodland and Morgan pastures in June and rotate through six to seven of the eight pastures until the end of September. Each large pasture would be rested at least once every 5 years. Cattle would rotate clockwise and counterclockwise through the pastures every other year. Graze periods would vary from 3 to 44 days.

Padre Canyon Allotment Proposed Grazing Schedule: The Padre Canyon herd would graze a maximum number of 87 head (435 head months) of cattle from June 1 through October 31. The cattle would run in a 4-pasture deferred-rotation grazing system. Only two fenced pastures exist on the allotment because the Mormon and Padre Canyons work as natural barriers to divide the allotment into four grazing pastures. The cattle would be rotated through all four pastures during the grazing season and this use would be deferred annually so the pastures are grazed at a different time each season. Graze periods vary from 15 to 39 days.

Semipermanent or seasonal wetlands would not be grazed by cattle from June 1 to July 15. This exclusion would be accomplished by using the Railroad pasture plus the Padre Canyon Allotment pastures during this time period because seasonal and semipermanent wetlands are not accessible in these pastures.

The Mormon and Jacket Fires, on the Padre Canyon Allotment, would need to recover before cattle are allowed to graze those areas. The earliest cattle grazing would occur would be the fall of 2006, which is more than two full growing seasons in which plants would be re-established, depending on moisture levels.

The following areas on Forest Service lands would not be used by Pickett Lake and Padre Canyon cattle in the next 10 years: Ashurst Lake exclosure, Ashurst Spring exclosure, and Long Lake exclosure.

Alternative 1 meets the purpose and need by: continuing cattle grazing on the Pickett Lake and Padre Canyon Allotments, maintaining and/or improving rangeland conditions where cattle grazing occurs, maintaining access to the permittee's water right, and considering filed water claims. Alternative 1 would not meet the need of providing new fencing or water improvements for better cattle distribution on the allotments.

Alternative 2

No Action/No Grazing

The Forest Service is required to analyze the "No Action" alternative under the provisions of NEPA (40CFR 1502.14).

Alternative 2 would not authorize cattle grazing on the Pickett Lake and Padre Canyon Allotments. This alternative does not preclude cattle grazing or cattle management on these allotments in the future if a decision is made through another comprehensive analysis to resume

these actions. With no cattle use, grazing periods, rest periods, utilization guidelines, or adjustments to AOIs do not apply.

Under this alternative, no new structural improvements would be built. Existing structural range improvements would require further analysis and coordination with other agencies to determine whether or not to maintain or remove these improvements.

Alternative 2 does not meet the purpose and need of continuing cattle grazing on the Pickett Lake and Padre Canyon Allotments because cattle grazing would be discontinued. The permittee would also not have access to their water use right and filed water claims under Alternative 2. No new fencing or water improvements would be constructed because cattle grazing would not be authorized.

Alternative 2 meets the need of maintaining or improving rangeland conditions because it eliminates impacts from livestock grazing to forage species. Alternative 2 also meets the need of maintaining and protecting seasonal and semipermanent wetlands with emergent vegetation because it eliminates impacts from livestock grazing to wetlands.

Alternative 3

Proposed Action

Alternative 3 proposes several additional changes to current cattle grazing management, thus more discussion is provided here to help explain these changes.

To meet the purpose and need, the Forest Service would re-authorize grazing on the Pickett Lake and Padre Canyon Allotments while reducing overall cattle use and graze periods and increasing rest periods. The authorization would be through a term grazing permit for 913 cattle between June 1 and September 30. Grazing rotations would be adjusted so that cattle do not graze on seasonal and semipermanent wetlands containing emergent vegetation from June 1 to July 15.

The Proposed Action would establish a 35 percent utilization guideline by cattle and/or wildlife. The Proposed Action also includes a 35 percent *seasonal utilization* guideline which is measured before the end of the growing season and is used when determining pasture moves. *Utilization* is measured at the end of the growing season when the total annual production can be accounted for and the effects of grazing in the whole management unit can be assessed. Utilization data will not be used alone, but would be used along with climate and condition/trend data, to set stocking levels and pasture rotations for future years.

Cattle will move from one pasture to another when seasonal utilization in a pasture reaches 35 percent. Seasonal utilization is an approximate value because it takes into account any additional growth which might occur later that year and considers season of use, wildlife use, weather conditions, availability of forage, and water in pastures. For example, if wildlife use exceeds this guideline in a pasture, cattle would skip this pasture and move to the next pasture in the rotation.

The two allotment areas would be managed together along with the cattle herd. Cattle numbers would consist of a maximum of 913 head (3,652 head months) in one herd from June 1 through September 30. The 913 head calculation was derived from adding 850 head (3,400 head months) for 4 months on Pickett Lake and 63 head (252 head months) for 4 months on Padre Canyon. The cattle would run in a 10-pasture rest-rotation grazing system. Cattle would run for about 30 days below the Anderson Mesa rim on the Woodland and Morgan pastures of Pickett Lake and the entire Padre Canyon Allotment either in June or September, every other year, with up to 20-day pasture graze periods.

Adjustments in the annual operating instructions (AOI) would be made if graze periods are adjusted more than 1 week. As the new allotment management plan is implemented, cattle numbers would be adjusted annually to meet any particular resource issues, such as drought.

Up to 20 percent use by cattle on emergent and woody vegetation at Boot and Billy Back Springs would be allowed. The pasture that these springs are within is a driveway so cattle only pass through this area. Because the permittee would be moving cattle through the area and their time would be limited in grazing, fencing would not be needed at these springs. If use by cattle exceeds this guideline, a fence would be constructed by the permittee to exclude cattle from these two springs.

Maintenance would be done by the permittee on all new and existing structural improvements including barbwire fences, cattle guards, trick tanks, stock tanks and drinkers (see Table 4). The stock tanks within seasonal and semipermanent wetlands would not be maintained for the next 10 years. In pronghorn habitat, the bottom wire of new and reconstructed fences would be smooth and a minimum height of 18 inches to facilitate wildlife movement.

In addition to maintaining current range structures, about $103,750 would be spent on proposed structural improvements. The permittee would primarily fund the labor for installation (about $65,900) with the materials provided by the Forest Service (about $37,850). These costs would likely be offset due to great interest and funding that becomes available from other agencies and organizations through grants and agreements, such as the Arizona Game and Fish Department, the Elk Foundation, Ducks Unlimited, or the Antelope Foundation.

Up to one and a half miles of fence, in sections, would be constructed along the Anderson Mesa rim to keep cattle from moving down past the rim, and for a small holding pasture in the western corner of the Elliot Driveway pasture. Four miles of pipeline (connected to a well on private land) and five drinkers would be constructed to improve water distribution below the Anderson Mesa rim on the Padre Canyon Allotment (see Figure 3 and Table 5).

Exclosure fences would be built to protect the hardstem bulrush plant community and surrounding upland buffer at Post and Perry Lakes, with a lane to the stock tank water at Perry Lake. Exclosure fences would also be built around the emergent vegetation and surrounding upland buffer at Ducknest and Indian Tank Lakes, with a lane to the stock tank water in Indian Tank Lake (see Figure 3 and Table 5).

Exclosure fences will exclude cattle from the emergent vegetation and surrounding upland buffer of waterfowl nesting habitat, except for the lanes which are designed to allow cattle access to the stock tank water. This also allows the permittee access to their water right and filed water claims. The exact size of the exclosures depends on the area of emergent vegetation and surrounding upland waterfowl nesting habitat. Most fences would be about 100 meters from the edge of the emergent vegetation. Collectively, the 4 proposed lanes include about 2 acres of emergent vegetation and 17 acres of surrounding upland waterfowl nesting habitat, which is about 1 percent of the wetlands and surrounding uplands on the allotments. Maps of the specific exclosure designs are located in the project record [PRD 21]. As an example, Figure 4 shows the proposed exclosure at Perry Lake.

The Proposed Action also includes an adaptive management option to fence Boot, Breezy, West Breezy, and Indian Lakes, with a lane to the stock tank waters in Boot and Indian Lakes (see Figure 3) As part of the adaptive management option, the Padre Canyon Allotment, Railroad, Ducknest, Morgan, and Woodland pastures condition and trend would be monitored in upland

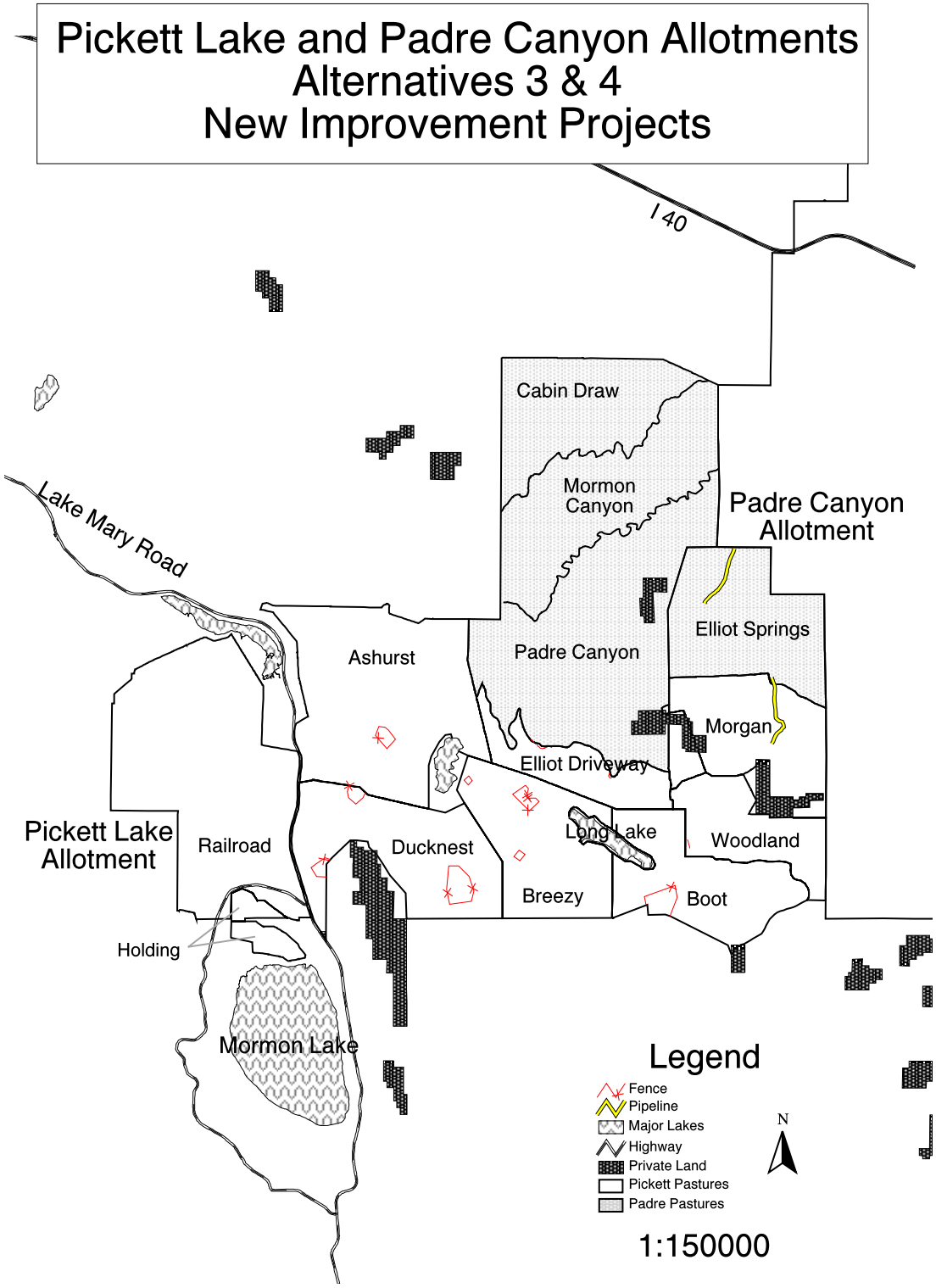


Figure 3. Proposed structural improvement projects for Alternatives 3 and 4

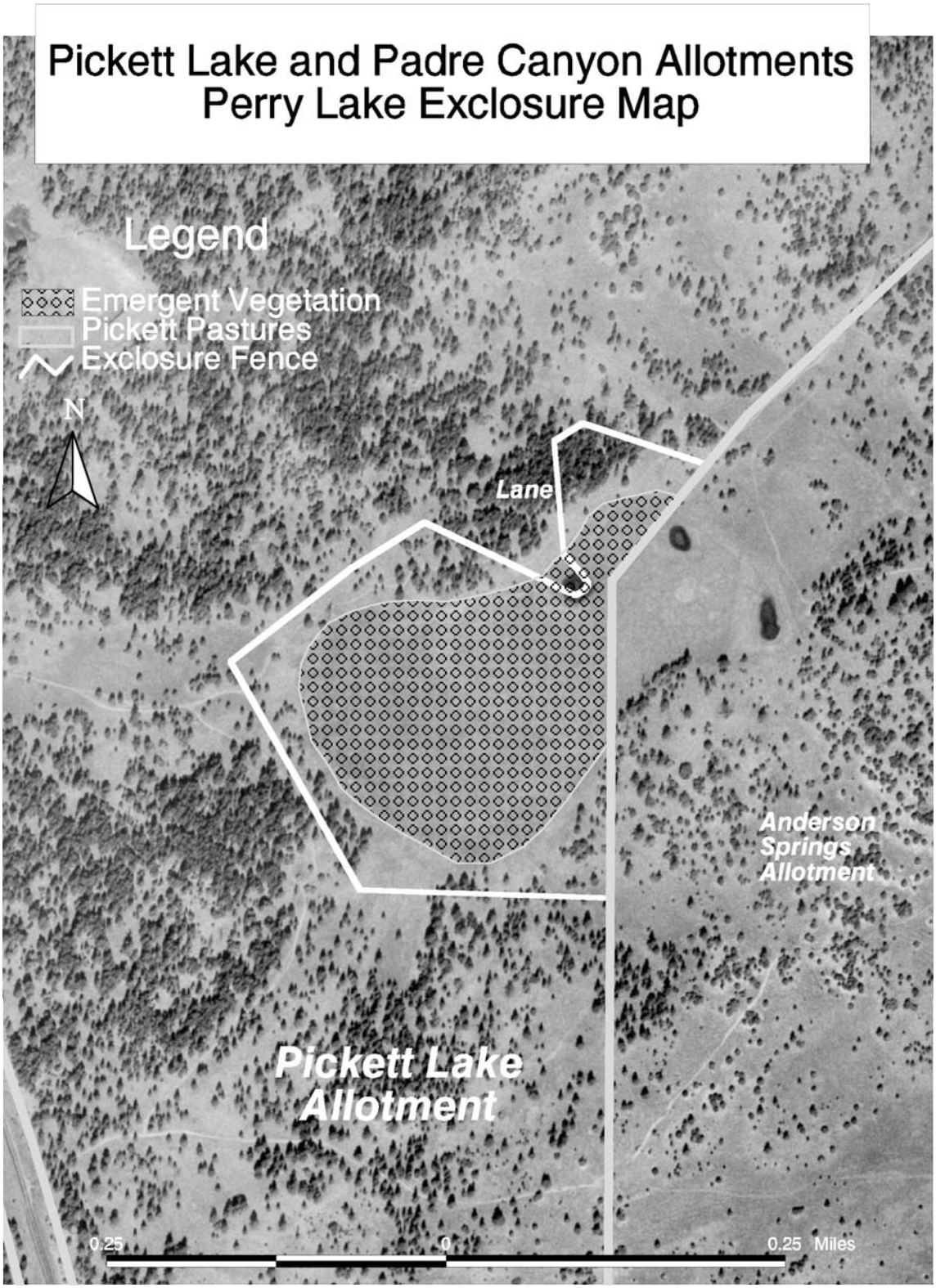


Figure 4. Proposed wetland exclosure with a lane to the stock tank water at Perry Lake

vegetation to determine if these pastures are being used too much at the same time of year, year after year. If they are, then in order to maintain rangeland condition in these pastures, or for increased flexibility in pasture rotations, the emergent vegetation and surrounding upland buffer would be fenced at these four wetlands. These wetlands would most likely be fenced within the life of this decision.

To help implement fencing at Perry and Post Lakes, two short road segments will be eliminated. A 0.4 mile section of the 82D road at Post Lake will be rerouted to the 9117F road, and a 0.5 mile segment of the 9117P road at Perry Lake will be decommissioned as per the 1989 Coconino Forest Plan Amendment 4 for road closures. A roads analysis was completed for these wetland road segments [PRD 15]. Since there are other existing roads in this area these closures will not affect travel.

Cattle numbers on the Pickett Lake and Padre Canyon Allotments would be reduced 14 percent from what is currently authorized. This would be done though combining the two allotments and shortening the grazing season (currently June 1 to October 31) from June 1 to September 30. Combining the allotments would reduce the pasture graze periods from 5 to 3 months above the Anderson Mesa rim and from 5 months to 1 month below the rim (see Table 6).

The two allotment areas would be managed together, and the cattle herd would be combined. Cattle numbers would consist of a maximum of 913 head in one herd from June 1 through September 30, which is 1 month shorter than current management. The 913 head calculation was derived from adding 850 head for 4 months on Pickett Lake and 63 head for 4 months on Padre Canyon. The cattle would run in a 10-pasture rest-rotation grazing system.

Cattle would run for about 30 days below the Anderson Mesa rim on the Woodland and Morgan pastures of Pickett Lake and the entire Padre Canyon Allotment either in June or September, every other year, with up to 20-day pasture graze periods. Pastures above Anderson Mesa rim would be grazed for 3 months, which is 1 month less than the current Pickett Lake schedule, with graze periods from 3 to 24 days. Two to three pastures would be rested from cattle grazing each year.

Semipermanent or seasonal wetlands would not be grazed by cattle from June 1 to July 15, except for lanes to the stock tank waters. This exclusion would be accomplished by using both the Railroad and Ducknest pastures plus the Padre Canyon Allotment pastures during this time period because seasonal and semipermanent wetlands are not accessible in these pastures. Ducknest pasture would be used during this time period only after the emergent vegetation and surrounding upland buffer at Indian Tank, Perry and Ducknest Lakes are fenced from cattle.

Once Indian Tank, Post, Perry and Ducknest Lakes are fenced, these lake exclosures would not be grazed by cattle, except for the lanes to the stock tank waters at Perry and Indian Tank Lakes. Boot and Breezy pastures would only be grazed from June 1 to July 15 if the Boot, Breezy, West Breezy, and Indian Lake exclosures around the emergent vegetation and surrounding upland buffer are built.

The Mormon and Jacket Fires, on the Padre Canyon Allotment, would need to recover before cattle are allowed to graze those areas. The earliest cattle grazing would occur would be the fall of 2006, which is more than two full growing seasons in which plants would be re-established, depending on moisture levels.

The following areas on Forest Service lands would not be used by Pickett Lake and Padre Canyon cattle in the next 10 years: Ashurst Lake exclosure; Ashurst Spring exclosure; Long Lake exclosure; Post Lake exclosure; Perry Lake exclosure; Indian Tank Lake exclosure; Ducknest Lake exclosure; possibly exclosures at Breezy, West Breezy, Boot and Indian Lakes; and possible

exclosures at Boot and Billy Back Springs if cattle use on emergent or woody vegetation exceeds 20 percent.

The following is a list of major changes in grazing management in the Proposed Action from current management:

- 14 percent reduction in cattle use for the combined allotment area from current use (4,225 head months to 3,652 head months)
- the grazing season above the Anderson Mesa rim is reduced from 5 to 3 months
- the grazing season below the Anderson Mesa rim on the Woodland and Morgan pastures of Pickett Lake and the entire Padre Canyon Allotment is reduced from 5 months to 1 month
- maximum pasture graze periods above the Anderson Mesa rim are reduced from 44 days to 24 days
- maximum pasture graze periods below the Anderson Mesa rim on the Woodland and Morgan pastures of Pickett Lake and the entire Padre Canyon Allotment are reduced from 39 days to 20 days
- one pasture below the rim is rested each year where currently no yearlong rest occurs
- two to three pastures above the rim are rested each year were currently one to two pastures are rested each year

Alternative 3 meets the purpose and need by: continuing cattle grazing on the Pickett Lake and Padre Canyon Allotments, maintaining and/or improving rangeland conditions where cattle grazing occurs, maintaining and protecting seasonal and semipermanent wetlands with emergent vegetation, and by maintaining access to the permittee's water right and considering their filed water claims. Furthermore, Alternative 3 would provide new fencing and water improvements for better cattle distribution on these allotments.

Alternative 4

Reduction in Permitted Cattle Numbers and Utilization

This alternative is similar to the Proposed Action (Alternative 3), except cattle and/or wildlife utilization guidelines would be reduced from 35 percent to 20 percent and cattle head months would be reduced by 15 percent from the Proposed Action (29 percent reduction from current management). All other actions such as grazing rotation schedules, rest periods, structural improvements, exclosure fences, and adaptive management options would be the same as described under Alternative 3.

Alternative 4 would establish a 20 percent utilization guideline by cattle and/or wildlife. Alternative 4 also includes a 20 percent *seasonal utilization* guideline which is measured before the end of the growing season and is used when determining pasture moves. Cattle will move from one pasture to another when seasonal utilization in a pasture reaches 20 percent. All other aspects of how utilization is measured are the same as described under Alternatives 1 and 3.

The two allotment areas would be managed together along with the cattle herd. Cattle numbers would consist of a maximum of 750 head (3,000 head months) in one herd from June 1 through September 30. The 750 head calculation was derived from adding 700 head (2,800 head months) for 4 months on Pickett Lake and 50 head (200 head months) for 4 months on Padre Canyon. The cattle would run in a 10-pasture rest-rotation grazing system. Cattle would run for about 30 days

below the Anderson Mesa rim on the Woodland and Morgan pastures of Pickett Lake and the entire Padre Canyon Allotment either in June or September, every other year, with up to 20-day pasture graze periods.

The following is a list of major changes in grazing management in Alternative 4 from current management:

- 29 percent reduction in cattle use for the combined allotment area (4,225 head months to 3,000 head months)
- the grazing season above the Anderson Mesa rim is reduced from 5 to 3 months
- the grazing season below the Anderson Mesa rim on the Woodland and Morgan pastures of Pickett Lake and the entire Padre Canyon Allotment is reduced from 5 months to 1 month
- maximum pasture graze periods above the Anderson Mesa rim are reduced from 44 days to 24 days; maximum pasture graze periods below the Anderson Mesa rim on the Woodland and Morgan pastures of Pickett Lake and the entire Padre Canyon Allotment are reduced from 39 days to 20 days
- one pasture below the rim is rested each year where currently no yearlong rest occurs
- reduction in utilization guideline from 35 percent to 20 percent
- two to three pastures above the rim are rested each year were currently one to two pastures are rested each year

Alternative 4 meets the purpose and need by: continuing cattle grazing on the Pickett Lake and Padre Canyon Allotments, maintaining and/or improving rangeland conditions where cattle grazing occurs, maintaining and protecting seasonal and semipermanent wetlands with emergent vegetation, maintaining access to the permittee's water right, and considering their filed water claims. Furthermore, Alternative 4 would provide new fencing and water improvements for better cattle distribution on these allotments.

Grazing Management Activities Common to All Alternatives

The following is a list of items that are common to all action alternatives. Some of these items are also applicable to the No Action/No Grazing Alternative (Alternative 2).

Annual Operating Instructions: Annual operating instructions (AOI) make adjustments to cattle numbers and time and duration of pasture use based on current climatic and range conditions. The AOIs are established at the beginning of each grazing season (spring) and published on the Coconino National Forest Web site: www.fs.fed.us/r3/coconino/publications. Annual operating instructions may be adjusted throughout the grazing season as conditions change.

The AOIs are the means by which adjustments of cattle numbers, change of season of use, and pasture rest periods are made in response to monitoring information such as frequency, canopy cover, Parker Three-Step plots and allotment inspections. Cattle numbers may go up or down annually but would not exceed the maximum number set by the decision. The annual minimum cattle number is zero.

The AOI for the Pickett Lake and Padre Canyon Allotments may be changed to reflect new information based on studies, ongoing field experiences, and conclusions. If changes are suggested that fall outside the parameters of the decision resulting from this EIS, they would

possibly be subject to another NEPA analysis and decision. The Forest Service would make the determination whether or not to undertake a new NEPA analysis at the time the recommendation is brought forward.

Grazing Schedules: Each action alternative contains proposed grazing schedules for each allotment and the schedules are detailed in the Range Specialist Report [PRD 57]. Alternative 1 (Current Management) has a schedule for two-herd management. Alternatives 3 and 4 each have schedules for one-herd management. These grazing schedules are given as a guide for future use; however, they may be adjusted as a result of monitoring, weather, or other conditions throughout the planned 10-year period. No grazing would occur from May 1 to May 30 under any alternative.

Roads and Cattle Guards: Common to all action alternatives is the need to keep cattle contained to pastures and prevent forest users from leaving pasture gates open. Where roads are open for public use, cattle guards would be maintained. Where roads are identified for closure, in past and future road decisions, no cattle guards are necessary. As roads are used more, gates tend be left open more often, creating a need for cattle guards. If this trend occurs over the next 10 years, new cattle guards may need to be installed.

Cattle guard maintenance is shared between the Forest Service and the permittee for level 3 roads (main surfaced roads). Cattle guard maintenance on level 2 roads (smaller, secondary roads) is the responsibility of the permittee.

Structural Improvements: Common to all action alternatives is the need for cultural, wildlife and recreation coordination when implementing construction of structural improvements for the grazing system. Structural improvements, such as fencing, pipelines, and drinkers would be used to implement the grazing plan. During the life of the permit, there may be additional or fewer improvements needed based on adapting to changes and meeting the goals of the new system. If the No Action/No Grazing Alternative is selected, each resource area specialist would be consulted to determine if the existing allotment improvements would be kept and/or maintained or removed. Allotment boundary fences would be maintained regardless of the alternative selected.

Monitoring: The following will be monitored for all action alternatives: permittee and permit compliance; allotment inspections; range readiness; forage production; rangeland utilization; condition and trend; precipitation; noxious weeds; threatened and endangered species; and soil condition. See Chapter 4, “Monitoring” for more specific information. For Alternative 2 (No Action/No Grazing), condition and trend monitoring would be the same as what is proposed in the action alternatives. Wildlife utilization monitoring, on forage, would also be completed on the allotments. The amount of wildlife monitoring would depend on funding availability.

Anderson Mesa Pronghorn Plan: The Anderson Mesa Pronghorn Plan was developed by the Arizona Game and Fish Department (2002) with participation from many interested agencies and groups. The Pronghorn Plan identifies the following needs: (1) support managing cattle with the intent of avoiding major negative impacts on pronghorn forage or fawning cover in the frequent years of below normal precipitation and (2) advocate managing cattle at the level where cattle impacts on pronghorn forage or fawning cover are not major through the fawning period.

Specific to this project, habitat suitable for pronghorn fawning occurs in Ashurst, Boot, Breezy and Ducknest pastures on the Pickett Lake Allotment. There is a need to continue this management scheme and monitor the effects to pronghorn habitat as outlined in the Pronghorn Plan. Monitoring provides an opportunity to learn about pronghorn habitat needs and the potential for future management adjustments.

Management objectives from the Pronghorn Plan, along with Forest Service monitoring and improvements, began in 2002 via the AOIs. Pronghorn Plan accomplishments specific to the Pickett Lake and Padre Canyon Allotments are listed here:

- Boot pasture was rested from cattle grazing from 2002 through 2004 through the AOI for the Pickett Lake Allotment.
- Ducknest pasture was deferred from cattle grazing between August 15 to June 15 from 2002 through 2004 through the current AOI.
- Approximately 35 miles of fences have been modified or replaced in the last 3 years, as needed, with the 18-inch smooth bottom wire recommendation in pronghorn habitat. This applies to new or reconstructed fences as per the Forest Plan [PRD 53].
- Adaptive management through a team comprised of interested members of the Anderson Mesa Pronghorn Mediation group (open to the public) will annually evaluate the results of the previous year's treatments and management. This group then makes management recommendations for the following year.

The Forest Service will continue to participate in the Pronghorn Plan management objectives and annual adaptive management meetings despite any alternative selected.

Mitigation Measures

The Forest Service will apply the following mitigation measures to any action alternative in order to minimize and reduce potential impacts from proposed activities.

Water Rights: There is one water right for livestock use, held by the permittee, on the Pickett Lake Allotment for Perry Lake and 23 filed water claims for livestock use throughout the Pickett Lake and Padre Canyon Allotments [PRD 23]. Filed water claims are part of the Lower Colorado River adjudication process and a decision on their status has not been made by the State of Arizona at this time. As part of working with the Pickett Lake and Padre Canyon permittee, access to water rights and/or claims will be maintained. For proposed exclosure fences around seasonal or semipermanent wetlands, access to the water rights and/or claims will be provided via lanes. The permittee has not requested lanes with the wetland exclosure designs in Alternatives 3 and 4 at Post, Ducknest, Breezy or West Breezy Lakes.

Watershed Protection: The current and proposed cattle grazing system incorporates best management practices (BMPs) and guidance practices (GPs) as per the Non-point Source Intergovernmental Agreement signed by Forest Service Region 3 and the Arizona Department of Environmental Quality.

The following GPs were selected for the Pickett Lake and Padre Canyon Allotments through the integrated resource management process and would apply to all cattle grazing alternatives. These GPs should protect soil and water quality on these allotments under the management alternatives. The BMPs or GPs have been adopted from the Draft Recommended Voluntary Management Practices for Grazing Activities (Arizona H.B. 2471) and include:

- Grazing systems are alternately rested and grazed in a planned sequence. Cattle rotate in a planned grazing system that alternates rest and graze periods throughout a given year and from year to year. Specifics on how this practice would be applied are described under each action alternative.

- Grazing at a level that would maintain enough cover to protect the soils and maintain or improve the quantity and quality of desired vegetation. Specifics on how this practice would be applied are described under each action alternative.
- Fencing is intended to improve cattle and wildlife management, control access, prevent soil loss, and improve water quality. Fencing specifics are described under each action alternative.

Fencing: All new fencing would have a smooth bottom wire at an 18-inch height for wildlife passage. Where possible, fences would be located within tree lines to limit impacts to visual quality. Elk jumps and goat bars (PVC pipes placed on the bottom two strands as a crossing point) may be constructed along new fences or along existing fences on game trails.

Stock Tanks: There are no new stock tanks proposed in any alternative. There is also no removal of existing stock tanks proposed in any alternative. New stock tanks have not been constructed in wetlands on the Pickett Lake and Padre Canyon Allotments for more than 40 years. Their construction was completed prior to the Clean Water Act requirement of a 404 permit for ground disturbance. For all alternatives, stock tanks located within seasonal and semipermanent wetlands would not be maintained for the next 10 years. For all action alternatives, stock tanks that are not in seasonal or semipermanent wetlands may be maintained as needed.

Stock tank maintenance outside of seasonal and semipermanent wetlands would meet the following standards: maintenance would be limited to the original boundary of the stock tank; maintenance would be limited to removal of sediment that has accumulated in the stock tank and maintenance of the tank berm and spillway; equipment that would be used includes but is not limited to a dozer, backhoe, or front end loader; maintenance frequency would range from no maintenance to whenever needed, depending on the amount of sediment flowing into the stock tank; maintenance would be done when the stock tanks are either dry or the water level is low enough so that the equipment would not get stuck in the mud; and any requirements or timing restrictions related to water quality, wildlife, archaeology, or Forest Plan standards and guidelines will be followed.

Noxious Weeds: State-listed noxious weeds located in these allotments will be treated as necessary. The permittee and Forest Service will coordinate the weed inventory and treatment with responsibilities identified through the AOI. Noxious weed monitoring is carried out at the same time allotment inspections are conducted. As noxious weed populations are found they are mapped, monitored and, in some areas, manually removed. Other treatment methods will follow guidelines established in the "Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds" (USDA 2005).

Threatened and Endangered Species: Mitigation measures or implementation parameters described in the biological assessment and biological evaluation [PRD 17] are required to minimize the impacts on bald eagles and Mexican spotted owl species and habitat.

Bald Eagle

Livestock management activities such as salting, herding and construction actions associated with grazing operations within the project area will not occur within one-quarter mile of a bald eagle roost or nest site during any time of occupation by bald eagles.

Mexican Spotted Owl

Seven acres of one Mexican spotted owl protected activity center (PAC) occurs on the Pickett Lake Allotment.

- No human disturbance or construction activities associated with livestock grazing operations would occur within this PAC during the breeding season (March 1 through August 31).
- Continue to monitor grazing use by livestock and wildlife in the ponderosa pine gamble oak type. Utilization for cattle and/or wildlife is 35 percent in this key area within the current PAC. Monitoring will be completed to ensure utilization is below this level. Cattle will be moved to the next pasture in the rotation before utilization is exceeded.
- The following guidelines will be used for placing salt, mineral blocks, or supplements:
  - Do not place these items in riparian areas, mountain meadows, or non-riparian drainages in ponderosa pine.
  - Do not place these items in spotted owl PACs.
  - Rotate salt and mineral supplement sites regularly, at least every 2 weeks, within spotted owl restricted habitat.
- Follow best management practices as listed in Chapter 3 under the "Soil," "Water Quality," and "Watershed" sections of this DEIS.
- Follow utilization guidelines to provide for favorable growth of forage species.
- If utilization guidelines are exceeded, stocking and management may need to be adjusted to maintain productivity of the pasture for the future.
- Livestock distribution techniques, such as salting and herding should be used, to provide for better use of a pasture.

Sensitive Plant Species: If sensitive plant species are located during the implementation of range improvements, coordination with a wildlife biologist or botanist will occur to mitigate impacts as needed (i.e. flagging specific plants and adjusting location).

Alternatives Considered but Eliminated from Detailed Study

Federal agencies are required by NEPA to explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 CFR 1502.14). Public comments received in response to the Proposed Action sometimes provide suggestions for alternative methods of achieving the purpose and need.

One alternative considered and eliminated from detailed study would have fenced seasonal and semipermanent wetlands to exclude cattle **and** provided water outside the fenced wetlands. This alternative was considered and dropped from further consideration because it was: (1) cost prohibitive (greater than $1 million for a well and pipeline); (2) pumping water out of a wetland would not be a legal use of the water due to water right/claim restrictions; and (3) building stock tanks would impede water flowing from the upper watershed into a wetland. This alternative was also dropped because it added 42 miles of fence to pronghorn habitat. The Project Record contains additional details of this alternative [PRD 9].

Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the following tables focus on activities where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives. To begin, a summary of existing and proposed improvements (including maintenance) is provided in Tables 4 and 5.

Table 4. Existing structural improvements and maintenance schedule

Existing Structural Improvements	Alternatives 1, 2*, 3, 4	Maintenance
Fences	Pickett – 81.5 Miles Padre – 26 Miles	Annually
Cattle guards: Level 2 and 3 roads	Pickett – 4 Padre – 0	Annually
Stock tank within seasonal/semipermanent wetlands	Pickett – 7 Padre – 0	No Maintenance
Stock tank outside seasonal/semipermanent wetlands	Pickett – 28 Padre – 16	As needed, when sediment levels reach 50 percent.
Trick tanks	Pickett – 0 Padre – 2	Annually

*Existing structural improvements would remain in place for the following reasons: temporary closure of these allotments to cattle grazing could be reassessed at a later date; allotment boundary fences would need to be maintained to keep cattle from other allotment out of this area; wildlife use of stock and trick tank would need to be assessed.

Table 5. Proposed structural improvements by alternative

New Structural Improvements	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Fences – along rim, springs, and holding pasture	0	0	1. 5 miles	1.5 miles
Fences – wetlands	0	0	10 miles*	10 miles*
Pipelines – Padre Canyon Allotment	0	0	4 miles	4 miles
Drinkers – Padre Canyon Allotment	0	0	5	5

*For Perry (~0.75 mile), Post (~0.75 mile), Ducknest (~2.1 miles), Indian Tank (~0.75 mile). Lakes and possible fences at Boot (~1.5 miles), Breezy (~1.5 miles), Indian (~1.5 miles), West Breezy (~0.75) Lakes.

Table 6. Cattle grazing statistics by alternative

Grazing Statistic	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Season of use	6/1-10/31	None	6/1-9/30	6/1-9/30
Months of cattle use	Pickett* 5 Padre 5	0	Pickett 3 Padre 1	Pickett 3 Padre 1
Number of cattle (cows/calf)	Pickett 758 Padre 87 Total 845	0	913	750
Head months**	Pickett 3,790 Padre 435 Total 4,225	0	3652	3000
Percent reduction in head months and cattle numbers from current management	0	100	14	29

Grazing Statistic	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Pasture graze period (days)	Pickett 3-44 Padre 15-39	None	3-24	3-24
Reduction in graze periods (days)	0	All	0-20	0-20
Maximum pasture graze period (days)	Pickett 44 Padre 39	0	24	24
Utilization guideline	35 percent	0 percent	35 percent	20 percent
Number of pastures rested yearly	Pickett 1-2 Padre 0	All	2-3	2-3
Pastures Grazed by Cattle 6/1-7/15	Railroad, Morgan, Woodland, Padre Canyon, Elliot, Mormon Canyon, Cabin Draw.	0	Railroad, Morgan, Woodland, Padre Canyon, Elliot, Mormon Canyon, Cabin Draw. Ducknest is used after fencing Indian Tank, Perry and Ducknest Lakes. Boot and Breezy would only be grazed if wetland fences are built.	Railroad, Morgan, Woodland, Padre Canyon, Elliot, Mormon Canyon, Cabin Draw. Ducknest is used after fencing Indian Tank, Perry and Ducknest Lakes. Boot and Breezy would only be grazed if wetland fences are built.

*Pickett = Pickett Lake Herd (10 pastures), Padre = Padre Canyon Herd (4 pastures), One-Herd = the Combined Use of Both Allotments with One-Herd of Cattle (14 pastures).

**Multiply months of cattle use by the number of cattle to get head months. To calculate animal unit months (AUMs), multiply 1.32 by head months.

Table 7. Alternative comparison by purpose and need and consistency with the Anderson Mesa Pronghorn Plan

Purpose and Need	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Continues cattle grazing on these allotments	Yes	No	Yes	Yes
Maintains and/or improves rangeland conditions	Yes	Yes	Yes	Yes
Maintains and protects season and semipermanent wetlands	Yes	Yes	Yes	Yes
Maintains access to permittee's water rights and filed water claims	Yes	No	Yes	Yes
New fencing and water pipeline for better cattle distribution	No	N/A	Yes	Yes
2002 Anderson Mesa Pronghorn Plan				
Consistency with the Pronghorn Plan	Yes	Yes	Yes	Yes

Table 8. Summary of environmental effects

Effect	Alt. 1	Alt. 2	Alt. 3	Alt. 4
New wetland cattle exclosures	None	None	Post, Perry, Ducknest, Indian Tank, possibly Indian, Boot, Breezy and West Breezy[1]	Post, Perry, Ducknest, Indian Tank, possibly Indian, Boot, Breezy and West Breezy[1]
Mexican spotted owl consultation	May affect not likely to adversely affect.	No effect	May affect not likely to adversely affect.	May affect not likely to adversely affect.
Bald eagle consultation	No effect	No effect	No effect	No effect
Pasture utilization guideline	35 percent for cattle and wildlife	N/A	35 percent for cattle and wildlife	20 percent for cattle and wildlife
Cattle grazing in seasonal and semipermanent wetlands May 1 through July 15 (Long and Ashurst Lakes have existing cattle exclosures)	No cattle use 5/1-5/31. No cattle use from 6/1 – 7/15 through pasture rotations.	N/A	No use 5/1-5/31. No cattle use from 6/1-7/15 through fencing or pasture rotations. Post, Perry, Indian Tank Ducknest Lakes, and possibly Indian, Boot, Breezy and West Breezy are fenced from cattle grazing [1]	No use 5/1-5/31. No cattle use from 6/1-7/15 through fencing or pasture rotations. Post, Perry, Indian Tank Ducknest Lakes, and possibly Indian, Boot, Breezy and West Breezy are fenced from cattle grazing [1]
Grazing in pronghorn antelope fawning habitat, i.e. open grasslands (April 1 through June 15)	No use 4/1-5/31. Grazing in pastures during fawning season is minimal.	N/A	No use 4/1-5/31. Grazing in pastures during fawning season is minimal. Post, Perry, Indian Tank Ducknest Lakes, and possibly Indian, Boot, Breezy and West Breezy are excluded from cattle grazing [1]	No use 4/1-5/31. Grazing in pastures during fawning season is minimal. Post, Perry, Indian Tank Ducknest Lakes, and possibly Indian, Boot, Breezy and West Breezy are excluded from cattle grazing [1]
Permittee water rights or filed claims affected	No effects, all stock tanks are accessible to permittees	Water rights/filed claims would be considered according to state law.	The claims at Post, Ducknest, Breezy, and W. Breezy would be affected. Lanes to Perry, Indian Tank, Indian and Boot Lakes would provide access to stock tank waters.	The claims at Post, Ducknest, Breezy, and W. Breezy would be affected. Lanes to Perry, Indian Tank, Indian and Boot Lakes would provide access to stock tank waters.

[1]Perry, Indian Tank, Indian, and Boot Lakes would have lanes to stock tank water.

Chapter 3. Affected Environment and Environmental Consequences

Introduction

This chapter summarizes the physical, biological, social, and economic environments of the project area and the effects of implementing each alternative on that environment. It also presents the scientific and analytical basis for the comparison of alternatives presented in the previous chapter. The following analysis of environmental consequences is organized by resource areas and documents direct, indirect, and cumulative effects of the proposed action and all alternatives.

Direct effects are those that may occur at the site, as a result of the proposed activities. *Indirect effects* may occur at some distance from the site or at a later time. *Cumulative effects* are the result of the proposed activities, in combination with other projects in the past, present, or reasonably foreseeable future, each of which may not affect the environment when considered alone, but could accumulate within watersheds or landscapes to create adverse or beneficial effects.

To analyze cumulative effects, activities and natural events that occur within an area much larger than just the Pickett Lake and Padre Canyon Allotments (project area) were considered. This larger area is referred to as the *cumulative effects area* in this DEIS. The cumulative effects area includes Anderson Mesa, which is generally described as the area on top of the mesa that lies south of Walnut Canyon, east of Lake Mary Road, north of Highway 87 and west of Anderson Mesa rim (near the Coconino National Forest boundary). The cumulative effects area also includes land located from Walnut Canyon to I-40 east to the edge of the pinyon-juniper plant community on the eastern side of the forest boundary, and south from I-40 along the eastern edge of the pinyon-juniper plant community near Forest Road 126 to the Anderson Mesa rim.

Table 9 describes several activities and natural events within the cumulative effects area that already have or will likely occur in or near the project area [PRD 49]. The activities listed occur on Anderson Mesa during the seasonal grazing season and overlap with the time that cattle graze the Pickett Lake and Padre Canyon Allotments (6/1 to 10/30). These activities may produce environmental effects relevant to the issues or resources described in the action alternatives and, therefore, have been considered in the cumulative affects analysis.

The timing for the activity or project will overlap with the time cattle are grazing in the cumulative effects area. Depending on the allotment, the majority of cattle graze from June 1 through October 31. The timeframe for considering past events will vary depending on the resource. The timeframe for considering future events will be at least 10 years, since 10 years is the standard timeframe for an allotment management plan.

Several historic activities occurred in the cumulative effects area that are common to all alternatives and fall outside the timeframe set for the cumulative effects. However, these activities are noteworthy because they still influence current conditions in some parts of the cumulative effects area. These historic activities include:

- Grazing of livestock has occurred within the cumulative effects area for more than 100 years. In the 1870s, ranchers began grazing cattle with the numbers of cattle peaking in 1891 [PRD 57]. Livestock numbers have been greatly reduced since the turn of the century.
- Utilization levels on vegetation from livestock have declined over time as well. It is logical to conclude that ecosystem health has followed this livestock use pattern with

trends that have improved as livestock numbers have been matched with carrying capacity, along with condition and trend data.

- In the late 1800s and early 1900s, settlers farmed and cut hay on deep soils, which included wetlands and meadows in the cumulative effects area. General wetland and meadow ecosystem health declined as native vegetation was disturbed and/or removed. These sites were hayed and planted with various crops which changed the vegetation component, compacted soils, and changed water flow dynamics. Farming declined after the establishment of the Coconino National Forest in 1908.
- Past wildlife grazing, specifically from elk, increased from the 1950s to peak numbers in the mid-1980s and has generally declined since the mid-1980s [PRD 57]. Utilization levels from elk on vegetation have decreased as their population numbers have decreased.

Table 9. Activities or natural events, other than cattle grazing, occurring within the cumulative effects area

Activity or Event	Timeframe	Description	Overall Effects
Dispersed Recreation, including the Arizona Trail	Was not intensely managed in the past, currently occurs, and will continue to increase as the area receives pressure from an increasing human population. In the future vehicle access will be monitored or limited in some areas.	Camping, hiking, hunting and other activities outside of developed campgrounds.	Affects soil conditions and vegetation by trampling (foot and vehicle). These effects are localized and are not widespread throughout the cumulative effects area. Dispersed recreation will be limited in the wetlands that are fenced because vehicles will no longer be able to access these areas, which will result in a positive effect.
Firewood Gathering	Use varies slightly year by year. The cumulative effects area does not receive heavy use from people gathering firewood. The majority of use occurs from October 1 through December 15 so there is not much overlap between firewood gathering and cattle grazing.	People gather firewood in many areas.	Effects to vegetation and soil can occur from driving vehicles off road or from trampling in areas where firewood is gathered.
Wildfires	No wildland fire use is planned in the cumulative effects area. Fires would be lightning ignited and are suppressed (unless they are placed in a confined status) and would be small. Example: 2004 Jacket Fire of 17,000 acres.	Vary from one tree to thousands of acres.	Effects vegetative structure and soils. General plant health will improve with most fires after sufficient moisture is received for plant growth. There would be short-term effects of reducing ground cover and increasing lower successional species. Long-term effects would improve grass and forb vegetation.
Existing Roads	The number of roads in the cumulative effects area has increased over time, but in the future will decrease as	Varies from high standard to two track roads. The EIS for cross	Affects soil conditions and vegetation by trampling and/or erosion. Existing roads, many user created, add to degradation of

Activity or Event	Timeframe	Description	Overall Effects
	decisions to obliterate roads are implemented. Designated roads will continue to be used in the future. Two track roads will be converted to motorized trails over the next 5 years.	country travel for five national forests in Arizona should reduce effects through the final decision.	vegetation, but these effects are localized and are not widespread throughout the cumulative effects area. People may occasionally turn off an existing road and drive through wetlands, but this is rare and long-term effects have not been measured.
Elk Grazing	Elk numbers increased from the 1950s to peak numbers in the mid-1980s and have generally declined since the mid-1980s.	Elk graze across the area. The extent and duration of grazing depends on elk numbers and movement.	Elk are attracted to wetlands and affect vegetation and soil conditions similar to the way cattle do. Depending on climate conditions, elk may graze the cumulative effects area year round.
Prescribed Burning as part of the AZ Game and Fish Pronghorn Plan	Depends on the type of implementation of adaptive management for the Pronghorn Plan.	Prescribed burning on Anderson Mesa, including Bar T Bar, Anderson Springs and Pickett Lake Allotments (100-2,000 acres depending on results).	Effects vegetative structure and soils. Short-term effects of reducing ground cover and increasing lower successional species. Long-term effects would improve grass and forb vegetation.
Stock tank maintenance	Maintenance would occur for a minimum of 10 years and would depend on when tanks need maintenance.	Stock tank maintenance includes cleaning of existing tanks that are not in seasonal or semipermanent wetlands. This maintenance would meet all applicable requirements, standards and guidelines.	Effects would be limited to 2 to 3 days of actual disturbance from equipment in the original stock tank perimeter. Typically these stock tanks would be dry, vegetation would be minimal, and so there would be a low level of disturbance to the wetland.
Removal of the Little Boot Lake stock tank	Completed in December 2004.	The stock tank in Little Boot Lake was filled in.	Possible improvement to vegetation and soil conditions in Little Boot Lake.
Anderson Mesa Landscape Scale Assessment (LSA)	The assessment is complete and will be incorporated into the Forest Plan revision.	The LSA established existing and desired conditions on Anderson Mesa.	In the reasonably foreseeable future, management may be modified as a result of the Anderson Mesa LSA (and associated NEPA decisions).

Activity or Event	Timeframe	Description	Overall Effects
Fencing at Fisher/Fry, Prime, Lost Tank Dry Lake, Youngs Lake (Walnut Canyon Allotment) and Deep Lake (Deep Lake Allotment)	These wetlands would be fenced as part of separate NEPA analyses for the Walnut Canyon and Deep Lake Allotments (proposed 2005-2006).	The emergent vegetation and surrounding upland buffer will be fenced to exclude cattle. There would be lanes to the stock tank waters at Fisher/Fry and Deep Lakes.	There will be improvements in emergent and upland vegetation, except where the lanes are. There would be impacts to vegetation in the lanes while cattle graze them, including decreased nutrient cycling, compaction, and reduced biomass.
Constructio n of an upland stock tank at Ashurst Lake	Planned for spring 2005.	A roadside stock tank will be built in an upland drainage southwest of Ashurst Lake as mitigation for the Ashurst Lake exclosure.	This project is part of the 2001 agreement to fence Ashurst Lake from cattle. Cattle will have access to water in the southern part of Ashurst pasture, and will be better distributed in this pasture.
Pinyon juniper maintenance cuts	The NEPA is in progress and the work will be implemented over the next 5-10 years. There are projects in various stages of analysis and implementation.	The work will consist of Agra-axe and hand thinning of pinyon-juniper on Anderson Mesa including Bar T Bar, Anderson Springs, Pickett, Padre, Deep Lake, and Walnut Canyon Allotments (50,000-100,000 acres depending on funding).	There may be minimal effects from the initial disturbance. However, the vegetative structure and soils will be improved by increasing species diversity and ground cover. Short-term erosion may occur from the initial work, but long-term benefits will increase as understory species fill in treated areas and decrease erosion.
Post Lake Habitat Restoration Project	Began in June 2004 and will be completed in August 2005.	Agra-axe and hand thinning on 375 acres of scattered juniper, pinyon and ponderosa pine in an area south of Post Lake.	Meadow and grassland habitat will be restored which will improve habitat and travel corridors for pronghorn and other wildlife. Grass and forb production will increase and soil conditions will stabilize or improve in 1 to 3 years depending on moisture availability.
Antelope Tank Habitat Restoration Project	Began in August 2004 and will be completed in August 2005.	Agra-axe and hand thinning on 963 acres of scattered juniper, pinyon and ponderosa pine in an area west of	Meadow and grassland habitat will be restored which will improve habitat and travel corridors for pronghorn and other wildlife. Grass and forb production will increase and soil conditions will

Activity or Event	Timeframe	Description	Overall Effects
		Ashurst Lake.	stabilize or improve in 1 to 3 years depending on moisture availability.
Long Lake Grassland Improvement Project	Decision expected in April 2005, work would begin in May 2005 and be completed by January 2008.	Agra-axe and hand thinning of encroaching pinyon and juniper trees on about 2,500 to 3,500 acres near Elliot Springs and Billy Back Springs.	Grassland habitat will be restored which will improve habitat and travel corridors for pronghorn and other wildlife. Grass and forb production will increase and soil conditions will stabilize or improve.
Drought	Depends on weather patterns.	Precipitation is insufficient for normal plant growth and for providing natural water sources for wildlife and/or cattle.	Vegetation is negatively effected in general from lack of precipitation. Wetlands or other riparian areas can be dry and emergent vegetation may not be present.
Jacket Fire Rehab, road closure (in the Roadless Area) and tank cleanout.	Spring and summer 2005	Using rehab funds the Forest Service will close social roads in the Padre Canyon Roadless Area, seed 100 acres in areas vulnerable to noxious weeds, and clean stock tanks that filled with sediment from the Jacket Fire.	Grass and forb production should increase in the seeded areas in 1 to 3 years depending on moisture availability and soil conditions will stabilize or improve in areas where the roads are closed. Cleaned tanks should hold more water longer which will better distrubute livestock and wildlife.

Soils

Soil condition status is obtained from the Coconino National Forest Terrestrial Ecosystems Survey (TES) and the Anderson Mesa Landscape Scale Assessment (USDA 1995 and 2004b). Generally, Forest Service lands on the Pickett Lake and Padre Canyon Allotments are in satisfactory condition (USDA 2004b and PRD 58). The majority of unsatisfactory and impaired soils on these allotments (12,914 acres) are directly related to a high density of pinyon and juniper trees and improving them is outside the scope of this project. Unsatisfactory and impaired meadow and grassland soils (TES units 41, 50, 53, 55 and 453) that can be affected by this project consist of 5,019 acres. These unsatisfactory and impaired soil conditions are specific to meadows and grasslands dispersed across the landscape. Some soils in the burned areas of the Jacket and Mormon fires are temporarily impaired due to lack of ground cover. They are expected to improve to satisfactory condition by 2006.

Microphytic soil crusts (also called cryptogamic crusts) are formed when all or some of a diverse array of photosynthetic blue-green algae, fungi, bacteria, lichens, and mosses bind together with

inorganic particles in the first few millimeters of a soil. Microphytic soils exist on the Pickett Lake and Padre Canyon Allotments in areas that have less than 16 inches of annual precipitation; where canopies are less than 30 percent; where gravel content is 15 percent or less; and where litter is less than 20 percent (Brewer 1999). They are mainly found within TES map units 436 and 465.

These soil map units represent 6,532 acres (12 percent) of these allotments. These areas are in satisfactory condition [PRD 58]. Map unit 436 is in pushed areas (where trees were pushed by heavy equipment in the 1960s) that do not have the high canopy cover like the other map units, and has the greatest potential for microphytic crust formation; hence unit 436 has the greatest potential for negative effects to microphytic crusts from trampling caused by grazing. The effects to microphytic crusts will be greatest near sites with high use, such as waters and salting locations.

The ability of the soil to hold and release nutrients is negatively affected by a lack of litter and trampling of microphytic crusts. The ability of the soil to hold and release nutrients is also affected by grazing. Microphytic crusts are thought to aid in nutrient release, as well as provide soil stability (Ladyman and Muldavin 1996) and generally occur throughout the lower precipitation zones within the project area. Microphytic soil crusts generally occur where other vascular plants do not, and the presence of vascular plants can impede their colonization (Brewer 1999; Ladyman and Muldavin 1996). However, this is not always the case, with the association between microphytic crusts and vascular plants being very complex (Ladyman and Muldavin 1996). In their review of microphytic crusts in the Southwest, Ladyman and Muldavin (1996) offer several studies that microphytic crusts can co-exist with vascular plants and that they impede colonization of the site by vascular plants.

What is consistent in the literature is that microphytic crusts are damaged from trampling by animals, vehicles, and human impacts (Ladyman and Muldavin 1996; Hart and Hart 1993). Fleischner (1994) notes the same negative effect to microphytic crusts from trampling of all kinds (human, animal, and vehicular). Ladyman and Muldavin (1996) note that the consensus of many scientific studies is that the amount of damage caused to microphytic crusts is proportional to the grazing pressure.

Overall, the grazing level throughout the project area will be light to moderate, and the effects to microphytic crusts will parallel the grazing intensity in map units 436 and 465. The trend toward increased vascular plants (grasses and forbs) displayed in current monitoring will decrease the role of microphytic soil crusts concerning soil nutrient cycling and soil stability, therefore the effect to soil condition from the loss of microphytic plants due to trampling can be offset by an increase in vascular plants and onsite litter.

Environmental Consequences

Direct and Indirect Effects Common to All Alternatives

Current conditions for the impaired and unsatisfactory meadow and grassland soils will be maintained in Alternative 1. These areas will improve in Alternative 2 because forage plants will not be removed by cattle grazing. Rest periods will increase and graze periods decrease in Alternative 3 and up to 1,000 acres of these impaired and unsatisfactory areas would be excluded from cattle. These changes in management are expected to improve these soils. The effects for these areas in Alternative 4 are very similar to the effects in Alternative 3. In Alternative 4, reduction in cattle numbers and utilization will have little effect on impaired and unsatisfactory meadow and grassland soils. Whether there are higher or lower cattle numbers in a pasture, cattle

will graze these productive, flat, and less rocky areas first before moving to the surrounding uplands.

In Alternative 1, cattle will have a continued effect on microphytic soils by trampling. There would be no effect on these soils in Alternative 2 because no cattle would be present. Damage to microphytic crusts may increase slightly in Alternative 3 as animal impacts increase (more cattle numbers in a shorter period of time). However, this effect may be offset by the increase in rest periods. Alternative 4 has less impact to these soils compared to Alternative 3, due to lower cattle numbers.

Cumulative Effects

There may be minimal cumulative effects to soil conditions from the initial disturbance of habitat or grassland improvement projects when added to short-term erosion that may occur from the initial work. However, as the vegetative structure and soils improves with increasing species diversity and ground cover, long-term conditions will improve as understory species fill in treated areas and decrease erosion.

Grass and forb production will increase and soil conditions will stabilize or improve in 1 to 3 years depending on moisture availability. **This improvement in grass and forb productions will result in a positive cumulative effect for soil conditions in these meadow and grassland soils.**

Effects from wildlife on soil conditions is additive to the effects from cattle grazing on unsatisfactory and impaired soils in meadows and grasslands. Recreation affects soil conditions from trampling (foot and vehicle) are additive to those from dispersed recreation. **These effects are localized and are not widespread throughout the cumulative effects area.**

Dispersed recreation will be limited in the wetlands that are fenced because vehicles will no longer be able to access these areas. **This would have a beneficial cumulative effect on soils in these areas.**

Effects to soil are cumulative to effects from driving vehicles off road or from trampling in areas where the firewood is gathered. Existing roads affect soil conditions as well by trampling and/or erosion, but these effects are localized and not widespread throughout the cumulative effects area. Fires and prescribed burns also affect soils; however, soils will improve as general plant health improves after sufficient moisture is received for plant growth.

Cumulative effects to mycrophytic soils crusts include influences from dense pinyon juniper, increased litter, trampling from recreation, existing roads, and wood cutting. **Increased forb and grass production is additive to the cumulative effects on mycrophytic soil crusts.**

Water Quality

The Pickett Lake and Padre Canyon Allotments are contained within three 5th code watershed areas: Canyon Diablo (223,845 acres), Lake Mary (97,207 acres), and Mormon Lake (25,361 acres). The nearest perennial waters to the Pickett Lake and Padre Canyon Allotments are Ashurst Lake, Mormon Lake, and Lake Mary. Ashurst Lake is located within the Pickett Lake Allotment and was fenced from cattle use in 2001, except for rocky access on the north edge of the lake. Lake Mary is located about one-quarter mile from the Railroad pasture of the Pickett Lake Allotment. Mormon Lake is located about 1 mile south of the railroad pasture. The next closest perennial water is located roughly 20 miles downstream from these allotments.

There are no 303(d) listed (water quality impaired) water bodies within the Pickett Lake or Padre Canyon grazing allotments. Watershed condition is overall stable and functioning in terms of the factors that affect hydrologic function and soil productivity. Wetland and upland conditions are currently being monitored. Water quality monitoring conducted by the Arizona Department of Environmental Quality (ADEQ) in 1996 does not indicate that current grazing is a problem. Within the allotment areas, the ability for cattle to directly influence water quality by bacterial contamination is limited due to the absence of live streams and scarcity of lakes.

Current water quality monitoring in the Little Colorado River does not note a problem with turbidity; the water quality stressors are heavy metals. There is no data from ADEQ to indicate that turbidity or fecal coliform are problems within the Canyon Diablo, Lake Mary, and Mormon Lake watersheds, therefore, any effects to water quality from grazing are localized in nature and do not move offsite. Decommissioning or obliterating roads helps reduce soil erosion, which can indirectly reduce turbidity and help improve overall watershed conditions.

Water quality at lentic (standing water) wetlands can be affected by the amount of soil that is disturbed near wetland sites, and the grazing intensity, which can minimize vegetation that can trap overland flow into wetland sites (Fredrickson and Dugger 1993). The effects of water quality to lentic wetlands are limited in scope and intensity due to the short duration of water within these sites. Many of the wetlands are in closed basins and, as such, there is no potential for sediments to reach a stream course.

Environmental Consequences

Direct, Indirect, and Cumulative Effects Common to All Alternatives

Water quality monitoring data does not indicate that the grazing schemes proposed in any of the action alternatives are expected to be a problem. All of the alternatives are consistent with the Clean Water Act of 1977 [PRD 58] and incorporate best management practices and guidance practices as per the Non-point Source Intergovernmental Agreement (see Chapter 2, “Mitigation Measures”). Wetland and upland conditions will continue to be monitored under any of the alternatives (see Chapter 4, “Monitoring”).

The water quality of perennial water would not be affected under any proposed alternative. The impaired and unsatisfactory soil conditions described in the vegetation section above would continue to function below potential. There is no difference in management for the 5,019 acres of unsatisfactory rangeland and impaired soil areas where cattle are contributing to these conditions in the action alternatives. The cumulative effect of obliterating two short road segments in Alternatives 3 and 4 would result in beneficial effects by reducing soil erosion, turbidity, and improving overall watershed condition.

Timing of stock tank maintenance can have a short-term negative effect on water quality for tanks located in drainages, occurring after the site is disturbed and has not yet recovered. There is potential for movement of sediments downstream if a large rain event occurred within the first growing season. The likelihood of this happening and affecting water quality is extremely small. Stock tanks within closed basins are usually dry or almost dry when they are cleaned, so minimal effects to water quality would occur. Non-semipermanent or seasonal wetlands are in closed basins, so there would be no flow of sediment downstream from maintaining stock tanks in these basins.

Effects to water quality from grazing can occur from sediment transport caused by removal of above ground biomass or disturbed surface crusts that can be easily moved during rain events. Monitoring results for the Pickett Lake and Padre Canyon Allotments indicates that there is litter,

which is residual plant material left behind on the ground after cattle graze. This litter is beneficial to limiting onsite soil movement by providing surface roughness. However, at the end of the growing season, after wildlife have removed the remaining stubble height, a few monitoring sites indicate less than adequate litter left behind to minimize soil movement.

Because there is little direct or indirect effect to overall water quality, there would be no significant cumulative effects to water quality or watershed condition based upon other past, present, or reasonably foreseeable future actions described in Table 9.

Wetlands

There are five types of wetlands on Anderson Mesa: permanent (reservoir), semipermanent, seasonal, temporary, and ephemeral. The Vegetation, Soil and Water Report [PRD 58] describes how wetlands were inventoried and evaluated to determine current conditions. The table in Appendix A summarizes this report and defines these five wetland types. Of these five types of wetlands, four are found on the Pickett Lake Allotment and include: permanent (reservoir), semipermanent, seasonal, and temporary. There are also six springs located on the Pickett Lake Allotment. Springs are not considered true lentic (standing water) wetlands, but are still analyzed under this section of the DEIS. There are no wetlands or springs on the Padre Canyon Allotment. Table 10 lists the wetland inventory specific for this analysis and includes wetland fences proposed in Alternatives 3 and 4.

Wetlands, except for the permanent reservoirs, are very dynamic due to large fluctuations in water. Reservoirs are more permanent and are managed in this area primarily for recreation. During an extended wet period, some wetlands and closed basins may produce more hydrophytic (emergent) plant species such as bulrush or spikerush. During an extended dry period, some wetlands and closed basins may lose indications of hydrophytic vegetation and drier upland species may become more prevalent. Most of the wetlands currently affected by cattle grazing are located in the Ashurst, Boot, Breezy, and Ducknest pastures on the Pickett Lake Allotment. Figure 5 show some of these wetlands surrounding Ashurst Lake.

Table 10. Wetlands by pasture on the Pickett Lake and Padre Canyon Allotments

Pasture Name	Waterbody Name	Waterbody Type	Grazing In Alternatives 1, 3* and 4*
Breezy	Breezy	Wetland, seasonal	Grazed after July 15. Adaptive management option to fence in 3 and 4.
	Indian Lake	Wetland, seasonal	Grazed after July 15. Adaptive management option to fence in 3 and 4 with a lane to the stock tank.
	West Breezy	Wetland, seasonal	Grazed after July 15. Adaptive management option to fence in 3 and 4.
	Long Lake	Wetland, seasonal	Excluded
Elliot Driveway	Ashurst Tank	Closed basin	Grazed
	Billy Back Spring	Spring	Grazed in 1. Would be excluded in 3 & 4 if seasonal utilization by cattle reaches 20 percent.
	Elliot Tank	Closed basin	Grazed
	Elliot Spring	Spring	Poor Access

Pasture Name	Waterbody Name	Waterbody Type	Grazing In Alternatives 1, 3* and 4*
Ashurst	Al's Lake	Wetland seasonal	Grazed after July 15.
	Antelope North	Wetland, seasonal	Grazed after July 15.
	Antelope Tank	Wetland, seasonal	Grazed after July 15.
	Ashurst Lake	Reservoir	Mostly excluded
	Ashurst Spring	Spring	Excluded by fencing
	Deep Lake	Semipermanent on the Deep Lake Allotment side of the fence.	Grazed after July 15.
	Horse Tank	Wetland, temporary	Grazed after July15.
	Pickett Lake	Wetland seasonal	Grazed after July15.
	Post Lake	Wetland, semi permanent	Grazed in 1 after July 15. Excluded by fencing in 3 & 4.
	Potato Lake	Wetland, seasonal	Grazed after July 15.
Boot	Boot Lake	Wetland, seasonal	Grazed after July 15. Adaptive management option to fence in 3 and 4.
	Boot Spring	Spring	Grazed in 1.Would be excluded in 3 & 4 if seasonal utilization by cattle reaches 20 percent.
	East Tank	Closed basin	Grazed
	Far East Tank	Closed basin	Grazed
	McDermott	Wetland, temporary	Grazed
	Replacement Tank	Closed basin	Grazed
Holding	Grass Lake	Wetland, seasonal	Grazed after July 15.
Ducknest	Coconino Dam	Permanent reservoir	Grazed
	Ducknest	Seasonal, wetland with good wildlife potential when has water.	Grazed in 1 after July 15. Excluded by fencing in 3 & 4.
	Indian Tank	Wetland, seasonal	Grazed in 1 after July 15. Excluded by fencing in 3 & 4 with a lane to the stock tank.
	Perry Lake	Semipermanent	Grazed in 1 after July 15. Excluded by fencing in 3 & 4 with a lane to the stock tank.

*Cattle exclosures will be built and rotation schedules will be adjusted to prevent cattle use in the semipermanent and seasonal wetlands during the waterfowl nesting season, May 1 to July 15.

Figure 5. Aerial photo of wetlands in north-central portion of the Pickett Lake Allotment (USDA photo)

The productivity, distribution, and size of wetlands are profoundly affected by the amount and timing of precipitation, influencing whether the basins have water or not; how long they hold water within and between years; and consequently the types of vegetation and wildlife species that can be supported and when. All wetland types have some value to wildlife although this may differ depending on individual needs of the species.

Another feature of some wetlands is the stock tanks are often located in drainages associated with wetlands. Stock ponds within these wetland types do provide water for wildlife, but no stock tanks have been identified specifically for wildlife habitat needs. Regardless if years are wet or dry, wetlands and closed basins with or without stock tanks show little difference in water levels and associated vegetation [PRD 58]. The location of stock tanks in the wetlands may affect where water will go in relation to the wetland [PRD 12].

Depending on the amount and timing of precipitation, water may collect in a tank, reducing the amount of water in the rest of the closed basin. Stock tanks provide more dependable water because the water is deeper and has less surface area, thus producing less water evaporation. It does not appear the construction of stock tanks has broken the natural seals of these closed basins and allowed them to drain [PRD 58]. No additional stock tanks are planned in any alternative and there is no proposal to remove stock tanks in any alternative. Stock tanks within seasonal or semipermanent wetland will be not be maintained for the next 10 years in any of the alternatives.

The dominant plants in semipermanent wetlands are hardstem bulrush (*Schoenoplectus acutus* var. *acutus*) formerly *Scirpus acutus*. These plants grow 3 to 9 feet high in wet years and are dormant in dry cycles. Mats of previous years' growth often stay onsite. Hardstem bulrush

provides nesting habitat for overwatering birds and some food for waterfowl. Use by waterfowl is year round, with waterfowl using these wetlands for molting, watering, courtship, nesting, brood habitat, wing molt, molt and staging. Inundation potential for the two semipermanent wetlands on the Pickett Lake Allotment is high for Perry Lake and medium for Post Lake (USDA 2004b). Deep Lake is also classified as a semipermanent wetland with about 63 acres of emergent vegetation. Of these 63 acres, 61 are on the Deep Lake Allotment side of the fence and 2 acres are on the Pickett Lake side of the fence. Part of Deep Lake has hardstem bulrush but this is only on the Deep Lake Allotment side of the fence.

The dominant plants in seasonal wetlands are spikerush species *Eleocharis acicularis* needle spikerush and *Eleocharis palustris* creeping spikerush. Average plant heights are 10 to 15 inches for needle spikerush and up to 24 inches for creeping spikerush. Spikerush provides habitat for many waterfowl. Plants are dormant or nonexistent during dry cycles or when no inundation occurs within a seasonal wetland. Spikerush is dependent on water being present in the basin long enough to allow hydric soils to form and when water is available at a depth that allows it to grow. Spikerush will also not grow in water that completely covers the plants.

Use by waterfowl during inundation is for watering, nesting, brood rearing, and molting, usually during spring and summer. Inundation varies for each seasonal wetland on the Pickett Lake Allotment and includes: a low potential for inundation at Antelope North, Antelope Tank, Boot Lake, Breezy, Indian Lake, and West Breezy, a low to moderate potential for inundation at Potato Lake; a medium potential for inundation at Al's Lake, Ducknest Lake, Grass Lake, Indian Tank, and Pickett Lake; and a medium to high potential for inundation at Long Lake (USDA 2004b).

Wetlands and closed basins have an impaired range condition in the main water body area of the basin due to the ever-changing wet-dry cycles. During extended wet periods, portions of these areas produce annual riparian species and spikerush while upland species die back. As these areas dry out, the riparian species die back and upland grasses and forbs become established. During transition periods, bare soil naturally exists. The duration of these cycles may be months to several years. This can create extreme conditions for the vegetation that may be associated with the basins. Trends in these areas are static [PRD 57].

Wetland sites have a tendency to attract grazing animals because they are a water source, as well as sites that support higher forage production due to the presence of water (Fredrickson and Dugger 1993). This especially happens at sites with developed waters because the water is more reliable (see Appendix). Thus, the effects to wetlands from grazing is that the heavier the graze, the greater the effect to vegetation (Fredrickson and Dugger 1993). The definition of heavy, moderate and light grazing pressure varies by the ecosystem being discussed (ibid).

Plant height and cover varies with seasonal moisture and temperatures. How much plant height and cover is affected by cattle also depends on the palatability and amount of vegetation in a given year. For example, 2003 monitoring showed that cattle were attracted to the dense hardstem bulrush and spikerush at Post Lake, reducing both vegetation height and cover in this area. At West Breezy and Breezy Lakes, the sparse spikerush did not attract any use by cattle. Comparing current and future monitoring data will continue to help determine the exact effects that cattle have on these areas as well as the effects to vegetation during different climate patterns.

Where cattle grazing does occur, this use may be limiting the vegetation potential of these wetlands by removing plant height, cover and litter (Hoff 1993). However, wildlife use will continue to affect plant height, canopy cover and litter, even if cattle do not graze emergent vegetation. The Arizona Game and Fish Department (AGFD) has reduced elk numbers since the 1990s in this area.

As well as affecting vegetation, livestock can affect wetland soils through compaction. Compaction can occur in areas where cattle are concentrated. Because of the high clay content of most soils in this area, compaction of the soil is of short duration (shrink-swell and freeze-thaw). Most wetlands show some signs of surface compaction, which can lead to an impaired soil condition. These areas can improve in the short and long term if proper grazing management is combined with normal or above normal years of precipitation (R. Steinke, pers. comm.).

The ability of these soils to hold and release nutrients would be negatively affected by a lack of litter. Impaired and unsatisfactory soils that are affected by this project occur on TES map units 50, 53, and 55 throughout the cumulative effects area [PRD 58].

Grazing also reduces the amount of vegetative litter available onsite, which increases the amount of bare ground (Clary and Medin 1990; Green and Kauffman 1995). Litter is removed by animals eating the vegetation, as well as by trampling from grazing animals. The effect of this is a reduction in surface roughness that increases erosion and sediment delivery to streams, as well as a loss of soil fertility. As cattle stocking rates increase and graze periods get longer, the greater the effect of grazing animals on litter. Low to moderate stocking and short duration graze periods have minimal impact. Cattle have been reported to be useful for breaking up dense, rank vegetation near wetlands (Weller 1996) and all grasses (Savory 1988), which can improve the health, palatability and forage production of grass species, but can counter the beneficial effects of litter onsite.

To help study effects of cattle grazing in wetlands and as part of the Arizona Game and Fish Pronghorn Plan, Boot Lake, Replacement Tank, East Tank, McDermott Tank, and East McDermott Lake have been rested from cattle grazing since 2002. In addition, cattle were excluded from Ducknest Lake, Indian Tank, Perry Lake, and Coconino Dam Reservoir through deferment. Deferment, in this case, relates to the Anderson Mesa Pronghorn Plan (AGFD 2002) and means there was no cattle grazing between August 15 and June 15. Current and future monitoring will help show whether or not the removal of cattle grazing improves these areas and to what degree. This information can be used to make future decisions on improving wetlands.

Monitoring exclosures established in Boot, Breezy, Ducknest, Long, and Post Lakes along with monitoring exclosures from adjacent allotments will provide detailed information on the effects grazing has on hydrophytic emergent vegetation. Monitoring has been completed annually since 2002 in these areas. Management would be adjusted when monitoring indicates vegetation is not positively responding through condition and trend. Any changes would most likely be made before the next grazing season.

Environmental Consequences

Direct and Indirect Effects Common to All Action Alternatives

The vegetation associated with wetlands may not change extensively with any alternative, because climate is the primary factor affecting these wetlands. If the next 10 years are wet, the wetlands would improve. If the next 10 years are dry, the wetlands would remain static or decline. Even though seasonal and semipermanent wetlands contain emergent vegetation and are considered key, they have extreme variations in their wet and dry cycles because they are almost exclusively dependent upon rain and snow for water, and there is no connection to ground water for these sites on Anderson Mesa (USDA 2004b).

There may be some change to emergent vegetation height, and sometimes cover, regardless of climate. Depending on plant species, when height is reduced, cover can be reduced at the same time. An erect morphology allows these plants to grow vertically and not horizontally, thus as

their height is removed, their cover is usually not. Removing cattle may not improve plant height due to wildlife use and the natural water regime.

In regards to emergent vegetation, the "Coconino National Forest Plan" states: "Meet the following riparian standards in the Regional Guide for 80 percent of riparian areas above the rim by the year 2030. Maintain at least 80 percent of the potential emergent vegetation cover from May 1 to July 15 in key wetlands" (p. 174). Key wetlands with emergent vegetation include: Post, Perry, Boot, Breezy, West Breezy, Indian, Ducknest, Al's, Long, Antelope North, Deep, Grass, Pickett, and Potato Lakes, along with Antelope and Indian Tanks (see Appendix A). These seasonal and semipermanent wetlands are the only wetlands that contain or have the potential for emergent vegetation. Springs containing emergent vegetation include Boot, Billy Back, Elliot, and Ashurst. Of these, Elliot Spring is inaccessible to cattle and Ashurst Spring is already fenced.

When managing for nesting habitat associated with wetlands, the Forest Plan states that: "The following applies to riparian areas, whether they are large enough to be mapped or not. Wetlands and open water containing emergent vegetation which provide nesting habitat are protected from disturbing uses that would harass nesting birds, such as activities that are noisy or would damage nests or nesting habitat from May 1 to July 15" (p. 173). This guideline applies to the same wetlands and springs listed above. When the wetlands are dry during the nesting season, emergent vegetation does not grow, so nesting habitat is not present.

All of the alternatives meet the above standards and guidelines by maintaining and/or improving this wetland habitat and protecting nesting habitat [PRD 53]. No alternative would allow grazing on the Pickett Lake and Padre Canyon Allotments from May 1 through May 31. Alternatives 1, 3, and 4 would adjust grazing rotations in Ashurst, Ducknest, Boot, and Breezy pastures to exclude cattle grazing in seasonal or semipermanent wetlands between June 1 and July 15. When these wetland pastures are not grazed from June 1 to July 15, cattle would not affect emergent vegetation. There would be no cattle grazing in wetlands or springs year-round in Alternative 2.

Alternatives 3 and 4 include additional actions to help maintain emergent vegetation cover in key wetlands and protect nesting habitat and birds: fencing the emergent vegetation and the surrounding upland buffer in Perry, Ducknest, Indian Tank, and Post Lakes (with a lane to the stock tank water in Perry and Indian Tank Lakes) and if use exceeds 20 percent on emergent and woody vegetation fencing Boot and Billy Back Springs to exclude cattle. As part of adaptive management, possible wetland exclosures would also be constructed at Breezy, West Breezy, Boot, and Indian Lakes (with lanes to the stock tank waters at Boot and Indian lakes).

Overall, wetland ground cover on the Pickett Lake Allotment is adequate for watershed health and does not change extensively under any alternative [PRD 58]. Plant canopy cover is also adequate overall for watershed health and would not change considerably under any alternative.

Direct and Indirect Effects for Alternative 1 (Current Management)

Alternative 1 would keep cattle grazing management the same as what has occurred during the last 12 years. Cattle directly and indirectly affect species' composition, plant canopy cover, plant production, and ground cover. In Alternative 1, a 35 percent utilization guideline is applied.

Where cattle grazing occurs in wetlands, cattle would graze near the water sources and highly productive grasslands first before moving to the uplands. Cattle do not generally graze in rocky and steep terrain or areas away from water sources. The height and canopy cover of emergent vegetation associated with closed basins, seasonal wetlands and springs would be affected while cattle are present and until the plants have regrown (typically within the same year).

Emergent vegetation height and sometimes canopy cover would be reduced as cattle graze areas when water is present. The current periods of rest for grazed pastures would provide opportunities for emergent vegetation to grow when water is present and cattle are not, however, the amount of rest is less than in Alternatives 3 and 4. Site-specific instances of overuse by cattle would continue and include patches of bare soil in and around wetlands. Each wetland is rested at least 1 year in 5 from cattle. Wetland use is deferred each year in order to rotate the season of use. Cattle would not be excluded from Billy Back and Boot Springs.

Seasonal and semipermanent wetlands would not be excluded from cattle under this alternative. The trend in these wetlands is expected to remain static. When cattle are present in Ashurst and Ducknest pastures, they would graze the hardstem bulrush community at Post and Perry Lakes respectfully. This grazing would limit production of the hardstem bulrush when cattle are in these pastures.

Cattle grazing advantages are similar to Alternative 3 and different mainly in the slower rotations and longer graze periods. Cattle would still graze highly productive forage areas first before moving from the wetlands to less accessible sites or areas with dense trees. The cattle grazing rotations are changed annually so that forage is grazed at a different time each year, which is similar to the rotations proposed in Alternatives 3 and 4. However, compared to Alternative 3, pasture rotations are slower and cattle grazing periods are longer and, therefore, more plants are likely to be regrazed. Plants would also be grazed in October in Alternative 1, not allowing additional rest in the fall like that proposed in Alternatives 3 and 4.

Cattle distribution under the current grazing system provides less flexibility than in Alternatives 3 and 4. Cattle would need to remain in other pastures longer, as water would not be as available to encourage distribution into the area below the Anderson Mesa rim.

Direct and Indirect Effects for Alternative 2 (No Grazing)

There is no cattle grazing proposed under Alternative 2, so there are no direct or indirect effects to plants from cattle grazing. All the forage plant's production would be available to reproduce, produce seed heads, produce litter important for nutrient recycling, and provide for the needs of wildlife.

Wildlife would likely still graze near the water sources and in more highly productive forage areas. Depending on the area, wildlife use can be equivalent to use by cattle, and wildlife grazing can occur year-round depending on snow levels.

The height and canopy cover of emergent vegetation associated with closed basins, seasonal wetlands and springs would be predominantly affected by wildlife. Vegetation height and sometimes canopy cover would be reduced as wildlife graze these areas when water is present. In Post and Perry Lakes, wildlife would reduce hardstem bulrush height when hardstem bulrush is available to graze. Wildlife can also graze riparian vegetation in Billy Back, Boot, and Elliot Springs.

Direct and Indirect Effects for Alternative 3 (Proposed Action)

Forest Plan standards and guidelines would be met in this alternative by adjusting grazing rotations to exclude cattle use from these wetlands between June 1 to July 15 and adding wetland exclosures around the emergent vegetation and surrounding upland buffer at Perry, Post, Ducknest, and Indian Tank lakes (see Table 11).

Once Indian Tank, Perry, Post, and Ducknest Lakes are fenced, these lake exclosures would not be grazed by cattle, except for the lanes to the stock tank waters at Perry and Indian Tank Lakes.

Boot and Breezy pastures would only be grazed from June 1 to July 15 if the Boot, Breezy, West Breezy and Indian Lakes exclosures around the emergent vegetation and surrounding upland buffer are built. Emergent vegetation height and sometimes canopy cover and soil compaction would be improved within these exclosures.

Lanes would be built with the exclosures for cattle to drink water from the stock tanks at Perry, Indian Tank, Indian and Boot Lakes. The exclosures are designed to exclude cattle from the emergent vegetation and surrounding upland buffer for waterfowl nesting habitat (see Table 12). The exact size of the exclosures depends on the area of emergent vegetation and surrounding upland waterfowl nesting habitat present. Most exclosures would be about 100 meters from the edge of the emergent vegetation. Maps of all exclosure designs are found in the project record [PRD 21]. An example of the Perry Lake exclosure is shown in Figure 4 of Chapter 2. There would be impacts to the vegetation in the lanes while cattle graze them, including decreased nutrient cycling, compaction and reduced biomass.

In wetlands grazed after July 15, emergent vegetation height and sometimes canopy cover would be reduced and soil compaction could occur as cattle graze when water is present. The current periods of rest for grazed pastures would provide opportunities for emergent vegetation to grow when water is present and cattle are not. The amount of rest is more than in Alternative 1.

Each wetland is rested at least 1 year in 5 from cattle. Wetland use is deferred each year in order to rotate the season of use.

Table 11. Wetland inventory and wetland fences proposed in Alternatives 3 and 4

Pasture*	Wetland Name	Wetland Type	Emergent Vegetation Present	Alternatives 3 and 4 Wetland Fences (approximate miles, acres fenced)
Breezy	Breezy	Seasonal	Yes	Possible 1.5 miles, 70 acres.
	Indian Lake	Seasonal	Yes	Possible 1.5 miles, 90 acres with lane to stock tank water. Lane includes 6 acres of upland buffer and 1 acre emergent vegetation.
	West Breezy	Seasonal	Yes	Possible 0.75 mile, 40 acres.
	Long Lake	Seasonal	Yes	Currently fenced
Elliot Driveway	Billy Back Spring	Spring	Yes	Possibly fenced in Alternatives 3 and 4, if >20 percent cattle use observed, 1 acre.
	Elliot Spring	Spring	Yes	
	Yellow jacket Spring	Spring	No	
Ashurst	Al's Lake	Seasonal	Yes	
	Antelope North	Seasonal	Yes	
	Antelope Tank	Seasonal	Yes	
	Ashurst Lake	Permanent (reservoir)	Yes	Currently fenced, except north rocky shore.

Pasture*	Wetland Name	Wetland Type	Emergent Vegetation Present	Alternatives 3 and 4 Wetland Fences (approximate miles, acres fenced)
	Ashurst Spring	Spring	Yes	Currently fenced.
	Deep Lake	Semipermanent	Yes	63 acres of emergent vegetation: 61 on the Deep Lake Allotment side of the fence and 2 on the Pickett Lake side of the fence.
	Mormon Spring	Spring	No	
	Horse Tank	Temporary	No	
	Pickett Lake	Seasonal	Yes	
	Post Lake	Semipermanent	Yes	0.75 mile, 52 acres.
	Potato Lake	Seasonal	Yes	
Boot	Boot Lake	Seasonal	Yes	Possible 1.5 miles, 560 acres with lane to stock tank water. Lane would include 5 acres of upland buffer and no emergent vegetation.
	Boot Spring	Spring	Yes	Possibly fenced if >20 percent cattle use observed, one acre.
	McDermott	Temporary	No	
Holding	Grass Lake	Seasonal	Yes	
Ducknest	Coconino Dam	Permanent (reservoir)	No	
	Ducknest	Seasonal	Yes	2.1 miles, 173 acres.
	Indian Tank Lake	Seasonal	Yes	0.75 mile, 52 acres with lane to stock tank water. Lane would include 3 acres of upland buffer 1/2 acre of emergent vegetation.
	Perry	Semipermanent	Yes	0.75 mile, 59 acres with lane to stock tank water. Lane would include 3 acres of upland buffer 1/2 acre of emergent vegetation.

*There are no wetlands in Railroad, Woodland, Morgan, Cabin Draw, Elliot, Padre Canyon and Mormon Canyon pastures.

Table 12. Seasonal and semipermanent wetlands with approximate acres of emergent vegetation in lanes and fences for Alternatives 3 and 4

Wetland Name	Acres of Emergent Vegetation	Acres of Upland Buffer	Acres of Emergent Veg. in Lane	Acres of Upland Buffer in Lane	Alternatives 3 and 4 Fences and/or Lanes in Wetlands
Breezy Lake	33	37	No Lane	No Lane	Possible fence (70-acre cattle exclosure).
Indian Lake	25	65	1	6	Possible fence with lane (90-acre cattle exclosure); 4 percent of emergent and 9 percent of the upland are in the lane.

Wetland Name	Acres of Emergent Vegetation	Acres of Upland Buffer	Acres of Emergent Veg. in Lane	Acres of Upland Buffer in Lane	Alternatives 3 and 4 Fences and/or Lanes in Wetlands
West Breezy Lake	5	32	No Lane	No Lane	Possible fence (40-acre cattle exclosure).
Post Lake	27	25	No Lane	No Lane	52-acre cattle exclosure.
Boot Lake	70	490	0	5	Possible fence with lane (560-acre cattle exclosure); no emergent and 1 percent of the upland are in the lane.
Ducknest Lake	42	131	No Lane	No Lane	173-acre cattle exclosure.
Indian Tank Lake	13	39	_	3	Fence with lane (52-acre cattle exclosure); 4 percent emergent and 8 percent of the upland are in the lane.
Perry Lake	25 (2 on Anderson Springs)	32	_	3	Fence with lane (59-acre cattle exclosure); 2 percent emergent and 9 percent of the upland is in the lane.
Long Lake	367				Currently fenced
Al's Lake	40				No proposed fence
Antelope North	5				No proposed fence
Antelope Tank	8				No proposed fence
Deep Lake	2*				No proposed fence
Pickett Lake	11				No proposed fence
Potato Lake	89				No proposed fence
Grass Lake	86				No proposed fence
Total	848	851	2	17	

*61 acres on the Deep Lake Allotment

Direct and Indirect Effects for Alternative 4 (Reduction in Utilization)

Effects to vegetation associated with closed basins, seasonal wetlands, and springs are similar to those described under Alternative 3. Utilization and cattle number reductions do not reduce the impacts to these areas because cattle seek them out first before moving to uplands. A reduction in cattle use would occur in the uplands.

Effects to highly productive forage areas would be similar to those in Alternatives 1 and 3. However, Alternative 4 has a slightly more flexible grazing system than Alternative 1, due to the addition of water sources in the area below the Anderson Mesa rim on the Padre Canyon Allotment.

Cattle grazing advantages are similar to those in Alternative 3, differing mainly by a lower utilization limit and lower cattle numbers. This alternative lacks the number of cattle and short duration of use that would influence cattle distribution into less accessible or desirable areas.

However, the lower number of cattle would reduce grazing use in a pasture by 15 percent, even if distribution is not improved, compared to Alternative 3.

Effects to Post and Perry Lake along with other semipermanent and seasonal wetlands are the same as described under Alternative 3. Grazing use in pastures would be rotated, so forage would be grazed and rested differently each year, similar to that in Alternative 3.

Tables 13 and 14 summarize each alternative's grazing strategy for seasonal and semipermanent wetlands and springs.

Table 13. Grazing strategy by alternative for seasonal and semipermanent wetlands*

Grazing Strategy[1]	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Existing fence already excludes cattle yearlong from wetland and surrounding upland buffer.	Long and Ashurst	Long and Ashurst	Long and Ashurst	Long and Ashurst
New fencing will exclude cattle yearlong from emergent vegetation (hardstem bulrush) and surrounding upland buffer.			Post and Ducknest	Post and Ducknest
New fencing will exclude cattle yearlong from emergent vegetation and surrounding upland buffer, except for a lane for cattle to access stock tank water.			Perry and Indian Tank	Perry and Indian Tank
No cattle grazing from 6/1-7/15 in these wetlands. This is accomplished through pasture schedules or fencing.	All	N/A	All	All
Monitoring would determine if emergent vegetation and surrounding upland buffer in the wetlands will be fenced from cattle.2			Breezy and West Breezy	Breezy and West Breezy
Monitoring would determine if emergent vegetation and surrounding upland buffer in the wetlands will be fenced from cattle, except for a lane for cattle to access stock tank water.2			Boot and Indian	Boot and Indian

*Seasonal and semipermanent wetlands on the Pickett Lake and Padre Canyon Allotments include: Breezy, Indian Lake, West Breezy, Long Lake, Al's Lake, Antelope North, Antelope Tank, Deep Lake, Pickett Lake, Post Lake, Potato Lake, Boot Lake, Grass Lake, Ducknest, Indian Tank Lake, and Perry Lake.

[1] Regardless of alternative, no cattle grazing occurs from 5/1-5/31.

[2] The Padre Canyon Allotment, Railroad, Ducknest, Morgan and Woodland pastures would be monitored for trend in upland vegetation to determine if these pastures are being used too much at the same time of year, year after year. To maintain rangeland condition, or for increased flexibility in pasture rotations, the emergent vegetation and surrounding upland buffer would be fenced at these four wetlands. Fencing would be completed as funding becomes available. These wetlands would likely be fenced within 3 years.

Table 14. Grazing strategy by alternative for springs

Grazing Strategy	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Existing fence already excludes cattle from spring.	Ashurst	Ashurst	Ashurst	Ashurst
Spring is dry and inaccessible to cattle.	Elliot, Yellow Jacket and Mormon	Elliot, Yellow Jacket and Mormon	Elliot, Yellow Jacket and Mormon	Elliot, Yellow Jacket and Mormon
New fence would be built if use by cattle exceeds 20 percent on emergent or woody vegetation.			Billy Back and Boot	Billy Back and Boot

Cumulative Effects to Wetlands Common to All Alternatives

For the cumulative effects analysis of wetlands, the cumulative effects area also includes three watersheds (Canyon Diablo, Lake Mary and Mormon Lake). For wetland sites, the following describes the areas of concern for the cumulative effects analysis:

- Lentic Wetlands - Standing water: The Forest Plan discusses compliance on 80 percent of the wetlands above the rim to occur by 2030. The lentic wetlands that occur above the Anderson Mesa rim on other portions of the forest are in much wetter climatic regimes and at higher elevations.
- Lotic Wetlands - Springs: Springs are highly variable across the forest. The effect to springs is directly related to the ground water basin size that is feeding the spring. None of the springs within the cumulative effects area have large ground water basins associated with the spring itself; therefore, the spring cumulative effects boundary is limited to the cumulative effects area boundary.
- Lotic Wetlands - Streams: The entire 5th code watershed for the cumulative effects boundary is included because the watershed affects waterflow to all streams in these watersheds. However, because there are no 5th code watersheds in the cumulative effects area that have streamflow and riparian lotic systems, effects are limited.

Past, present, and reasonably foreseeable cattle grazing actions for the cumulative effects cumulative effects area are displayed in Table 15. This table lists when the NEPA analysis would take place or if it has been completed for each allotment and not the specific details of treatments, improvements, or the disposition of whether or not grazing would continue on the listed allotments. Since these analyses are for cattle grazing only, the effects would be similar to the cumulative effects for this project and are additive for this decision.

The proportional extent of grazing allotments within the Canyon Diablo, Mormon Lake, and Lake Mary Watersheds on National Forest System lands is also displayed in Table 15. Note that the acres within each 5th code watershed are gross acres, and include areas that are not suitable for grazing due to slope. Excluded are areas not part of an active grazing allotment. Table 16 displays wetland acres within the Pickett Lake and Padre Canyon Allotments and within the cumulative effects area.

Vegetation associated with wetlands may not improve much with any alternative because climate is the primary factor affecting these areas. If the next 10 years are wet, the wetlands will improve. If the next 10 years are dry, the wetlands will remain static or decline.

Table 15. Past, present, and future grazing decisions by 5th code watersheds

5th Code Watershed*	Allotment Name	Acres in Watershed[1]	Percent in Watershed	Status of Decision
Canyon Diablo	Anderson Springs	47,074	21	NEPA analysis; Implement 2005
	Apache Maid	15,292	7	NEPA completed in 1995
	Bar T Bar	38,524	17	NEPA analysis; Implement 2005
	Padre Canyon	20,993	9	Complete NEPA in 2005
	Pickett Lake	24,560	11	Complete NEPA in 2005
	Mud/Tinny Springs	7,388	3	NEPA completed in 1995
	Angell	38,106	17	NEPA analysis; Implement 2007
	Deep Lake	10,973	5	NEPA analysis, Implement 2006
	Walnut Canyon	7,487	3	NEPA analysis, Implement 2007
	Youngs Canyon	6,342	3	NEPA completed in 2001
	Excluded Acres	7,105	3	
	Total Acres	**223,845**		
Mormon Lake	Anderson Springs	218	0.1	NEPA analysis; Implement 2005
	Apache Maid	1,188	0.5	NEPA completed in 1995
	Mud/Tinny	21,242	84	NEPA completed in 1995
	Pickett Lake	1,052	4	NEPA analysis; Implement 2005
	Excluded Acres	1,661	7	
	Total Acres	**25,361**		
Lake Mary	Anderson Springs	17	0.1	NEPA analysis; Implement 2005
	Angell	2,773	3	NEPA analysis; Implement 2007
	Casner/Kelly	2,201	2	NEPA analysis; Implement 2007
	Cosnino	4,110	4	NEPA analysis; Implement 2007
	Deep Lake	12	0.1	NEPA analysis; Implement 2006
	Lake Mary	18,698	19	NEPA completed in 1995
	Mud/Tinny	21,224	22	NEPA completed in 1995
	Pickett Lake	9,201	9	NEPA analysis; Implement 2005
	Walnut Canyon	25,095	26	NEPA analysis; Implement 2007
	Youngs Canyon	5,001	9	NEPA completed in 2001
	Excluded Acres	8,875	5	
	Total Acres	**97,207**		

*Watersheds are functioning and this was determined through the TES analysis (see Chapter 3-Soils and Water Quality sections).

_All of the acres are gross acres and include steep slopes (no grazing capacity lands) and non-Forest Service land.

Table 16. Wetland acres within Pickett Lake and Padre Canyon Allotments and cumulative effects area

Wetland Type	Wetland Acres in Cumulative Effects Area	Wetland Acres Inside Pickett Lake and Padre Canyon Project Area	Total Wetland Acres	Total Wetland Acres With No Cattle Grazing in Project Area	Total Wetland Acres With No Cattle Grazing in Cumulative Effects Area
Perennial Spring	11	6	17	4	5
Permanent wetland (Reservoir)	1,384	209	1,593	180	123
Ephemeral wetland	28	0	28	0	0
Seasonal wetland	587	796	1,383	553*	635
Semipermanent wetland	5,598	52	5,650	52	134
Temporary wetland	74	80	154	0	0
Totals	7,682	1,143	8,825	789	897

*Acreage includes numbers from the possible exclosures at West Breezy, Breezy, Indian, and Boot Lakes.

There are existing cattle exclosures on various wetlands on or near Anderson Mesa. Upper Lake Mary (reservoir wetland, 661 acres), Lower Lake Mary (reservoir, 149 acres), Vail Lake (semipermanent wetland, 71 acres), Horse Lake (semipermanent wetland, 61 acres), and Long Lake (seasonal wetland, 179 acres) all have cattle exclosures. Ashurst Lake (reservoir, 199 acres) is partially protected from cattle grazing. There are seven elk exclosures on Anderson Mesa in wetland locations (total of 1 acre). Ashurst Spring is also protected from all grazing with an elk exclosure (2 acres), and Elliot Spring (1 acre) has natural protection by abundant rock outcrops and slopes, for a total of 1,304 acres of wetland protection (about 860 acres of wetland reservoir, 281 acres of semipermanent wetland, 171 acres of seasonal wetland and 3 acres of springs).

As a whole, there would be 1,760 (of the about 7,524) acres of wetlands outside the project area protected from cattle grazing by cattle exclosures. Of these acres, 1,609 are still available to grazing by wildlife. The protection from grazing by cattle has been effective in maintaining hardstem bulrush communities in other semipermanent wetlands like Little Dry, Vail, and Marshall Lakes. **The protection of these wetlands is cumulative for the entire cumulative effects area.**

The combined effect of cattle and wildlife use on plant height and cover in wetlands is cumulative to similar situations in surrounding allotments (see Appendix). Unsatisfactory range conditions and impaired soils occur in portions of some wetlands in the cumulative effects area. When added together, these areas represent a degraded condition but one that is still functioning [PRD 58]. From a plant health and rangeland condition standpoint, no alternative is considered to have substantial effects.

The wetlands in this area rarely burn, because they are too wet to burn or they are too dry to produce vegetation that would be capable of burning. Prescribed burns are not proposed as part of this project. However, prescribed burns or wildfires in other areas can add to short-term wetland vegetation declines immediately following a fire because wildlife may initially congregate in the

wetlands, thus cumulatively affecting them. If wetlands did burn, they would recover quickly because of the natural nutrient flush. Wetlands would still function and irreversible impacts would not occur from the combination of cattle grazing and prescribed burning in the cumulative effects area.

There is no proposed change to existing stock tanks, except maintenance, on the Pickett Lake and Padre Canyon Allotments. No maintenance would be completed on stock tanks in semipermanent or seasonal wetlands. **Therefore, there are no cumulative effects from stock tank maintenance to seasonal or semipermanent wetlands when considered with other tanks in the cumulative effects area.**

Maintenance includes cleaning the tank as sediment levels reach 50 percent of the total volume of the tank. All maintenance will occur within the original footprint of the stock tank. **The cumulative effects of maintenance on adjacent allotments with stock tanks is that the stock tanks would hold more water for a longer period of time, providing cattle and wildlife a more reliable source of water.**

Depending on when stock tanks have water they can concentrate cattle and wildlife. They are, however, more reliable water source for cattle and wildlife, especially during dry conditions. **Cumulative effects to wetlands from stock tanks are water would be available for a longer period of time providing a more reliable water source for wildlife.**

This increased water availability may cause a decrease in vegetation surrounding the stock tank, however, grazers are still attracted to the vegetation in the wetlands whether water is available or not so **there would be no cumulative effects to emergent vegetation from the presence of stock tanks**.

The cumulative combination of all these individual actions would still maintain or improve wetland vegetation in the cumulative effects area.

Cumulative Effects of Alternative 1

Alternative 1 should have some effect on wetlands from cattle grazing at current levels. **These effects are additive to grazing by wildlife.** The combined use of vegetation by wildlife and cattle has been occurring at levels in the cumulative effects area as described in Alternative 1 for many years. The resulting condition is a stable ecological condition with patches of less than desirable plant production, plant height and ground cover. The combined cattle and wildlife use on the cumulative effects area is not causing major environmental effects.

In Alternative 1, the emergent vegetation and surrounding upland buffer at Post and Perry Lakes would not be fenced and would continue to have a combined effect from cattle and wildlife grazing. When cattle graze after July 15 where wetlands are deferred from cattle use (all action alternatives), there would be no negative effect for the years they are deferred and, therefore, no negative cumulative effect.

Cumulative Effects of Alternative 2

There is no grazing in Alternative 2 therefore cumulative effects from cattle grazing do not occur.

Cumulative Effects of Alternatives 3 and 4

In Alternatives 3 and 4, an additional water source (pipeline with drinkers) would be added to the area below the Anderson Mesa rim on the Padre Canyon Allotment. This would distribute cattle more evenly in this area, and would increase flexibility in the grazing system. **The addition of**

this water source would be additive to other water sources on the Pickett Lake and Padre Canyon Allotments and water availability on adjacent allotments for wildlife.

Alternatives 3 and 4 would provide some protection from cattle grazing on plant and soil attributes in seasonal and semipermanent wetlands compared to Alternative 1. The combined use by cattle and wildlife is not a substantial negative use under Alternatives 3 and 4.

Alternatives 3 and 4 have lanes to stock tank water at Perry Lake, Indian Tank Lake, Boot Lake and Indian Lake. The lanes are a small portion (about 2 acres) of the entire excluded wetland area. Even with cattle grazing in the lanes, there will be at least 80 percent of emergent vegetation protected in the wetland as a whole. Soil condition will not improve in the lanes because grazing at these sites will not leave enough plant biomass onsite to provide for nutrient cycling and they will be subject to heavy traffic by animals, resulting in compaction. **These effects are additive to the effects from other wetlands in the cumulative effects area that are fenced with lanes.**

Overall, the functionality of the wetland sites will improve toward the site potential. The exception to this will be the lanes and stock tanks themselves. All wetland sites will maintain proper functioning condition.

There are cumulative impacts from livestock grazing on 2 acres of lanes to stock tanks within seasonal and semipermanent wetlands. These adverse effects include impacts to soil conditions, decreases in nutrient cycling, disturbance to waterfowl potential nesting sites between May 1 and July 15 through trampling and will minimize nesting habitat potential within these lanes.

The exclosures are designed so the lane area will not be located in the wetland vegetation that has the most potential for growth. The lanes in seasonal and semipermanent wetlands on the Pickett Lake and Padre Canyon Allotments **would have cumulative effects, which are additive to effects at other seasonal and semipermanent wetlands that will be fenced with lanes on other allotments in the cumulative effects area**.

The vegetation in the excluded wetlands in Alternatives 3 and 4 will improve, which will be additive to other seasonal and semipermanent wetlands in the cumulative effects area that will be fenced. The cumulative effects will be additive for the improved vegetation as well as wildlife habitat.

In seasonal and semipermanent wetlands that are fenced, there would be no effect from cattle grazing to the emergent vegetation and surrounding upland buffer except where the lanes are and, **therefore, nothing to accumulate to the effects of other actions after the following are implemented**: the emergent vegetation and surrounding upland buffer in Post and Perry Lakes are fenced in Alternatives 3 and 4; the emergent vegetation and surrounding upland buffer at Post and Ducknest Lakes, and Perry and Indian Tank (with lanes to stock tank water at Perry and Indian Tank) are fenced in Alternatives 3 and 4; and the possibility of fencing the emergent vegetation and surrounding upland buffer at Breezy, West Breezy, Indian and Boot Lakes with a lane to the stock tank water at Boot and Indian Lakes.

Vegetation

This section describes vegetation found in the uplands, woodlands, and grasslands. This section does not include detailed information on vegetation in riparian areas or wetlands. Information specific to these areas can be found in the previous “Wetland” section of this chapter.

The Pickett Lake and Padre Canyon Allotments have vegetation types ranging from ponderosa pine and mixed conifer to pinyon-juniper woodlands, mountain grasslands, and grassland and sparse pinyon-juniper above the Anderson Mesa rim. Pinyon, juniper and ponderosa pine communities dominate the vegetation on the Pickett Lake and Padre Canyon Allotments at an elevation ranging from 6,000 to 7,425 feet. Ponderosa pine is located on the far western portion of Pickett Lake Allotment. Old growth pinyon and juniper exists in small patches near and within canyons and some steeper sloped areas. Portions of these allotments were recently grassland and are now being filled in with pinyon, juniper and ponderosa pine trees.

There are several canyons running though the allotments below the Anderson Mesa rim which include: Padre, Mormon, Cabin Draw, Yellow Jacket, and Elliot. These canyons have diverse vegetation, including some ponderosa pine and gambel oak, but contain no riparian values, except in small areas associated with four active springs near the Anderson Mesa rim.

Above the Anderson Mesa rim, dominant grass species include western wheatgrass (*Agropyron smithii*), squirreltail (*Elymus elymoides*), and blue grama (*Bouteloua gracilis*). Below the rim, blue grama is the dominant grass species found throughout the area. Near and on the rim, cliffrose (*Cowania mexicana stansburniana*) and fernbush (*Chamaebatiaria millifolium*) are the two most abundant shrub species and provide important structure and food for wildlife.

The Pickett Lake and Padre Canyon Allotments combined consist of 55,807 acres. Of these, full carrying capacity rating for cattle is given to about 42,893 acres where soils are stable and are producing more than 100 pounds of forage per acre. A “potential capacity” rating for cattle is given to about 5,019 acres where soils are impaired or unsatisfactory mainly due to dense pinyon and juniper trees. A “no capacity” classification is given to about 6,200 acres where slopes are over 40 percent and/or where forage production is less than 100 pounds per acre.

Wildlife use falls within this carrying capacity estimate. Wildlife use on browse is a problem on the Pickett Lake and Padre Canyon Allotments, while cattle use on browse is low because cattle are primarily grazers. Wildlife use in small areas can cause impacts, but overall wildlife use falls with the carrying capacity of the area [PRD 57].

Carrying capacity is based on current conditions, and not conditions of the past, for all the action alternatives. Carrying capacity for this analysis is based on actual use data, cattle and wildlife use patterns, cattle condition, condition and trend determinations, TES soil survey, forage production estimates, and professional opinion. Forage production estimates and use of spreadsheets for capacity is a tool for management of the allotment. Carrying capacity on an allotment is estimated through annual and long-term monitoring of the allotment. Under each action alternative, the annual operating plans would adjust numbers of cattle to match forage production in a given year with the grazing system in place to meet goals of maintaining or improving conditions.

Forest Service personnel observe how current cattle management is affecting the area and determine if this use is sustainable over time. Long-term monitoring data points, found throughout the allotment were used for this analysis [PRD 57]. Cattle health is also used to gauge capacity. If the cattle are in good condition and show good gains through the years, this is a positive indicator that cattle numbers are in line with the area.

The health of vegetation on the Pickett Lake and Padre Canyon Allotments is measured through range condition and trend and is called range management status. Range condition and trend are a subjective expression of the status or health of the vegetation relative to their combined potential to produce a sound and stable biotic community. Soundness and stability are evaluated relative to a standard that encompasses the composition, density, and vigor of the vegetation (USDA 1987).

Rangeland management status is a comparison of existing vegetation and soil conditions to either the potential natural community or desired plant community. Rangeland management status is considered to be in satisfactory condition when the existing vegetation community is similar to the desired condition, or short-term objectives are being achieved to move the rangeland toward the desired condition.

The assessment of current condition and trend presented here provides an overview for large areas and does not necessarily uniformly apply to all areas on the Pickett Lake and Padre Canyon Allotments. Range conditions and trends can vary from area to area. Ponderosa pine areas are generally static to upward. Pinyon and juniper grassland areas above the rim are generally static. Lake and deep soil site conditions above the rim vary from site to site, from static to upward. Pinyon and juniper grassland below the rim are generally static to downward. Cattle are contributing to downward trends in a few locations; however, the increasing density of trees is the primary reason for areas of static or downward trends [PRD 57].

Approximately 42,893 acres have satisfactory rangeland management status and mid to high similarity to the desired natural community. Approximately 12,914 acres have unsatisfactory rangeland management status and low similarity to the desired natural community. Cattle are contributing to unsatisfactory rangeland conditions and impaired soil conditions on 5,019 of these acres. Unsatisfactory and impaired areas are listed in Table 17.

The impaired conditions on the 5,019 acres specific to meadows and grasslands are not expected to change under any of the alternatives due to: historic and current uses by cattle and wildlife; fluctuation in high and low water levels; human disturbances from growing crops; cutting hay; intense fires; driving vehicles; and various recreational uses.

These range conditions and trends exist with the current cattle grazing system and current utilization guideline of 35 percent for cattle and wildlife. Past cattle grazing on these allotments has been within this utilization guideline, and cattle have been able to use these allotments for the full length of the grazing season.

If the seasonal utilization guideline is reached prior to pasture rotations established for a particular season, cattle must be moved. Cattle may not enter a pasture if utilization from wildlife has already met the 35 percent seasonal utilization guideline. Early moves or skipping pastures have not been routinely needed under the current grazing system and have only occurred on occasion, mainly related to drought conditions.

Within the utilization guideline cattle graze plants and have the potential to modify understory plant height, reduce seed head growth, affect plant community composition, diversity, physiognomy, and encourage regrowth in good precipitation years all under well managed light to moderate grazing. Plant height and cover varies with seasonal moisture and temperatures. Loeser et al. (2004) found that 5 years without cattle grazing has little effect on forb abundance or standing herbaceous matter on the Anderson Mesa grasslands.

Table 17. Unsatisfactory and impaired soil areas and their relationship to cattle grazing

Unsatisfactory and Impaired Areas	Relationship to Cattle Grazing
Steep slopes with a grade over 40 percent	Cattle do not graze.
Dense pinyon and juniper stands	Cattle do not usually graze these areas.
Meadow and grasslands	Cattle may be contributing to these conditions, along with other factors.

The vegetation, soil and water report [PRD 58] describes how district personnel conducted a review and evaluation of understory vegetation conditions on these two allotments through monitoring during end of the season inspections and condition and trend monitoring. The range specialist report [PRD 57] also describes the grazing history of these allotments.

Environmental Consequences

Direct and Indirect Effects Common to All Action Alternatives

Under all action alternatives range management status of condition and trend would remain the same or move upward, except where pinyon juniper and pine trees limit improvement potential. Treating areas with trees is outside the scope of this analysis.

Cattle can improve or decrease plant species composition depending on the timing of grazing. Grazing use is rotated so forage is grazed and rested at a different time each year. For instance, spring and early summer grazing occurs mainly on cool season species. After the monsoon season, grazing occurs mainly on warm season species. As the weather cools in the fall, utilization changes back to cool season species. Loeser et al. (2004) showed evidence of increased aboveground productivity on Anderson Mesa grasslands in response to defoliation from cattle grazing.

Direct and Indirect Effects of Alternatives 1 and 3

A utilization guideline of 35 percent is set for cattle and/or wildlife during cattle graze periods. This is an appropriate utilization level by these grazing ungulates for forage, because it leaves 65 percent of forage production available to reproduce, grow to maturity, build necessary root mass, produce seed heads, produce litter important for nutrient recycling, propagate and move into new areas, and provide for the needs of other wildlife species.

Alternatives 1 and 3 would have direct effects to understory plants. Condition and trend monitoring would indicate if proper utilization guidelines are being applied to the vegetation, and if this utilization is negatively affecting general plant health.

The number of days cattle graze a pasture in Alternatives 3 and 4 is shorter than current management, so the vegetation would have longer to recover. For example, when Ashurst pasture is grazed in June, cool season species are mainly grazed and warm season species may not be grazed that year. Typically, in the fall, these cool season species would fully regrow from this early season cattle use.

Direct and Indirect Effects of Alternative 2

By removing cattle in Alternative 2, there would be no direct or indirect effects from cattle grazing on plant health. Soil conditions in these areas are not expected to change without cattle grazing. During the first 5 years, rangeland management conditions, in low tree density areas, would be expected to move toward desired conditions with an increase in grass, forb and shrub plant species composition, plant canopy cover, plant production and ground cover due to rest from cattle grazing. However, after 5 years, rangeland management conditions in the uplands would likely move away from desired conditions with a decrease in grass, forb and shrub abundance, diversity and production due to a buildup of grass litter.

During the first 5 years, rangeland management conditions in low tree density areas are expected to move toward desired conditions with an increase in grass, forb and shrub plant species

composition, plant canopy cover, plant production and ground cover because of rest from cattle. However, after 5 years, rangeland management conditions in the uplands would likely move away from desired conditions with a decrease in grass, forb and shrub abundance, diversity, and production due to a buildup of grass litter.

Direct and Indirect Effects of Alternative 4

A 20 percent utilization guideline would be set for cattle and/or wildlife, during cattle graze periods. This alternative allows 80 percent of the plant (compared to 65 percent in Alternatives 1 and 3) to be available to reproduce, grow to maturity, build necessary root mass, produce seed heads, produce litter important for nutrient recycling, propagate and move into new areas, and provide for the needs of other wildlife species. However, this benefit primarily occurs in the more remote uplands as utilization and cattle numbers are lowered, because cattle graze near the water sources and highly productive grasslands first before moving to the uplands.

Alternative 4 would also have shorter graze periods, increased rest periods in each pasture, and improved cattle and wildlife distribution similar to Alternative 3. In addition, the number of cattle head months would be decreased by 15 percent. The other effects of Alternative 4 are similar to those described for Alternative 3.

Cumulative Effects Common to All Action Alternatives

The boundary area analyzed for cumulative effects for utilization is Anderson Mesa. Utilization is discussed in terms of general plant health. The adjacent Forest Service allotments in the cumulative effects area along with utilization guidelines as described in their current AMPs and are: Deep Lake-35 percent, Anderson Springs-50 percent, Bar T Bar-40 percent, Walnut Canyon-35 percent, and Apache Maid-50 percent. Utilization levels on Arizona State Trust and private lands typically follow the levels set for national forest allotments. Condition and trend along with general plant health is similar on adjacent allotments, Arizona State Trust, and private lands.

Past actions may have affected general plant health; however plant health is generally static under the current cattle grazing system. In the action alternatives, cattle grazing would occur over the next 10 years. There would be some variation in general plant health due to timing of the cattle grazing season in relation to wildlife grazing, vegetative treatments, fire and related fire suppression, recreation use, and climatic conditions. General plant health would also vary because the effects are not all site specific but may overlap in some areas.

Under all action alternatives, trends would remain the same or move upward, except where trees limit improvement potential. Several pinyon and juniper tree treatment projects are and will be implemented in the cumulative effects area (see Table 9). Meadow and grassland habitat will be restored, improving habitat and travel corridors for pronghorn and other wildlife. Grass and forb production will increase and soil conditions will begin to stabilize or improve in 1 to 3 years depending on moisture availability. **These positive effects would be cumulative and benefit the vegetation and wildlife habitat.**

Range trends are expected to be static to upward under all alternatives. The trends on adjacent allotments within the cumulative effects area are also static to upward [PRD 57], so there is a slight additive effect of Pickett Lake and Padre Canyon cattle grazing in combination with cattle grazing on other allotments. **When all these static to upward trends are added together, the result for the cumulative effects area is static to upward**.

The Mormon Fire burned 2,719 acres of the Padre Canyon Allotment in 2003. The Lizard Fire burned 5,127 acres of the Angell Allotment, adjacent to the Padre Canyon Allotment to the north, in 2003. The Jacket Fire burned 17,219 acres of the Padre Canyon Allotment in 2004. With this

reduction of pinyon and juniper trees, grass and forb cover in the burned areas is expected to increase as these areas receive adequate moisture for plants to establish, and improve their general health, which will be additive to improved vegetation conditions.

Cattle can improve or decrease plant species composition depending on the timing of grazing. Grazing use is rotated so forage is grazed and rested at a different time each year. For instance, spring and early summer grazing occurs mainly on cool season species. After the monsoon season, grazing occurs mainly on warm season species. As the weather cools in the fall, use changes back to cool season species. Loeser et al. (2004) showed evidence of increased aboveground productivity on Anderson Mesa grasslands in response to defoliation from cattle grazing. **These effects will occur and will be additive to similar effects on other allotments in the cumulative effects area that have grazing rotations that benefit forbs and grasses.**

The direct effects to plants from cattle use are additive to wildlife grazing and other grazing on plants by other animals. The combined cattle and wildlife use would not cause substantial environmental effects on the overall vegetation under any alternative, but may affect isolated areas such as sites with deeper soils.

The unsatisfactory rangeland and impaired soil conditions on the 5,019 acres of meadow and grasslands on the Pickett Lake and Padre Canyon Allotments are not expected to change under any alternative. Adjacent allotments most likely have similar areas. However, like the Pickett and Padre Canyon allotments, the overall percentage of unsatisfactory rangeland and impaired soil conditions is low when compared with the surrounding landscape. **Thus, there is not a substantial cumulative effect from the combined cattle grazing situation on the overall landscape.**

Cumulative Effects of Alternative 1

In Alternative 1 cattle will still graze highly productive forage areas first before moving to less accessible sites or areas with dense trees. The cattle grazing rotations are changed annually so forage is grazed at a different time each year. **More plants are regrazed in Alternative 1, so the effects to vegetation are additive to other uses or activities.**

Cattle distribution in Alternative 1 provides less flexibility in the grazing system. Cattle will need to remain in other pastures longer as water will not be available to encourage distribution into the area below the Anderson Mesa rim. **This could cumulatively affect isolated locations.**

A 35 percent utilization guideline is applied in Alternatives 1 and 3. This guideline is similar to that in other parts of the cumulative effects area so **the cumulative effects of plants being able to reproduce, produce seed heads, produce litter important for nutrient recycling, and provide for the needs of other wildlife species is additive**.

Cumulative Effects of Alternative 2

By removing cattle in Alternative 2, there would be no cumulative effects from cattle grazing on plant health. Soil conditions in these areas are not expected to change without cattle grazing.

During the first 5 years in Alternative 2, rangeland management conditions, in low tree density areas, would be expected to move toward desired conditions with an increase in grass, forb and shrub plant species composition, plant canopy cover, plant production and ground cover due to rest from cattle grazing. However, after 5 years, rangeland management conditions in the uplands would likely move away from desired conditions with a decrease in grass, forb and shrub abundance, diversity and production due to a buildup of grass litter. **During these first 5 years**

these effects would be additive to the vegetative improvements from other activities, but then would decrease after 5 years.

Cumulative Effects of Alternatives 3 and 4

A 35 percent utilization guideline is applied in Alternative 3. This guideline is similar to that in other parts of the cumulative effects area so **the cumulative effects of plants being able to reproduce, produce seed heads, produce litter important for nutrient recycling, and provide for the needs of other wildlife species is additive**.

Alternatives 3 and 4 reduce graze periods, increase the rest periods, and improve cattle distribution. This is expected to slightly improve plant species composition, plant canopy cover, plant production and ground cover over the current condition under the current grazing scheme. **These effects would also be additive to any other improvements in vegetation from other activities or events.**

The 20 percent utilization guideline applied in Alternative 4 allows more of the residual vegetation to be available to reproduce, produce seed heads, produce litter important for nutrient recycling, and provide for the needs of wildlife. **This effect would be additive to vegetation effects from other activities and natural events that increase productivity or overall plant health.**

The benefit of the 20 percent utilization guideline in Alternative 4 primarily occurs in the more remote uplands as utilization and cattle numbers are lowered, because cattle graze near the water sources and highly productive grasslands first before moving to the uplands. **These effects could be additive to other uses or activities in these highly productive grasslands.**

Effects to vegetation associated with closed basins, seasonal wetlands and springs in Alternative 4 are similar to Alternative 3. Utilization and cattle number reductions do not reduce the impacts to these areas because cattle seek them out first before moving to uplands. **The reduction of use is found in the uplands, which would be additive to use on other uplands in surrounding allotments.**

Alternative 4 decreases the number of cattle 29 percent from the numbers in Alternative 1. **This reduced number of cattle would have additive effects to other vegetation effects from other possible reductions in livestock numbers on other allotments in the cumulative effects area.**

Sensitive Plant Species

Sensitive species are defined as “those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by: (a) significant current or predicted downward trends in population numbers or density, or (b) significant current or predicted downward trends in habitat capability that would reduce a species’ existing distribution” (FSM 2670.5(19)).

It is the policy of the Forest Service regarding sensitive species to: (1) assist states in achieving their goals for conservation of endemic species; (2) as part of the National Environmental Policy Act process, review programs and activities, through a biological evaluation, to determine their potential effect on sensitive species; (3) avoid or minimize impacts to species whose viability has been identified as a concern; (4) if impacts cannot be avoided, analyze the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole (the line officer, with project approval authority, makes the decision to allow or disallow impacts, but the decision must not result in loss of species viability or create

significant trends toward Federal listing); and (5) establish management objectives in cooperation with the state when projects on National Forest System lands may have a significant effect on sensitive species population numbers or distributions.

All species on the district's threatened, endangered and sensitive species list [PRD 4] were considered in this analysis. There are no threatened, endangered, or proposed plant species within the project area. Four sensitive plant species are present or have potential habitat within the project area and have been evaluated (see Table 18).

Table 18. Sensitive plant species on the Pickett Lake and Padre Canyon Allotments

Species Name	Scientific Name	Listing Status*
Cliff Fleabane	*Erigeron saxatilis*	SEN
Rusby's Milkvetch	*Astragalus rusbyi*	SEN
Arizona Sneezeweed	*Helenium arizonicum*	SEN
Flagstaff Beardtongue	*Penstemon nudiflorus*	SEN

*Listing status refers to those species identified as sensitive (SEN) in the Regional Forester's Sensitive Species List (USDA 1999).

Cliff Fleabane

Cliff fleabane occurs between 4,400 and 7,000 feet in elevation on various aspects and a variety of vegetative communities, including the Rocky Mountain Riparian Deciduous Forest. It is found on dacite and Coconino sandstone, in mainly inaccessible shaded cliff-faces and boulders in shady canyons. The nearest known plant is over 10 miles to the west of the Pickett Lake and Padre Canyon Allotments.

Potential habitat is limited to steeper slopes in the project area. Threats to cliff fleabane include those activities that damage cliffs and boulders. No plants were found during some plant surveys in 2000 (USDA 2000b).

Environmental Consequences

Direct, Indirect, and Cumulative Effects of All Alternatives

Potential habitat for this species is inaccessible to livestock because of cliff fleabane's location on cliff faces and boulders in shady canyons. None of the alternatives propose to modify the substrate on which this species depends, so no direct, indirect, or cumulative effects would occur.

Rusby's Milkvetch

This plant is known only from northern Arizona. It has been located on the San Francisco Peaks, north of Williams and Mount Trumbell, from 6,500 to 9,000 feet. It blooms from May to September. Potential habitat on the Pickett Lake and Padre Canyon Allotments includes ponderosa pine or ponderosa pine/gambel oak sites in dry or temporarily moist basaltic soils. It is about 16 miles from the allotments to the nearest known population of this plant. No plants were found during some plant surveys in 2000 (USDA 2000b).

This species is fire-adapted species with a high tolerance for disturbance. It is browsed by wildlife, and is probably used by other grazers as well. It seems to prefer an open canopy with light and nutrients reaching the forest floor.

Environmental Consequences

Direct and Indirect Effects of Alternatives 1, 3, and 4

Plant response to grazing has not been well studied but observations in the vicinity of the San Francisco Peaks suggest that this plant is not heavily grazed (Green 1999). Where it is grazed, plant responses could include compensatory effects such as development of lateral branches, foliage, and flowers. Other responses may include delayed flowering, reduced seed output, and reduced vigor. Both of these responses would be interactive with the effects of climate, pasture rotation, timing of grazing, number of livestock, and timing of subsequent grazing by both livestock and wildlife.

Cumulative Effects of Alternatives 1, 3, and 4

Cumulative effects on Rusby's milkvetch include prescribed and natural fire, livestock grazing on adjacent allotments, wild ungulate grazing, recreation use, and silviculture activities.

Cumulative effects from both livestock and wild ungulates include potential impacts on growth, vigor, structure, seed head production, reproductive processes, and survival of individual plants as described above or trampling. Depending on the intensity of grazing, these impacts may be negligible or they may result in the loss of individual plants.

Cumulative effects from recreational uses include soil compaction associated with road and trail use, the potential for trampling of individual plants, and alteration in habitat for this species. Injury or death of the plant can occur as a result of camping, picnicking, or off-road vehicle use.

Cumulatively, prescribed and natural fires would affect this plant both positively and negatively. Fires can result in plant mortality, loss of foliage and reproduction, which is a negative effect. Fire positively impacts individual plants through increased nutrients following the burn and opening the canopy, resulting in increased vigor, growth, and reproduction. More plants have been observed within the boundary of the Pumpkin Fire, which burned in 2000, than in unburned habitat immediately adjacent to the fire.

The determination for these alternatives is *likely to impact individuals but not likely to result in a trend toward listing or loss of viability* of the population because of grazing by cattle and wildlife, including small mammals and seed predators.

Direct, Indirect, and Cumulative Effects of Alternative 2

No livestock would be present in the project area if this alternative was implemented, so no direct, indirect, or cumulative effects would occur.

Arizona Sneezeweed

This perennial herb blooms between July and September and is found between 7,000 to 8,000 feet in elevation. It is known only from central Arizona. The type locality is from Mormon Lake (Kearney and Peebles 1951). It is associated with many of the meadows on the Mormon Lake and Long Valley Ranger Districts. Habitat includes roadsides and clearings in ponderosa pine forests. The nearest known location is about 3 miles south of the Pickett Lake Allotment boundary. Potential habitat in the project area is considered wet meadows, mainly around the seasonal or semipermanent wetlands. No plants were detected during any of the visits to wetlands or other parcels of potential habitat on the allotments. No plants were found during plant surveys in the late 1980s (Ricketson 1990) or in 2000 (USDA 2000b).

Threats to the Arizona sneezeweed include: changes in hydrological processes in wet and intermittently wet meadows that result in lowered water tables or dewatering; loss of habitat due to housing development or road construction; trampling or other soil disturbances (USDA 2000a).

Environmental Consequences

Direct and Indirect Effects of Alternatives 1, 3, and 4

Some grazing impacts to Arizona sneezeweed have been observed although wildlife and cattle use is low. Cattle seem to avoid the plant although trampling would be expected because cattle tend to concentrate around water and these plants tend to grow where the water table is high. Cattle impacts would vary by grazing schedule and early cattle use would have little direct impact to plants because sneezeweed growth appears to be timed with the monsoon. Consequently, late cattle use would have higher impacts. This will vary by year. There are no anticipated effects due to range improvements because these will not occur in habitat for this species.

Cumulative Effects of Alternatives 1, 3, and 4

Cumulative effects on Arizona sneezeweed include livestock grazing in adjacent areas, wildlife grazing, and recreation use.

Cumulative impacts from grazing include trampling, possibly light grazing and soil compaction. Individual plants will have differential response based on the degree and timing of impacts. For example, the plant may still be able to produce seed heads if use occurs relative early in the season. However, impacts during flowering are likely to have greater impact to reproduction. This same trend of relatively low impacts during some years and higher impacts due to others is anticipated in potential habitat as well.

Cumulative impacts from recreation use include trampling of individual plants by campers or off-road vehicles and collection of flowers. This is expected to affect reproductive rates by reducing seed production and reducing the number of plants in the population.

Considering direct, indirect and cumulative effects, there is a determination of may impact individuals, but not likely to result in a trend toward listing or loss of viability if these alternatives were implemented. This is because potential habitat is grazed with the possibility of soil compaction or trampling as described above.

Direct, Indirect and Cumulative Effects of Alternative 2

No livestock would be present in the project area if this alternative was implemented, so **no direct, indirect, or cumulative effects would occur**.

Flagstaff Beardtongue

This penstemon is found only in north-central Arizona in Coconino and Yavapai Counties (Kearney and Peebles 1951). It occurs on dry slopes with ponderosa pine in mountainous or hilly regions south of the Grand Canyon. It may be expected to occur on light, dry neutral soils in eroded or mountainous areas. It is found between 4,480 and 6,965 feet in elevation and it has been documented along Lake Mary Road within 2 miles of the Pickett Lake Allotment boundary. Potential habitat for this species occurs in the project area within the appropriate elevation range. No plants were found during plant surveys in 2000 (USDA 2000b). Threats to the Flagstaff beardtongue include seed predators and grazing. According to the botanist for the Coconino, Kaibab, and Prescott National Forests, this species is adapted to fire and generally grows in open

habitats. There is no known compensatory response to herbivory. The plant has seed predators and grasshoppers eat the foliage.

Environmental Consequences

Direct and Indirect Effects of Alternatives 1, 3, and 4

The seed heads can be eaten by cattle or wildlife resulting in delayed flowering, reduced seed output, or reduced vigor. Some plants could be trampled. All of these responses would be interactive with the effects of climate, pasture rotation, timing of grazing, number of livestock, and timing of subsequent grazing by both livestock and wildlife.

Cumulative Effects of Alternatives 1, 3, and 4

Cumulative effects on Flagstaff beardtongue include livestock grazing in adjacent areas, wildlife grazing, prescribed and natural fire, silviculture activities, and recreation use.

Cumulative effects from grazing include the potential for injury to individual plants. Anecdotal evidence suggests that this species is lightly grazed, but is not preferred as forage by livestock or wildlife. Light grazing has the potential to alter the growth form of individual plants and to result in the loss of flowering stalks and subsequent seed production.

Cumulatively, individuals of this plant would be affected both positively and negatively by proposed prescribed burning in the southwestern portion of the adjacent Anderson Springs Allotment near Pine Hill. Prescribed fire can result in plant mortality, loss of foliage and reproduction, which is a negative effect. Fire would positively impact individual plants through increased nutrients following the burn and opening the canopy, resulting in increased vigor, growth and reproduction.

Cumulative effects from silviculture activities would include injury or death of individual plants due to falling trees, human activity, and equipment use where plants occur. The opening of the canopy could have positive effects from increased sunlight.

Cumulative effects from recreational use are similar to those for other plant species and include trampling of individual plants, injury or death from off-road vehicle use or other human activities, and plant or flower collection.

Considering direct, indirect and cumulative effects, the determination of effect is may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability for all three alternatives because there is potential habitat and some possible effects to reproduction if plants are present.

Direct, Indirect, and Cumulative Effects of Alternative 2

No livestock would be present in the project area if this alternative was implemented, so no direct, indirect, or cumulative effects would occur.

Wildlife

The affected environment and effects of each alternative for wildlife is organized by species status: threatened and endangered, sensitive, management indicator species, and migratory birds.

Threatened and Endangered Species

The Pickett Lake and Padre Canyon Grazing Allotments contain potential or occupied habitat for threatened species. The threatened, endangered and sensitive species list for the Mormon Lake and Peaks Ranger District was reviewed and a list specific to this project was created in November 2000 [PRD 4]. The following is a description of the species and their habitat, and an analysis of the effects of implementation of each alternative on each species and appropriate critical habitat that occurs within or adjacent to the project area.

Section 2 of the Endangered Species Act of 1973, as amended declares that "…all Federal departments and agencies shall seek to conserve endangered species and threatened species and shall utilize their authorities in furtherance of the purposes of this Act." Section 7 directs Federal agencies to ensure that actions authorized, funded, or carried out by them are not likely to jeopardize the continued existence of any threatened or endangered species or result in the destruction or adverse modification of their critical habitats (16 U.S.C. 1536 et seq.).

Federal agencies also must consult with U.S. Fish and Wildlife Service (USFWS) whenever an action authorized by the agency is likely to affect a species listed as threatened or endangered or to affect its critical habitat. The act mandates conference with the Secretary of the Interior whenever an action is likely to jeopardize the continued existence of any species proposed for listing as threatened or endangered, or whenever an action might result in destruction or adverse modification of critical habitat proposed for listing (16 U.S.C. 1536(a)4).

The Pickett Lake and Padre Canyon Allotments provide habitat for two threatened wildlife species (bald eagle and Mexican spotted owl). There are 388 acres of Mexican spotted owl critical habitat within the Railroad pasture of the Pickett Lake Allotment.

Bald Eagle

Bald eagles, a threatened species, are primarily winter visitors to the Coconino National Forest, and the Pickett Lake and Padre Canyon Allotments, occupying all habitat types and elevations. Wintering eagles arrive in the fall, usually late October or early November, and leave in early to mid-April. They feed on fish, waterfowl, terrestrial vertebrates, and carrion. Eagles are often seen perched in trees or snags near water or next to roadways where they feed on road-killed animals. At night, small groups (usually 2 to12) or individual eagles roost in clumps of large trees in protected locations such as drainages and hillsides. Eagles usually roost adjacent to or very near food sources.

Bald eagle surveys are conducted, annually, in January on the forest. One of the standardized routes traverses portions of the Pickett Lake Allotment and in years past up to 69 eagles have been counted on this route (Mormon Lake Ranger District wildlife records). Eagle sightings are strongly influenced by percentage of open water and/or prey availability and viewing conditions. Sightings are variable year to year. Most birds are generally seen in the vicinity of Mormon Lake and Lower and Upper Lake Mary, which are adjacent to the Pickett Lake Allotment.

There are no known nesting sites on these allotments. The only known nesting on the Forest is along lower Oak Creek and the Verde River about 40 miles from the analysis boundary (Mormon Lake Ranger District wildlife records). There are no riparian areas on either allotment capable of developing the riparian trees typically used for nesting.

According to district records, there are two known roosts on the Pickett Lake Allotment. Both roosts are groves of large yellow pines associated with ephemeral drainages in the Railroad pasture. All of one roost and about half of the other roost lies within this pasture. When visited in 2004, both roosts consisted of large live trees and snags. The live trees are susceptible to

mortality from drought and insects due to tree density, shallow rocky soils and the precipitation patterns of the past few years.

There are two additional roosts within one-quarter mile of the Railroad pasture outside the Pickett Lake Allotment. One of these roosts, near Rock Ledge, is located within one-quarter mile of the "012" pasture, which is used as a holding/shipping pasture, usually in September, but may be used June through August.

Additionally an alleged roost in the Padre Canyon Allotment was reported to the forest biologist in 1988. After five visits to confirm the roost, the forest biologist was unable to confirm the site as a bald eagle roost. This area burned in June 2003 during the Mormon Fire.

Eagles forage widely and opportunistically on carrion, waterfowl and fish. The timing and amount of precipitation and fish stocking by the Arizona Game and Fish Department drive waterfowl and fish distribution. Though carrion is the primary food source for eagles on the allotments, eagles typically use any open water that would support waterfowl. As described in the Vegetation, Soil and Water Report [PRD 58], there are seven types of wetlands plus wet and dry springs on these allotments. These wetland types are distinguished based on flooding regimes, presence of hydric soils and presence of hydrophytic vegetation.

Fish are most likely to persist in the relatively deep perennial reservoirs of Ashurst Lake and Coconino Dam, which are stocked with fish by the Arizona Game and Fish Department. Although all waters can be used by waterbirds, abundance and diversity of species will vary by presence of water, basin size, habitat interspersion, water availability etc. Livestock use does not overlap with the primary use period of wintering bald eagles.

Prior consultation with the U.S. Fish and Wildlife Service on the effects of ongoing grazing on the Padre Canyon Allotment was conducted in 1998. There was a no effect determination for bald eagles. The effects of grazing on Pickett and Padre Allotments on threatened and endangered species have been discussed with the U.S. Fish and Wildlife Service as this analysis has proceeded.

Environmental Consequences

The determination of no effect for bald eagles is based on the "Framework for Streamlining Informal Consultation for Livestock Grazing Activities" (USDA 2004a). In order to comply with the no effect criteria, the actions must meet one of the following:

- Bald eagles are not present within the action area.
- Livestock grazing will not occur in areas that drain into identified bald eagle nesting habitat (upper Verde and Salt Rivers and Tonto Creek in Arizona) or roost sites.
- Livestock management activities (beyond presence of livestock) in the project area will not occur within one-quarter mile of a bald eagle roost or nest site during any time or occupation by bald eagles.

Direct, Indirect, and Cumulative Effects of Alternative 1

Direct, indirect and cumulative effects are the same as described for Alternative 3, however, new fence construction would not occur and the pipeline and drinkers would not be installed or used.

Direct, Indirect, and Cumulative Effects of Alternative 2

No livestock would be present in the project area if this alternative was implemented, so there are no direct, indirect, or cumulative effects from livestock grazing or any connected actions. This determination is based on the following:

No livestock grazing would occur in the project area.

No other actions are proposed that would affect nesting or roosting habitat for bald eagles.

Direct and Indirect Effects of Alternatives 3 and 4

Grazing on both allotments will occur outside the time of use by wintering bald eagles. There are no direct or indirect effects to nesting or nesting habitat due to lack of habitat and no known nesting within the project area. There are no direct or indirect effects to roost sites because although livestock grazing occurs within known roosts, monitoring visits indicate that livestock do not graze near roost or recruitment roost trees. No livestock management activities, other than the presence of livestock, occur within one-quarter mile of a known roost. The fencing around Post, Ducknest, Indian Tank and Perry Lakes along with the installation of pipeline and drinkers will occur at least 5 miles from the nearest known roost, thus will not impact a roost area nor will it constitute a disturbance. Fencing of these wetlands will improve habitat for waterbirds, which are bald eagle prey. Fence work along the Anderson Mesa rim within the Elliot Driveway pasture is over 5 miles from the nearest roost and will not result in habitat modification or disturbance. This will provide additional habitat for waterfowl, one of the bald eagles' prey.

There were no effects to bald eagles from implementation of the Ashurst Agra axe project, Antelope Tank and Post Lake thinning or the Pickett Agra axe, each having removed young pine and juniper from about 1,800 semi-open acres in the Ashurst Lake area (USDA 2001 and 2002e). There are no anticipated effects resulting from implementation of grazing or vegetation treatments in the proposed Bar T Bar and Anderson Springs Allotment Management Plan because livestock management on these two adjacent allotments will not occur with one-quarter mile of a roost during any time of occupation by eagles, and vegetation treatments in areas adjacent to eagle roosts at Long Lake and Soldier Annex Lake would be outside the November 15 through April 15 timeframe when eagles use this area (Mogollon Ranger District wildlife personnel, pers. comm., 2003).

Cumulative Effects of Alternatives 3 and 4

Livestock grazing occurs on state and private lands during the winter months. Wintering habitat for eagles, however, is concentrated on the forested portions of the watersheds, which is grazed during the summer. Over the years, a variety of closures on the forest have been implemented that improve habitat conditions for species like this one, including motorized vehicle closures at Pine Hill on Anderson Mesa and seasonal recreation restrictions such as at nearby Hay Lake and along the Verde River (USDA 2002b). Habitat treatments on Arizona State Trust and private lands would gradually occur over a long period of time having little effect on eagles. **Habitat for bald eagles forest wide has also been improved through improvements (such as fencing) and restriction of grazing and recreation use over time** (USDA 2002c)**, which is additive to other habitat restoration or improvement projects.**

There are no cumulative effects to bald eagles or their habitat with implementation of Alternative 3 because: grazing occurs outside the primary use period of wintering bald eagles; there is no known nesting or nesting habitat on or adjacent to the allotments; grazing does not reduce roost trees or roost tree regeneration; there is no disturbance to known roosts; and the installation and use of drinkers and proposed fence work will not disturb eagles or modify roosts. This is

consistent with the "Framework for Streamlining Informal consultation for Livestock Grazing Activities" (USDA 2004a).

Mexican Spotted Owl

The Mexican spotted owl (MSO) was listed as a threatened species in 1993. On the Coconino National Forest, this species occupies mixed conifer and ponderosa pine-gambel oak vegetation types; usually characterized by high canopy closure, high stem density, multilayered canopies within the stand, numerous snags, and down woody material.

Coconino National Forest lies within the Upper Gila Mountain Recovery Unit. Primary threats to Mexican spotted owls within the Upper Gila Mountain Recovery Unit include catastrophic wildfire, recreation, and grazing (USDI 1995). Effects of livestock grazing on Mexican spotted owls and habitat are described in the "Framework for Streamlining Informal Consultation for Livestock Grazing Activities" and relate to grazing effects on habitat structure and composition, as well as the availability and diversity of food for the owl. The Recovery Plan for the Mexican spotted owl (USDI 1995) summarizes the effects of livestock grazing on Mexican spotted owls in four broad categories: (1) altered prey availability; (2) altered susceptibility to fire; (3) degeneration of riparian plant communities; and (4) impaired ability of plant communities to develop into spotted owl habitat.

Prior consultation: The effects of ongoing grazing on the Padre Canyon Allotment on Mexican spotted owls and their habitat was analyzed and included as part of the 1998 ongoing grazing consultation process. Because there was no known MSO habitat on the Padre Canyon Allotment, there was a determination of no effect. The effects of the Proposed Action on Mexican spotted owls and its critical habitat has been consulted on with the USFWS [PRD 17].

On the Pickett Lake Allotment MSO habitat consists of a portion of one PAC, critical, and restricted habitat. There is no known habitat on the Padre Canyon Allotment. Of the restricted habitat, there is no known target or threshold habitat. The MSO habitat on the Pickett Lake Allotment is accessible to livestock. It is located within the Railroad pasture and in Mormon Canyon at the north end of Ashurst pasture. There are no riparian trees in MSO habitat in either allotment so grazing will not impact riparian tree regeneration.

Protected Activity Center (PAC): 7 acres of PAC 040541 (0.02 percent of the Pickett Lake Allotment). PAC 040541 has remained one of the most productive PACs on the Mormon Lake Ranger District (Mormon Lake District wildlife records). It is located on the slopes of nearby Mormon Mountain and known nest and roost locations are outside the Pickett Lake Allotment boundary.

Protected Steep Slope: none.

Restricted (target threshold): none

Restricted Habitat: There are about 1,026 acres of restricted habitat, all pine oak.

Critical Habitat: 388 acres.

The condition of restricted/critical habitat was monitored in August 2002 (USDA 2002d). Monitoring verified that cattle use did not occur during 2004. The majority of MSO habitat has a canopy cover greater than 40 percent, which in general limits understory production and vigor. Wildlife and grazing use in these higher canopy cover areas tends to be light. The level of use in the higher canopy cover areas maintains the 4.5-inch stubble height criteria described below, as well as seed head production and a species composition commensurate with the area potential. Understory vigor and growth was clearly affected by the drought.

The restricted/critical habitat just west of Pine Grove Hill is flat, with medium to small sized oaks. In the small openings in the canopy, the understory is mainly blue grama. Although there was residual vegetation and seed heads from the previous growing season, there was little new growth. On the average, the structure height was mostly 4.5 inches or less and most of the understory was very dry.

Environmental Consequences

Direct, Indirect, and Cumulative Effects of Alternative 1

The determination of effect if Alternative 1 were implemented is the same as for Alternatives 3 and 4 with the following caveat. Higher utilization in the _-mile radius around waters and in the blue grama portions of the restricted and critical habitat would be anticipated. The magnitude of this effect would be higher under Alternative 1 because pastures are used over a longer period. There are no direct, indirect, or cumulative effects due to fencing proposals or drinker/pipeline actions because those are not part of this alternative.

Direct, Indirect, and Cumulative Effects of Alternative 2

No livestock would be present in the project area if this alternative was implemented, so no direct, indirect, or cumulative effects on Mexican spotted owls would occur. This is consistent with the "Framework for Streamlining Informal Consultation for Livestock Grazing Activities," which states for a *no effect* determination, "No livestock grazing or livestock management activities will occur within protected and restricted habitats, as defined by the species' recovery plan" (USDA 2004a).

Direct and Indirect Effects of Alternatives 3 and 4

There are no human disturbances or cattle associated construction actions proposed within the PAC. However, livestock grazing will occur within the MSO breeding season 3 years out of 4.

The Railroad pasture contains 7 acres of one PAC and 388 acres of critical habitat. About 120 acres of this habitat are within one-quarter mile of water, thus utilization by livestock and wildlife tends to be higher within this _-mile zone than outside, in areas where the canopy cover is less than 40 percent. This utilization does not differ between Alternatives 3 and 4.

Along the road in map section 31 in the southwest portion of the Railroad pasture, about 108 acres of the pine oak restricted/critical habitat occurs on flat ground, on either side of a main road and in places where the canopy cover is less than 40 percent. These small canopy breaks have a lot of blue grama in the understory, and portions fall within the _-mile buffer around water described above. These small canopy breaks are fractions of acres and not the 3 to 5 acre mountain meadows identifiable in either terrestrial ecosystem survey units or timber stand inventory. The low structure height within these canopy breaks was attributed to a combination of low plant vigor due to drought, proximity to road and water (which predispose these areas to higher animal and human use), flatness of the area (accessible to people and animals); and soil type. Because of the combination of these factors, it is expected that the blue grama on these approximately 108 acres will not maintain the 4.5-inch height regardless of cattle presence.

There are about 262 acres of restricted habitat in the Ashurst pasture on the pine covered slopes near the north end of Mormon Canyon. Cattle use the juniper lined openings, meadows and wetland basins that are nearby, which are in sharp contrast to the Mormon Canyon drainage. Portions of the restricted habitat within Mormon Canyon also lie within one-quarter mile of water, however, the limited livestock use due to poor accessibility causes this area to differ from the restricted habitat in Railroad pasture. There is little sign of livestock use within this drainage.

Livestock grazing has little discernable effect in this area on residual biomass, seed production, species composition, tree regeneration, structure height, or any other factor that might influence MSO or its prey (USDA 2002d). These effects are the same for Alternative 3 or 4.

Implementation of Alternative 3 or 4 will result in sufficient residual biomass, seed head production, and adequate species composition to meet the needs for MSO prey in the remaining restricted habitat, critical habitat and the 7-acre PAC. There may be a slight advantage of Alternative 4 over Alternative 3 in this regard because the 20 percent utilization guideline should result in less use in the uplands. However, the 35 percent utilization guideline in Alternative 3 will maintain prey habitat. This utilization difference is not expected to be measurable in MSO habitat because canopy cover in this area appears to have a stronger influence over understory structure, abundance and vigor than livestock grazing. The proposed exclusion of Post, Perry, Ducknest and Indian Tank Lakes, the fence work in Elliot Driveway pasture, and the proposed pipelines and drinkers in the Morgan and Elliot Springs pastures will have no effect on MSO or their habitat because these actions do not occur within or near habitat.

There is a determination of *may affect, not likely to adversely affect* for Mexican spotted owls if Alternative 3 were implemented. This is based on the following rationale and in consideration of the criteria described in the "Framework for Streamlining Informal Consultation for Livestock Grazing Activities" (USDA 2004a):

> *May Affect, Not Likely to Adversely Affect* (must meet criteria 1 through 3 below unless high, mesic meadows are present within the action area, otherwise all criteria apply)
>
> 1. In the action area, livestock grazing or livestock management activities will occur within PACs, but no human disturbance or construction actions associated with the livestock grazing will occur in PACs during the breeding season.
> 2. Livestock grazing and livestock management activities within PACs, in the action area, will be managed for levels that provide the woody and herbaceous vegetation necessary for cover for rodent prey species, the residual biomass that will support prescribed natural and ignited fires that would reduce the risk of catastrophic wildfire in the forest, and regeneration of riparian trees.
> 3. In owl foraging areas, forage utilization will be maintained at conservative levels.
> 4. In high elevation mesic meadows in mixed conifer habitat, where the vole is one of the primary prey species, livestock grazing will be at a level that maintains a minimum cover height (including all species of vegetation) of 4.5 inches of all vegetation, providing cover for the owls' prey species (measurements are to follow protocols established by Dr. Pat Ward and applied in appropriate areas only). The 4.5-inch cover height minimum will be met 10 days after the onset of summer rains or August 1, whichever comes first, and maintained through the end of the grazing season.
>
> A *may affect, not likely to adversely affect* finding is appropriate for Alternatives 3 and 4 because:
>
> - There is no disturbance or construction activities within PACs during the breeding season;
> - Riparian regeneration is not affected because there are no riparian trees in the Pickett Lake MSO habitat;

- Species composition, residual biomass and seed head production will be sufficient to support MSO prey and to carry fire in occupied habitat and most of the restricted and critical habitat;
- Mesic meadows (as per the framework) are lacking within MSO habitat within the project area that would be considered foraging habitat for MSO (e.g. wet meadows in mixed conifer habitat of a size to be identifiable with TES units or stand exam); and
- Range data shows a static to upward trend and satisfactory rangeland condition in the pine type [PRD 57]; and
- Protected and most restricted habitats maintain the 4.5-inch stubble height minimum, even in a drought situation, however, there is a relatively small amount of flat, accessible pine oak habitat located near roads and waters (which predispose these areas to higher wildlife and human use) which in my opinion will not maintain the 4.5-inch threshold under cattle and wildlife or just wildlife grazing. This is due to the flatness of the area; the presence of blue grama (a species whose leaves would not be expected to reach 4.5 inches in this soil type in this area in most years) and the location mentioned above; and variable precipitation.

Post and Perry Lakes are in a ponderosa pine vegetation type and will be fenced but are not in MSO habitat.

Cumulative Effects of Alternatives 3 and 4

Cumulatively, the Ashurst and Pickett Agra axe projects, and thinning at Post Lake and Antelope Tank had no effect to MSO because these projects, which treated over 1,800 acres of sparse pine and juniper, did not occur in MSO habitat (USDA 2001 and 2002e). Ongoing fence modifications on the Pickett Lake and Anderson Springs Allotments likewise are occurring outside of MSO habitat and have no effects (AGFD 2005).

This PAC lies mainly on the Mud Tinny grazing allotment. Although there were adverse effects to MSO during consultation on the Mud Tinny grazing allotment, these effects were not due to grazing impacts within this PAC, which is mainly on steep slopes with high canopy cover. Monitoring is required as part of consultation for the Arizona Trail, however, the effects of cattle grazing on the Pickett Lake Allotment on this PAC are not considered measurable due to the rockiness, high canopy cover and ground cover density within the PAC. **There are no prescribed fires or silviculture treatments planned for the PAC or restricted or critical habitat within the project area, so there are no cumulative effects for MSO.**

Combined wildlife and livestock grazing in "restricted" or critical habitat has the potential for cumulatively impacting Mexican spotted owls, primarily their prey habitat. Utilization levels monitored in "restricted" habitat on the nearby allotments are primarily in the light to moderate range, with few exceptions. The 35 percent utilization guideline provides for prey species habitat.

Drought and insect mortality have affected habitat within the project area. The rate and extent of tree mortality in the future is not known. Mortality is expected to continue to a small degree if wet years are in the forecast because insect infestation will continue if host trees are present but adequate moisture will assist with tree resistance to attack by insects. The extent of mortality may increase if dry years are in the forecast because drought mortality will continue and drought will facilitate insect infestation and die off. This could negatively affect nest trees or foraging habitat for owls. **Drought and insect infestation could also create snags, which are important habitat features for other prey species, and could cumulatively effect MSO.**

The Pinegrove Quiet Area (about 12,000 acres) has a late fall motorized vehicle seasonal closure which provides an area of relatively low human disturbance for part of the year, of benefit to many forest dwelling species, including MSO prey and is additive to protection in other areas for MSO.

Black-Footed Ferret

The historical range of the endangered black-footed ferret is nearly identical to that of three prairie dog species: the black-tailed prairie dog (*Cynomys ludovicianus*), Gunnison's prairie dog (*C. gunnisoni*), and the white-tailed prairie dog (*C. leucurus*). Gunnison's prairie dogs are the species found on the Coconino National Forest. Ferrets occupy the burrows made by prairie dogs and utilize prairie dogs as a main food source. The black-footed ferret formerly ranged from the Great Plains of Canada to the intermountain region of the interior Rocky Mountains and the Southwest. There is a 1952 specimen from an area 7 miles northeast of Williams, Arizona; another from the Bacas Ranch 16 miles northeast of Springerville (Hoffmeister 1986); 1 from Government Prairie near Parks, and another from 12 miles west of Winona (Cockrum 1960).

No records of black-footed ferrets exist within the project area, although there are two known prairie dog colonies. One is located within the Ducknest pasture on the Pickett Lake Allotment. This colony was active when last visited in 2001 (Green 2002b). Vegetative species composition, height and abundance were commensurate with prairie dog use and maintenance of the colony. No active prairie dogs were observed during a site visit in late fall of 2002. There were no apparent negative effects from grazing, roads or recreation use on either visit. Another colony is associated with Breezy Lake in the Breezy pasture.

When visited in 2001, 2002, 2003 and 2004, vegetative conditions were good for this species. Prairie dog populations are cyclic and can go from huge numbers to almost no animals within a short time due to disease, weather patterns, predation, and other factors. Population numbers fluctuate yearly, with high numbers in some years and undetectable numbers in others. Bubonic plague has been a significant factor in prairie dog colonies in the Flagstaff area in recent years and many recently active colonies have been severely impacted. Ferret surveys and burrow density counts have not been conducted on these two colonies. Other impacts to prairie dogs include predation by coyotes, raptors and bobcats, and legal shooting.

Indirect impacts to prairie dog habitat include grazing by livestock and wildlife. Prairie dog control is not part of grazing management on the Pickett Lake and Padre Canyon Allotments.

Prior consultation: Consultation on ongoing grazing on the Padre Canyon Allotment occurred in 1998 with a determination of effect of *no effect*. The effects of grazing on Pickett and Padre grazing allotments on threatened and endangered species have been discussed with the U.S. Fish and Wildlife Service as analysis has proceeded (USDA 2003).

Environmental Consequences

Direct and Indirect Effects Common to All Alternatives

There is a determination of *no effect* to black footed ferrets under any alternative. This is consistent with the "Framework for Streamlining Informal Consultation for Livestock Grazing Activities" (USDA 2004a) for Alternatives 1, 3 and 4 because prairie dog control will not be part of the livestock management program. There would be no direct or indirect effects under implementation of Alternative 2 due to lack of cattle grazing.

Cumulative Effects Common to All Alternatives

Cumulative effects on black-footed ferrets would include vegetation treatments in adjacent areas, and past treatments within the cumulative effects area. Black-footed ferrets have not been located on or adjacent to the Pickett Lake or Padre Canyon Allotments. **Proposed vegetation treatments are expected to be beneficial for grassland species such as Gunnison's prairie dogs because the treatments are designed to improve and maintain the quality of grasslands and would be additive for black-footed ferret.** The threat of disease to prairie dog colonies continues to be high. Prairie dog control is not part of grazing management on any of the adjacent allotments.

On the Padre Canyon Allotment the recent fires have created about 20,000 acres of opening in the pinyon/juniper woodland and, to a lesser extent, in the ponderosa pine stringers found in Padre, Mormon, Yellow Jacket and Elliott Canyons. Habitat potentially created by these fires may eventually have a positive cumulative effect for prairie dogs, but will have no effect on black-footed ferrets.

Sensitive Wildlife Species

Sensitive species are defined as "those plant and animal species identified by a Regional Forester for which population viability is a concern, as evidenced by: (a) significant current or predicted downward trends in population numbers or density, or (b) significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution" (FSM 2670.5(19)). Forest Service policy regarding sensitive species is described in detail on page 60.

All species on the district's threatened, endangered and sensitive species list were considered in this analysis [PRD 4]. Of these, 11 sensitive animal species are present or have potential habitat within the project area and have been evaluated (see Table 19).

Table 19. Sensitive wildlife species on the Pickett Lake and Padre Canyon Allotments

Species Name	Scientific Name	Listing Status*
Birds		
American peregrine falcon	*Falco peregrinus anatum*	SEN
Northern goshawk	*Accipiter gentilis*	SEN
Amphibians		
Northern leopard frog	*Rana pipiens*	SEN
Insects		
Mountain silverspot butterfly	*Speyeria nokomis nitocris*	SEN
Blue-black silverspot butterfly	*Speyeria nokomis nokomis*	SEN
Spotted skipperling	*Piruna polingii*	SEN
Freeman's agave borer	*Agathymus baueri freemani*	SEN
Aryxna giant skipper	*Agathymus aryxna*	SEN
Neumogen's giant skipper	*Agathymus neumogeni*	SEN
Early elfin	*Incisalia fotis*	SEN
Mammals		
Navajo Mountain Mexican vole	*Microtus mexicanus navaho*	SEN

*Forest Service status refers to those species identified as sensitive (SEN) in the Regional Forester's Sensitive Species List (USDA 1999).

American Peregrine Falcon

The peregrine falcon was removed from the Federal List of Endangered and Threatened Wildlife in August 1999 (USDI 1999) and is now a Forest Service sensitive species. The essential habitat for the peregrine falcon includes rock cliffs for nesting and a large foraging area. Suitable nesting sites occur on rock cliffs with a mean height of 200 to 300 feet. The subspecies *anatum* breeds on isolated cliffs and is a permanent resident on Coconino National Forest. Peregrines prey mainly on birds found in wetlands, riparian areas and meadows within a 10- to 20-mile radius from this nest site. The peregrine breeding season is from March 1 to August 31.

The nearest known eyrie (nest site) is located over 5 miles from the allotment boundaries. No eyries are known to occur on or adjacent to the Pickett Lake and Padre Canyon Allotments. There are no potential eyries on the Pickett Lake and Padre Canyon Allotments. The ephemeral and permanent waters in the project area provide foraging habitat for peregrine falcons. Productivity, distribution and size of wetlands are profoundly affected by the amount and timing of precipitation, influencing whether the basins have water or not; how long they hold water within and between years; and consequently the type of vegetation and wildlife species that can be supported and when. The types of wetlands present on Anderson Mesa are described in the Vegetation, Soil and Water Report [PRD 58] and the wetlands section of this chapter.

All wetland types have some value to wildlife although this may differ depending on individual needs of the species. In general, those basins that are larger, hold water longer, and have a combination of vegetation types and will retain wildlife values longer. From a waterbird standpoint and by definition, permanent, semipermanent, and seasonal wetlands have higher values followed by temporary, ephemeral, and stock tank wetlands. Closed basins function similarly to uplands in dry years and have some wetland values in wet years, though for a short period of time.

The main threat to the peregrine falcon is the continued contamination of its environment by synthetic chlorinated hydrocarbon pesticides, especially DDT. These contaminants result in eggshell thinning and direct mortality to this species. Other threats include disturbance from rock climbing near eyries and mortality from power lines.

Environmental Consequences

There are no impacts to eyries or disturbance to peregrine reproduction under any of the alternatives. Livestock grazing and related actions do not occur near eyries in Alternatives 1, 3 or 4. There are no impacts from grazing or related actions in Alternative 2.

Direct and Indirect Effects of Alternative 1

For Alternative 1 there would be a determination of *may impact individuals, but not likely to result in a trend toward Federal listing or loss of viability*, based on direct, indirect and cumulative effects to wetlands. The majority of wetlands lie within Ashurst, Breezy, Boot and Ducknest pastures (refer to Table 10, Chapter 3). Ashurst pasture is of particular interest because it contains the most semipermanent or seasonal wetlands. The value of wetlands to wetland wildlife species varies by species and wetland type. Semipermanent and seasonal wetlands tend to have higher values for wildlife in general due to habitat interspersion within the wetland, extended flooding regimes and higher species diversity within and adjacent to the basin.

The following effects are anticipated with the implementation of Alternative 1:

- Ashurst, Breezy, Boot and Ducknest pastures are rested 1 year in 4, benefiting the wetlands in these pastures;

- Livestock use occurs after spring migration for waterbirds so vegetation production during migration is primarily influenced by climate, recreation and wildlife factors.
- Livestock use overlaps the longest with fall bird migration in key pastures, which in good water years could reduce vegetation production in wetlands used by migratory waterbirds. Regrowth potential would be reduced between a late fall graze and spring use by waterbirds.
- The duration of grazing in key pastures is longer in some pastures in some years resulting in longer use on wetlands. This keeps vegetation structure short and reduces the accumulation of residual wetland vegetation for longer periods, having a greater magnitude of effect for nesting or fall migration when grazing occurs during these time periods.

Cumulative Effects of Alternative 1

Cumulative effects are the same as described under Alternative 3.

Direct, Indirect and Cumulative Effects of Alternative 2

No livestock grazing or other actions are proposed in the project area, so no direct, indirect, or cumulative effects would occur. A determination of *no impact* on peregrine falcons would be made if Alternative 2 was selected.

Direct and Indirect Effects of Alternatives 3 and 4

For Alternatives 3 and 4, there would be a determination of *may impact individuals, but not likely to result in a trend toward Federal listing or loss of viability*, based on direct, indirect and cumulative effects to wetlands. In many respects, the scope and magnitude of impacts are least with the implementation of Alternative 3 and 4 because:

- Post Lake, a peregrine foraging site, is fenced in the alternatives, which benefits habitat for peregrine prey;
- The development of a pipeline and drinker may slightly lessen any grazing impacts around existing waters that serve as foraging sites for peregrines in the Elliot Driveway pasture;
- Up to 20 percent seasonal utilization by cattle on emergent and woody vegetation at Boot and Billy Back Springs would be allowed benefiting potential prey species. If use by cattle exceeds this guideline, a fence would be constructed by the permittee to exclude cattle at these two springs.
- Ashurst, Breezy, Boot and Ducknest Pastures are rested 1 year in 4, benefiting the wetlands in these pastures;
- Livestock use comes after spring migration for waterfowl and overlaps in some years with about 2 weeks of fall migration (last 2 weeks of September);
- The duration of grazing in key pastures is less under the one herd schedules compared to the two herd option of Alternative 1;
- Use in uplands in Alternatives 3 and 4 is less than Alternative 1 and Alternative 4 is less than 3. This would be beneficial for other bird species, also prey for peregrine; and
- The 35 percent utilization guideline in Alternative 3 is considered adequate to maintain prey habitat in uplands because there should be adequate residual regrowth, structure, diversity and seed head production.

As shown in Table 20, Alternatives 1, 3, and 4 have varying cattle graze periods during the waterfowl nesting period of May 1 to July 15. The main difference from Alternative 1 is the reduction in graze periods and the one herd option. Cattle will not graze wetlands during the waterfowl nesting season through deferring pastures and constructing exclosures in Alternative 3 and 4.

Table 20. Summary of use in Ashurst, Boot, Breezy, and Ducknest pastures (key pastures) from May 1 to July 15

Alternative	Yearlong Rest	Late Use	Upland Use
1-Current Management	1-2 Yearly	3 Pastures Year A and C. 2 Pastures Year B and D.	Similar upland use to Alt. 4. Less upland use than Alt 3.
2-No Action	All	N/A	N/A
3-Proposed Action	2-3 Yearly	1 Pasture Year A,C,D. 2 Pastures Year B.	More upland grazing use than Alt. 1 and 4. Shorter graze periods and longer rest periods than Alt 1.
4-Reduction in Utilization	Same as Alt. 3	Same as Alt. 3.	Similar upland use to Alt. 1, less upland use to Alt. 3. Shorter graze periods and longer rest periods than Alt. 1.

* Key pastures are those which contain seasonal and semipermanent wetlands. Cattle exclosures will be built and rotation schedules will be adjusted to prevent cattle use in the semipermanent and seasonal wetlands during the waterfowl nesting season, May 1 to July 15.

Cumulative Effects of Alternatives 3 and 4

The effects of grazing in these alternatives are additive to livestock and wildlife grazing in the wetlands on adjacent allotments, but these effects are not enough to change the determination of effect. This is because wetland productivity as it relates to peregrine prey is so strongly influenced by precipitation. High waterbird numbers have been observed on the mesa historically, concurrent with wildlife and cattle grazing (Mormon Lake District wildlife records).

Over the years, a variety of closures on the forest have been implemented to improve habitat conditions for a variety of species, which results in a positive cumulative effect for peregrine falcon. Closures on the mesa include motorized vehicle closures at Pine Hill and seasonal recreation restrictions such as those at nearby Hay Lake (USDA 2002b). Habitat quality for peregrines forest wide has improved over time through improvements such as fencing and restrictions of grazing (e.g. Marshall Lake, Ashurst Spring, Vail Lake and Horse Lake) and restrictions in recreation use over time (USDA 2002c). Road and trail management in the vicinity of Walnut Canyon has reduced disturbance to peregrines. The recent expansion of Walnut Canyon National Monument, with the resulting reduced human access to the rim of the canyon, has also improved conditions for peregrines by reducing disturbance.

Northern Goshawk

The goshawk is a forest habitat generalist that uses a wide variety of forest stages in ponderosa pine and mixed conifer habitat. The goshawk preys on large to medium sized birds and mammals. It prefers stands of intermediate canopy cover for nesting and more open areas for foraging. All ponderosa pine and mixed conifer above the rim is considered goshawk habitat, including associated pine or mixed conifer stringers that may extend below the rim. Nest stands are typically in later successional stages, especially old growth. Post-fledging family areas (PFA)

have patches of dense trees, developed herbaceous or shrubby understories, snags, downed logs, and small openings, which provide cover and prey for fledglings to develop their hunting skills. Foraging areas are a mosaic of various successional stages and cover types.

Goshawk foraging use is normally associated with ponderosa pine vegetation. Although juniper or pinyon-juniper habitat types are not heavily used by northern goshawks, some foraging may occur there, especially in transition areas between ponderosa pine and pinyon-juniper habitats. There are no PFAs within the Pickett Lake and Padre Canyon Allotments although there is one adjacent to the Railroad pasture.

Threats to northern goshawks are generally related to timber management. However, fire suppression, catastrophic fire, livestock grazing, drought, and toxic chemicals may also pose a threat. Declines may be related to decreases in prey populations associated with changes in structure and composition of forests.

Environmental Consequences

Direct and Indirect Effects of Alternative 1

Pasture rest 1 year in 4 is beneficial for prey habitat because of the anticipated positive effect of increased growth, vigor and seed head production. The magnitude of effect of grazing in prey habitat is higher in this alternative than Alternatives 3 and 4. The relative impacts to uplands and meadows in the pine type are higher due to a longer season of graze and longer duration in pastures.

Cumulative Effects of Alternative 1

Cumulative effects are the same as described Alternative 3. Implementation of this alternative would also result in a determination of effect of *may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability* due to modification of prey habitat by grazing.

Direct, Indirect and Cumulative Effects of Alternative 2

No cattle would be present in the project area if this alternative was implemented, so no direct, indirect, or cumulative effects on northern goshawks would occur.

Direct and Indirect Effects of Alternatives 3 and 4

Cattle grazing has the potential to modify the understory through height reduction, selection of forage species thereby affecting seed head production, and encouraging regrowth in years with good precipitation. Cattle grazing modifies food and cover for some prey species that nest or feed in these areas. Habitat for deer mice may be improved while cover for voles or ground-nesting birds may be reduced. Other prey species, such as squirrels, may be less affected since their habitat requirements are more closely tied to the pine overstory, which would not be affected in any alternative.

Within the project area, goshawk habitat is associated with the pine type on the western and central portions of the Pickett Lake Allotment. Cattle grazing is expected to occur at levels that maintain prey species habitat (35 percent in Alternative 3, 20 percent in Alternative 4). In the pine type, range monitoring shows there is a static to upward trend and satisfactory rangeland condition [PRD 57]. Grazing at these levels would not significantly reduce herbaceous ground cover, thus providing for prey species. Additionally, pastures are rested 1 year in 4 which is beneficial for prey habitat.

In the Railroad pasture, there are about 120 acres of habitat within one-quarter mile of water. Grazing utilization by cattle and wildlife tends to be higher within this _-mile zone than outside, in areas where the canopy cover is less than 40 percent. This does not differ between Alternatives 3 or 4. The majority of pine habitat visited had a canopy cover greater than 40 percent, which in general limits understory production and vigor due to shading. Wildlife and livestock grazing in these higher canopy cover areas, as well as the adjacent small cinder hills tended to be light. The level of observed use in the higher canopy cover areas maintained a minimum 4-inch stubble height, as well as seed head production and a species composition commensurate with the area potential. Understory vigor and growth was clearly affected by the drought.

The pine type just west of Pine Grove Hill is flat, with medium to small sized oaks. In the small openings in the canopy, the understory is mainly blue grama. Although there was residual vegetation and seed heads from the 2001 growing season, there was little new growth. On the average, structure height was mostly 4 inches or less and most of the understory was very dry. The Railroad pasture was grazed during 2003 from June 7 to July 2 and in 2004 from August 2 to October 3. Despite the longer than normal use in 2004, monitoring determined that utilization for the pasture was 30 percent.

Along the road in map section 31 in the southwest portion of the Railroad pasture, about 108 acres of pine oak habitat occurs on flat ground, on either side of a main road and in places has breaks in the canopy less than 40 percent. These small canopy breaks have a lot of blue grama in the understory, and portions fall within the _-mile buffer around water described above. Low structure height within these canopy breaks was attributed to a combination of low plant vigor due to drought, proximity to road and water (which predispose these areas to higher grazer and human use), flatness of the area (accessible to people and grazers); and soil type and low moisture. Because of the combination of these factors, it is expected that the blue grama on these about 108 acres will not maintain a 4-inch height regardless of cattle presence in most years. Under these alternatives, this area would be grazed by cattle 3 years out of 4.

Human disturbance and livestock associated construction actions proposed will occur over 1 mile from the PFA and will not result in disturbance to nesting goshawks.

Cumulative Effects of Alternatives 3 and 4

Cumulative effects include livestock and wildlife grazing on the adjacent allotments, drought and insect mortality and the effects of the Pinegrove seasonal motorized vehicle closure. There is over 45,000 acres of pine type on the adjacent Anderson Springs and Bar T Bar grazing allotments. Grazing on these allotments is anticipated to result in a determination of *may impact individuals, but* is *not likely to result in a trend toward Federal listing or loss of viability* due to modification of prey habitat by grazing. Livestock and wildlife browsing and grazing through the allotments reduce seed heads and cover for prey species. Guidelines for utilization of forage by cattle and wildlife will maintain adequate food and cover for prey species.

Ponderosa pine mortality associated with drought and insects have occurred in goshawk habitat within and adjacent to the cumulative effects area, according to Forest Service aerial detection surveys conducted in August of 2002. This die off is expected to continue as long as host trees are present. The scope of mortality may increase if the drought continues. **This could negatively affect nest trees and foraging habitat and cumulatively effect northern goshawks.** Although the newly created snags are an important habitat features for many prey species. Currently the scope and magnitude of this effect is small.

The Pinegrove Quiet Area (about 12,000 acres) is located within the Railroad pasture and has a late fall motorized vehicle seasonal closure which provides an area of relatively low human disturbance of benefit to many forest dwelling species, including goshawks and their prey.

Northern Leopard Frog

The northern leopard frog occurs in the northeastern quarter of Arizona, usually in montane streams and wetlands that have aquatic vegetation but also in wet meadows at higher elevations. This leopard frog is generally restricted to permanent waters. There are no known existing locations of this species within the Pickett Lake and Padre Canyon Allotments (see Table 21). Historic locations include Ashurst Lake (largely excluded from grazing). Ashurst Lake has a sizeable crayfish population; has a campground on the west end and has a road nearly all the way around it. It is popular for fishing and boating and has little emergent vegetation. The best potential habitat is at the springs. Ashurst Spring is excluded from cattle and wildlife grazing. Elliot Spring is considered inaccessible to cattle due to topography. Currently, Boot Spring and Billy Back Spring are accessible to cattle. Up to 20 percent use by cattle on emergent and woody vegetation at Boot and Billy Back Springs would be allowed. If use by cattle exceeds this guideline, a fence would be constructed by the permittee to exclude cattle at these two springs.

Threats to local populations of northern leopard frogs include changes in wetlands, especially the alteration of marshy ponds to reservoirs and natural local extinctions as ponds dry up during years of low precipitation. Other threats include stocking of predatory fish, alteration of riparian vegetation by crayfish and livestock grazing, and predation and competition by introduced bullfrogs and crayfish.

Table 21. Results of leopard frog surveys* in the vicinity of the Pickett Lake and Padre Canyon grazing allotments

Survey Location	Years Surveyed	Results
Ashurst Lake	1973, 1976, 1989, 1990, 1991, 1993	Positive in 1973, 1976, 1989. Negative in subsequent years
Perry	1992	Negative
Al's Lake	1993	Negative
Ashurst Spring	1990	Negative
Deep Lake	1993	Negative
Mormon Canyon Tank	1993	Negative
Potato Lake/Tank	1993	Negative

*Survey records located at Mormon Lake Ranger District

Environmental Consequences

Direct and Indirect Effects of Alternative 1

Alternative 1 will result in similar effects as Alternatives 3 and 4 with the exception of impacts at Boot and Billy Back Springs. With the implementation of Alternative 1, these two springs will continue to be grazed by cattle resulting in impacts to potential frog habitat. However, this grazing impact will be low because the pasture with access to these springs is used as a driveway for less than 1 week.

Cumulative Effects of Alternative 1

Wildlife use is additive to that of livestock, these impacts include: reduced height of vegetation in wet meadow and spring vegetation, isolated soil compaction and possible shifts in understory species composition. These impacts to vegetation reduce habitat quality for frogs making them more susceptible to predation and by reducing habitat suitable for laying egg masses. The determination of effect is *may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability* due to continued grazing in the potential habitat at Boot Spring and Billy Back Spring.

Direct, Indirect, and Cumulative Effects of Alternative 2

No cattle would be present in the project area if this alternative was implemented, so no direct, indirect, or cumulative effects on northern leopard frogs would occur.

Direct and Indirect Effects of Alternatives 3 and 4

Implementation of these alternatives will not change frog habitat at Ashurst Lake, Ashurst Spring or Elliot Spring. Up to 20 percent utilization by cattle on emergent and woody vegetation at Boot and Billy Back Springs would be allowed. If use, by cattle, exceeds this guideline, a fence would be constructed by the permittee to exclude cattle at these two springs. Vegetative conditions for frogs at Boot Spring and Billy Back Spring would thus improve. Vegetative conditions at Post and Perry Lakes, and for Indian Tank and Ducknest Lakes in Alternative 3, would improve due to construction of cattle exclosures around these wetlands.

Cumulative Effects of Alternatives 3 and 4

Recreational use at Ashurst Lake is expected to increase over time, commensurate with the growth of the Flagstaff area, the increasing recreation use, and the recent establishment of the Arizona Trail about a mile or so west of the lake. Crayfish populations are high and not expected to change at the lake. Crayfish are frog predators and limit the vegetation growth that frogs use for breeding and cover. **Consequently, the effects are cumulative and frog habitat conditions are expected to remain poor.**

Recreation use is not expected to increase at Elliot, Boot or Billy Back Springs, and Ducknest Lake due to poor road access. Recreation use in the vicinity of Ashurst Spring may increase slightly; commensurate with overall recreation use in the area, however, the elk fence controls recreation use within the spring area, which has the best potential frog habitat on the Pickett Lake Allotment.

Considering direct, indirect and cumulative effects, the determination of effect for these alternatives is *may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability* due to improvement of potential habitat at Boot Spring and Billy Back Spring and Indian Tank, Perry, Ducknest and Post Lakes.

Mountain Silverspot Butterfly, Blue-black Silverspot Butterfly, and Spotted Skipperling

Scattered populations of these species occur throughout the Southwest in wet meadows, grassy springs in mountainous woody areas, seeps, or riparian canyons. Habitat is the upper Sonoran to Canadian zone (Scott 1986). Violets are larval host plants for the silverspot butterflies, however, the blue black silverspot is more associated with desert landscapes. The spotted skipperling, in southeast Arizona, has been known to take nectar avidly along cool, deep canyons and along forested road margins. *Dactylis glomerata* (Poaceae) is a strongly suspected food plant. There is a single rainy season brood. It is known to occur along the Mogollon Rim (Bailowitz and Brock

1991). These three species were added to the Regional Forester's sensitive species list in 1999. None have been documented on either allotment. Egg and larval timeframes for these species are not known.

The best potential habitat for the mountain silverspots and spotted skipperling are Billy Back Spring (accessible to cattle); Elliot Spring (considered inaccessible to cattle due to topography), Ashurst Spring (elk and cattle are excluded); and Boot Spring (accessible to cattle). The habitat of the spotted skipperling consists of moist meadows and streamsides in low to mid-elevation mountains (Opler and Wright 1999; Pyle 1981; Wallesz 1999). Although little information is available concerning the specific threats to these species, habitat alteration and loss of riparian habitat are the primary concerns.

Environmental Consequences

Direct and Indirect Effects of Alternatives 1, 3, and 4

Effects on these species resulting from cattle grazing include loss or reduction of larval host plants resulting from trampling and foraging. Butterfly eggs or larvae could be trampled or accidentally consumed. This would be a concern when cattle use overlaps with egg or larval timeframes in an accessible spring area.

Alternative 1 has similar effects as Alternatives 3 and 4 with the exception of more impacts at Boot Spring and Billy Back Spring. With implementation of Alternative 1, these two springs will continue to be grazed by cattle resulting in impacts to potential habitat, but utilization is expected to continue to be low. These impacts include: reduced height to vegetation in wet meadow and spring vegetation, soil compaction, and possible shifts in understory species composition. These impacts to vegetation may reduce habitat quality and may result in some loss of larvae or eggs as previously described.

Cumulative Effects of Alternatives 1, 3, and 4

Impacts from recreational uses could occur and could result in a cumulative effect from trampling of host plants, eggs or larvae, and compacting soils. Visitation to all of the spring sites by recreationists is low and is expected to remain low in the foreseeable future due to poor road conditions. **Wildlife use is additive to that of cattle.**

Due to the small amount of accessible potential habitat for these species and based on the possibility for direct and indirect effects, the determination of effect is *may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability*. The determination is based on continued grazing in the potential habitat at Boot Spring and Billy Back Spring under Alternative 1 and reduced access by cattle to these two springs with implementation of Alternatives 3 and 4.

The installation of pipelines and drinkers in Alternatives 3 and 4 may reduce cattle use at springs slightly and, thus, may be additive for these species compared to Alternative 1. Alternative 3 would reduce potential impacts from cattle further by fencing Indian Tank, Perry, Post and Ducknest lakes.

Direct, Indirect, and Cumulative Effects of Alternative 2

No cattle would be present in the project area if this alternative was implemented, so no direct, indirect, or cumulative effects would occur.

Freeman's Agave Borer, Aryxna Giant Skipper, and Neumogen's Giant Skipper

The Freeman's agave borer, Aryxna giant skipper, and Neumogen's giant skipper are all Forest Service sensitive species that were added to the Regional Forester's sensitive species list (USDA 1999). The Freeman's agave borer requires agaves, especially *Agave chrysantha*, as host plants. They are far ranging with wide habitat use. They generally inhabit canyons. Adults fly from September through November (Pyle 1981).

The Aryxna giant skipper is found within arid, but well-vegetated desert canyons (Pyle 1981) or in canyons with periodic water and open grassy woodlands; its host plant is agave.

The Neumogen's giant skipper occurs from the upper Sonoran or lower Transition Zone in open woodland or shrub-grassland (Wallesz 1999). They range from central Arizona to west-central New Mexico and from southern New Mexico to west Texas. Their host plant is agave (primarily *A. parryi*).

Based on TES units, the amount of agave on these allotments is small (USDA 1995).

Little information is known about threats to these three species, but effects to agaves are the main concern. Threats to agave plants include collection as ornamentals and livestock grazing where agaves are abundant.

Environmental Consequences

Direct, Indirect, and Cumulative Effects Common to All Alternatives

There would be no direct, indirect or cumulative effects for these species due to the minimal amount of habitat present. Hot, rocky slopes that could support agaves are unlikely to support sufficient vegetation to attract or concentrate ungulates. There are no new stock tanks proposed and the fence, pipeline and drinker installation in Alternatives 3 and 4 are expected to avoid agave patches. Poor access limits the collection of agave stalks for ornamentals compared to other areas on the forest.

Early Elfin

This invertebrate favors roadsides with flowers (Borror and White 1970) and dry areas in mountains. The larva feed on cliffrose (*Cowania [Purshia] mexicana* [*ssp stansburniana*]). It is locally uncommon among arid plateaus and desert mountains from 6,000 to 7,000 feet (Ferris and Brown 1981). They have a single brood with adults present from March through April (ibid.).

Threats to the early elfin are unknown, but impacts on their larval host plant, cliffrose, are the main concern.

Early elfins are not known to be found on these allotments. Cliffrose is located on these allotments along and below the Anderson Mesa rim. Browse conditions vary but utilization is generally moderate to high by both cattle and wildlife. Cliffrose is an important food item for big game winter range. The most potential habitat is in the Woodland, Morgan, Elliot Springs, and Padre Canyon pastures.

Environmental Consequences

Direct and Indirect Effects of Alternatives 1, 3, and 4

The scope and magnitude of the effect to early elfin is difficult to describe because of the lack of information regarding early elfin larvae and the different age classes and plant parts of cliffrose

they prefer. However, grazing use of cliffrose would be higher within one-quarter mile of water and in flatter topography in all action alternatives. Cattle access to cliffrose below the rim in the Padre Canyon pasture will be reduced when the fence improvements in the Elliot Driveway proposed in Alternatives 3 and 4 are implemented. Cliffrose even though browsed, are likely to persist sufficiently to permit reproduction of early elfin.

Positive effects can occur as a result of low intensity fires "releasing" cliffrose in some areas. Negative effects can occur when high intensity fires kill individual plants or damage them, allowing insect outbreaks and increasing susceptibility to poor weather conditions. Direct effects to eggs could also occur as a result of fire. If eggs are present during a fire, it is likely that they will be lost if the fire gets into the branches and leaves where the eggs are laid.

Cumulative Effects of Alternatives 1, 3, and 4

Cumulative effects on early elfin include livestock grazing on adjacent allotments; grazing by wildlife; vegetation treatments on adjacent allotments, state, and private lands; prescribed and natural fires. **Cumulative effects are additive for livestock grazing on adjacent allotments, and grazing by wildlife include some localized trampling and consumption of host plants, varying by topography and distance to water.** Depending on the location of plants, time of year and type of grazer present, utilization of browse species including cliffrose can be light or heavy. This could range from little impact to cliffrose to stunted plants with reduced vigor and size and have either little impact to host plants or reduced availability for early elfin.

Vegetation treatments on adjacent allotments, as well as on state and private lands may have a positive cumulative impact on early elfin by increasing production of cliffrose in some areas. This could occur by opening up tree canopies which give existing cliffrose plants and seeds a chance to grow, or by increasing production of other sources of forage and reducing competition for forage by wildlife and livestock.

Prescribed and natural fires may cumulatively affect this species in both positive and negative ways. As a result of the fires on the Padre Canyon Allotment which were about 20,000 acres, cliffrose germination is expected to increase, in the long term benefiting larva. In the short term much of the pre-existing cliffrose was likely destroyed.

A determination of *may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability* would be made if any action alternatives were implemented. Because cattle grazing will occur within potential habitat and cattle will graze on cliffrose. This is in addition to the cumulative effects of cattle grazing on cliffrose on adjacent state and private lands and wildlife grazing throughout.

Effects of Alternative 2

No cattle would be present in the project area if this alternative was implemented, so no direct, indirect, or cumulative effects would occur.

Navajo Mountain Mexican Vole

Navajo Mountain Mexican vole distribution is only found at Navajo Mountain (on the Arizona-Utah border), the south rim of the Grand Canyon, and the Flagstaff and Williams areas (Hoffmeister 1986; Mormon Lake District wildlife records). Locations have also been reported from 3,800 to 9,700 feet in elevation with a number of locations around the San Francisco Peaks area. Navajo Mountain Mexican voles typically occupy dry grassy or dry grass-forb vegetation in association with ponderosa pine or other coniferous forests. In many localities in the northern parts of their range, they are found in low, dense, shrubby thickets.

There are no known populations of Navajo Mountain Mexican voles on these allotments. There are known locations from about 5 miles southeast of the Pickett Lake Allotment boundary and at Mormon Lake (Hoffmeister 1986). Potential habitat is in the pine and pine transition areas on the Pickett Lake Allotment.

The main threat to the Navajo Mountain Mexican vole is reduced ground cover resulting from increased tree density, grazing or periodic droughts. Recreation use has the potential to reduce habitat for this species. Chambers and Lesh (2002) reported that grazing affects habitat and abundance of some small mammals. She found that vole captures were higher where grass biomass was higher and in areas further from the forest edge (average 18.6 meters from edge). In her study, no voles were captured where average grass biomass was less than 1,500 pounds per acre (1700 kg/ha). Most captures were in elk exclosures, ungrazed, or lightly grazed areas.

Environmental Consequences

Direct and Indirect Effects of Alternatives 1, 3, and 4

Grazing by both cattle and wildlife would directly result in loss of cover and some food for voles and may make them more susceptible to predation. The duration and subsequent impacts on voles will vary depending on vole distribution and timing relative to the reproductive cycle. Regrowth may mitigate these impacts somewhat by providing succulent vegetation. Fencing is not expected to have a direct impact to voles or their habitat due to short duration of activity, minimal habitat modification, lack of habitat in the area and disturbance. The duration and subsequent impacts on voles may vary depending on vole distribution in the area, which is unknown. This may impact survivability of young depending on where and when this occurs relative to the reproductive cycle. Vegetation regrowth may mitigate these impacts somewhat by providing succulent vegetation.

Small mammal habitat is expected to improve in Boot Spring and Billy Back Spring in Alternatives 3 and 4 due to the exclusion of cattle resulting from fence improvements. Alternatives 3 and 4 propose cattle exclosures around Indian Tank, Ducknest, Post and Perry Lakes would provide additional habitat improvements. Reduced cattle access is expected to result in some increase in vegetation height, however, wildlife use is not expected to change. Human use is potential vole habitat can also result in reduced habitat quality due to vegetation trampling and soil compaction.

Cumulative Effects of Alternatives 1, 3, and 4

Recreation use of meadows also results in compaction and reduction in grasses and forbs. Meadows attract recreationists due to their open condition and favorable microclimate. Such impacts have not been quantified, but add to grazing effects. The 12,000-acre Pine Grove Quiet Area provides reduces motorized vehicle use seasonally. This reduction in vehicle use reduces soil compaction and disturbance in some vole habitat.

A determination of *may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability* would be made with implementation of any of these alternatives. Cattle grazing can result in loss of cover and some food for voles and may make them more susceptible to predation. **This is additive to wildlife grazing and the loss of cover due to increased tree densities.**

Direct, Indirect, and Cumulative Effects of Alternative 2

No livestock would be present in the project area if this alternative was implemented, so no direct, indirect, or cumulative effects would occur.

Management Indicator Species

Management guidance for management indicator species (MIS), other wildlife and fish resources, and diversity of plant and animal populations, is found in several key documents. The 1982 National Forest Management Act Regulations (planning regulations) at 36 CFR 219 set forth a process for developing, adopting, and revising land and resource management plans for the National Forest System (CFR 219.1) and identify requirements for integrating fish and wildlife resources in forest land management plans (CFR 219.13 and CFR 219.19).

Key provisions for fish and wildlife resources require that fish and wildlife habitat be managed to maintain viable populations of existing native and desired nonnative vertebrate species in the planning area, where a viable population is considered to be one that has the estimated numbers and distribution of individuals to ensure its continued existence is well distributed through the planning area (CFR 219.19). By definition, the planning area is the area covered by a regional guide or forest plan (CFR 219.3). The forest planning regulations require that certain species, whose population changes are believed to indicate the effects of management activities, be selected and evaluated in forest planning alternatives (CFR 219.19). Additionally, the planning regulations require that population trends of management indicator species be monitored and relationships to habitat changes determined (ibid).

Specific management direction for MIS is also found in Forest Service Manual (FSM) 2600. Policy and direction that tiers to CFR 219.19 is provided for MIS for application at the Forest Plan and project levels relative to species selection, habitat analysis, monitoring and evaluation, and other habitat and planning evaluation considerations, in FSM 2620. FSM 2630 provides guidance on improving MIS habitat, and conducting habitat examinations, and project level evaluations for MIS within the project area.

A working draft forest-wide assessment entitled “Management Indicator Species Status Report for the Coconino National Forest” (USDA 2002a) summarizes current knowledge of population and habitat trends for management indicator species on the Coconino National Forest. Population trends need to be monitored as the Forest Plan is implemented, and relationships to habitat changes over time determined (CFR 219.19).

Table 22 displays MIS by management area and Table 23 lists the habitat feature the MIS were chosen to represent on the Coconino National Forest (USDA 2002a).

Table 22. Management indicator species by management area

Management Area (MA)	Management Indicator Species
MA-3: Ponderosa pine and mixed conifer, less than 40 percent slopes	Abert squirrel, red squirrel, Mexican spotted owl, elk, northern goshawk, pygmy nuthatch, turkey, and hairy woodpecker
MA-4: Ponderosa pine and mixed conifer, greater than 40 percent slopes	Abert squirrel, red squirrel, Mexican spotted owl, elk, northern goshawk, pygmy nuthatch, turkey, and hairy woodpecker
MA-6: Unproductive timber lands	elk, mule deer, Abert squirrel, and hairy woodpecker
MA-7: Pinyon-juniper woodland, less than 40 percent slopes	plain (juniper) titmouse, mule deer, and elk
MA-8: Pinyon-juniper woodland, greater than 40 percent slopes	plain (juniper) titmouse, mule deer, and elk
MA-9: Mountain grassland	pronghorn antelope

Management Area (MA)	Management Indicator Species
MA-10: Grassland and sparse pinyon-juniper above the rim	pronghorn antelope
MA-12: Riparian and open water	cinnamon teal, Lincoln's sparrow, yellow-breasted chat, Lucy's warbler, and macroinvertebrates

Table 23. Coconino National Forest MIS and the habitat they were chosen to represent

Species	Habitat
Abert Squirrel	Early seral ponderosa pine
Northern Goshawk	Late seral ponderosa pine
Pygmy Nuthatch	Late seral ponderosa pine
Turkey	Late seral ponderosa pine
Elk	Early seral ponderosa pine, mixed conifer, and spruce-fir
Hairy Woodpecker	Snag component of ponderosa pine, mixed conifer, and spruce-fir
Mexican Spotted Owl	Late seral mixed conifer and spruce-fir
Red Squirrel	Late seral mixed conifer and spruce-fir
Red-naped (Yellow-bellied) Sapsucker	Late seral and snag component of aspen
Mule Deer	Early seral aspen and pinyon-juniper
Juniper (Plain) Titmouse	Late seral and snag component of pinyon-juniper
Pronghorn Antelope	Early and late seral grasslands
Lincoln’s Sparrow	Late seral, high elevation riparian (>7000’)
Lucy’s Warbler	Late seral, low elevation riparian (<7000’)
Yellow-breasted Chat	Late seral, low elevation riparian (<7000’)
Macroinvertebrates	Late seral, high and low elevation riparian
Cinnamon Teal	Wetlands/aquatic

Red squirrels, red-naped (yellow-bellied) sapsuckers, Lucy’s warblers, and yellow-breasted chats are excluded from this analysis. Red squirrels are associated with late-seral mixed conifer and spruce-fir, which does not occur on these allotments. Red-naped (yellow-bellied) sapsuckers are associated with the late-seral stage and snag component of aspen, which also does not occur on these allotments. There is no low elevation late-seral riparian habitat (less than 7,000 feet) within the project area for which Lucy’s warblers and yellow-breasted chats are management indicator species.

Macroinvertebrates are considered indicators of high and low elevation riparian areas. The riparian areas targeted for monitoring in the Forest Plan are perennial streams. There are no perennial streams within or adjacent to the project area and, therefore, macroinvertebrates are also excluded from this analysis.

The MIS status of northern goshawks and Mexican spotted owls is independent of their threatened or sensitive status. Therefore, potential impacts to habitat and population trends for these two species are included in this section.

Turkey

Turkey is an indicator of late-seral stage ponderosa pine forests, based on roost habitat requirements. Turkey populations on the Coconino National Forest declined in the early 1990s and have increased since the mid-1990s in probable response to favorable over wintering conditions, changes in hunt design in Game Management Unit (GMU) 7 and contributions to overall mast production from trees from the 1919 seed year. The age class distribution of ponderosa pine has remained the same during Forest Plan implementation. Late seral stage trees have remained largely unchanged on slopes greater than 40 percent. The loss of large old trees occurred on slopes less than 40 percent during the early stages of Forest Plan implementation. The rate of loss is now much reduced (USDA 2002a).

The Pickett Lake and Padre Canyon Allotments contain summer and winter range in woodland and ponderosa pine. Roosts are generally clumps of large ponderosa pine. These are located in the pine type on the west end of the project area, in pine stringers, and in transition areas between ponderosa pine and other vegetation types. Other key habitat attributes include: mast from ponderosa pine, pinyon pine, juniper and oak; riparian areas around springs and seeps, and small openings for seed head and invertebrate production; cover and water and forage availability. The 12,000-acre Pinegrove motorized vehicle closure within the project area provides a seasonal low disturbance area for turkeys.

Water sources in the analysis vary in reliability depending on precipitation and are fairly well distributed. Ungulate grazing can decrease seed and forage availability for turkeys in small meadows and remove hiding cover for nests and poults (young turkeys) but does not affect roost trees, roost tree recruitment or mast production. Ashurst Spring is fenced from cattle and elk. Yellow Jacket Spring and Mormon Canyon Spring are dry and do not have any riparian vegetation. Boot Spring, Billy Back and Elliot Spring have sedges, rushes and other riparian vegetation. Steep and rocky terrain excludes cattle grazing from Elliot Spring; however, cattle can access Boot Spring and Billy Back Spring.

Environmental Consequences

Implementation of any of these alternatives will not result in reduction of roost trees, recruitment roost trees or mast producing trees for turkeys. The implementation of any of the alternatives will not result in effects that change the population trend on the forest or seral stage that turkeys were chosen to represent.

Areas within one-quarter mile of water within habitat for this species will receive higher use by both cattle and wildlife in all action alternatives. Higher use means lower structure height and reduced availability of seed heads of forage species when cattle or wildlife are in the area. Overall, seed head production and vegetation height will vary with grazing schedules and precipitation.

Direct, Indirect, and Cumulative Effects of Alternative 1

Implementation of this alternative will have similar direct, indirect, and cumulative effects as Alternative 3, although of higher magnitude. Use in turkey habitat (both within one-quarter mile of water and in uplands) will be of longer duration [PRD 57] prolonging recovery of vegetative structure and seed head production following grazing.

The two springs will continue to be accessible to cattle. Grazing in these areas by both cattle and wildlife reduces structure height (cover) and seed head production for turkeys. Up to 20 percent seasonal utilization by cattle on emergent and woody vegetation at Boot and Billy Back Springs

would be allowed. If utilization by cattle exceeds this guideline, a fence would be constructed by the permittee to exclude cattle at these two springs.

Direct, Indirect, and Cumulative Effects of Alternative 2

Implementation of this alternative would result in no direct, indirect or cumulative effect to turkeys or their habitat due to lack of grazing by cattle.

Direct and Indirect Effects of Alternative 3

Roost tree maintenance, recruitment and mast producing trees are not affected by grazing or related activities because cattle do not graze the overstory and improvements will not modify roost, or recruitment of yellow pines and snags.

Water distribution is not affected by this alternative because no new waters are proposed in turkey habitat. The fencing of Post Lake and Ducknest Lakes will not impact turkeys because wetlands are generally not considered turkey habitat. The fencing of Perry Lake and Indian Tank Lake will improve riparian habitats within turkey habitat. The fence improvements or light use only along the Anderson Mesa rim will reduce cattle use in Boot Spring and Billy Back Spring, improving turkey habitat. Springs can be particularly important for turkeys due to the presence of water and diverse forage species. Riparian areas can offer important cover features for both young and adult turkeys so less cattle use can potentially result in more cover availability. Riparian areas are valuable for other wildlife as well, so increased structure height from reduced cattle access at the springs will likely be offset to some extent by grazing by wildlife.

Grazing during the turkey nesting season (April 15 through June 30) will remove hiding cover for poults and facilitate predation on nests where understory vegetation is providing concealing cover. This would be less pronounced on steep slopes that receive little cattle use. This will vary within the project area and by year because grazing schedules vary and not all habitats in all pastures are grazed during the nesting season every year.

The resting and deferral of Boot and Ducknest pastures described in the section on annual operating instructions will improve the forage availability for turkey habitat within these pastures. The 35 percent utilization guideline should allow for adequate seed head and mast production. The fence work should also allow reduced cattle use on the nearby slopes of Anderson Mesa rim, reducing the amount of grazing use on mast producing shrubs.

The level of use in higher canopy cover areas maintains seed head production and a species composition commensurate with the area potential yet can be considerably impacted by drought (USDA 2002c).

The high quality turkey habitat in Ashurst pasture on the pine covered slopes near the north end of Mormon Canyon is affected little by grazing because cattle concentrate more in the juniper lined openings, meadows, and wetland basins that are nearby. Cattle grazing has little discernable effect in this area on residual biomass, seed production, species composition, tree regeneration, structure height, or any other factor that might influence turkeys (USDA 2002e).

Cumulative Effects of Alternative 3

Over the years, a variety of closures on the forest have been implemented that improve habitat conditions for species like turkey, including motorized vehicle closures at Pine Hill on Anderson Mesa (includes turkey habitat) and seasonal recreation restrictions such as at nearby Hay Lake (USDA 2002e). **Habitat for turkeys forest wide has also been improved through other projects (such as fencing) and restriction of grazing and recreation use over time (USDA 2002b).**

On the nearby Anderson Springs and Bar T Bar Allotments, some proposed vegetation treatments in the pinyon-juniper will be beneficial, if implemented, because forage and seed production is expected to increase in treated stands. Creation of large openings will not be beneficial due to lack of interspersion of cover with openings. This will be mitigated somewhat because pine stringers will not be treated. Also, some cover will be left to provide movement corridors between summer and winter range and to provide shelter in more open areas created by the vegetation treatments.

Prescribed burning will have a 2 to 3 year benefit to turkeys by improving the nutritional value of herbaceous species and increasing vigor on plants and forbs that produce forage and seeds used by turkeys. Oaks and alligator juniper and large pine will not be cut, maintaining the mast producing size classes and species.

Drought and insect mortality within and outside the project area constitutes the biggest concern for turkey habitat. **Pinyon and ponderosa pine trees have been affected the most, resulting in loss of mast producing species in turkey summer and winter range and a potential loss of roost trees, which can cumulatively affect turkey.** The rate and extent of tree mortality in the future is not known. Tree mortality is expected to continue at a smaller scale if wet years are in the forecast because insect infestation will continue if host trees are present but adequate moisture will assist with tree resistance to attack by insects. The extent of mortality may increase if dry years are in the forecast because drought mortality will continue and drought will facilitate insect infestation and die off.

The two recent fires on the Padre Canyon Allotment created about 20,000 acres of openings in the pinyon/juniper woodland and, to a lesser extent, in the ponderosa pine stringers found in Padre, Mormon, Yellow Jacket and Elliott Canyons. Drought and the associated pinyon mortality have contributed to the intensity and severity of these fires. **Turkey occasionally use the Padre Canyon Allotment and these fires will have a long lasting cumulative effect on the habitats used by turkey for foraging, roosting and wintering, particularly the pine stringers.**

Direct, Indirect, and Cumulative Effects of Alternative 4

The direct, indirect, and cumulative effects are similar to what is described for Alternative 3. The duration of grazing will remain similar between the alternatives and the grazing impacts outside of the wetland exclosures, but within one-quarter mile of water are not expected to change. The magnitude of effect (primarily structure height and seedhead production) will be less in this alternative due to the lower utilization and reduced number of cattle.

Northern Goshawk

This species is an indicator of late seral stages of ponderosa pine forests (MA 3 and 4). An analysis of effects to this species was described earlier under the Sensitive Wildlife Species section of this chapter. However, the MIS status of northern goshawks is independent of its sensitive status. Therefore, impacts to potential habitat and population trends for northern goshawk are described here.

Although the forest has some information on territory occupancy and reproduction, the collection of this information was not designed to detect changes in population trend. The total number of territories has increased and the statewide breeding bird survey data indicates a significant increase, but some indicators of occupancy and productivity appear to be declining on the forest. Year-to-year variability is high. At this time, the population status is considered to be inconclusive on the forest. Monitoring and surveys are ongoing and implementation of the Forest Plan standards and guidelines should contribute to improving trends in habitat (USDA 2002a).

The age class distribution of ponderosa pine has remained the same during Forest Plan implementation. Late seral stage trees have remained largely unchanged on slopes greater than 40 percent. The loss of large old trees occurred on slopes less than 40 percent during the early stages of Forest Plan implementation. The rate of loss is now reduced (USDA 2002a).

Environmental Consequences

Direct, Indirect, and Cumulative Effects of All Alternatives

Late seral ponderosa pine and mixed conifer habitat will not be modified by implementation of any of the alternatives. Mature stands of ponderosa pine are not usually impacted by cattle grazing. Cattle management in the project area is not expected to impact habitat or population trends for northern goshawks during the Forest Plan period.

Elk

Elk are indicators of early seral ponderosa pine, mixed conifer and spruce fir. The elk of today are descendents of Rocky Mountain elk transplanted in 1913. By 1928, 217 head had been released into several remote woodland areas of Arizona. These elk rapidly expanded their numbers and their range, and in 1935 the first hunting season was instituted. The hunting that had extirpated the Merriam's elk also took a toll on predators of Rocky Mountain elk including mountain lion, wolves, and bear. The main factors controlling Rocky Mountain elk populations became hunting and starvation.

Elk populations have been the most closely monitored of all the game species. Analysis of population trend shows an increase in elk numbers in the early to mid-1990s, with a gradual decline to roughly the late 1980s level. Habitat conditions were favorable for elk in the late 1980s and early 1990s. As populations increased, concern about habitat impacts resulted in cooperation between the Arizona Game and Fish Department and Forest Service to decrease elk numbers. The observed decline in the latter half of the period resulted (see Figure 6). The lower calf crops may indicate that habitats are not providing adequate nutrition (USDA 2002a) possibly due to drought conditions.

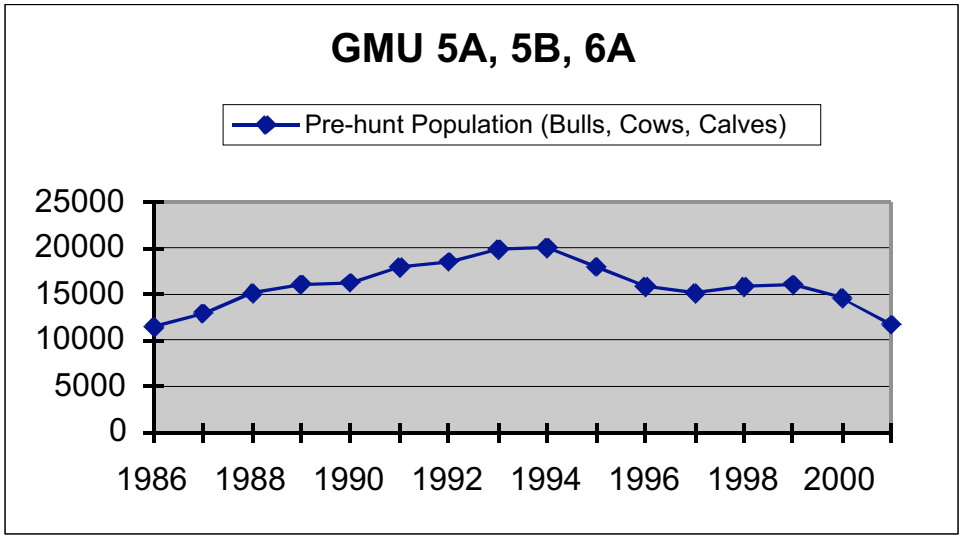


Figure 6. Approximate number of elk by year for Game Management Units 5A, 5B, 6A (USDA 2002a)

By 1981, elk populations in Arizona had reached more than 10,000 animals despite a yearly harvest of about 1,500. By 1989, the elk population had increased to 30,000. Evidence of elk impacts on vegetation was first noticed during this time in the riparian meadows and areas seeded following timber harvest, particularly those seeded with orchard grass.

By 1992, harvest practices were initiated to reduce the elk population due to concerns over damage to vegetation. The harvest more than doubled from 3,415 in 1985 to 7,881 in 1995 statewide. Harvest management focused on reducing population numbers in certain game management units.

The project area provides both summer and winter range for elk. In 2000, the estimated number of elk on Padre Canyon Allotment during the summer was 100-160 elk and 350-450 elk in the winter. The estimated number on the Pickett Lake Allotment was 400-650 during the summer and 100-400 during the winter [PRD 2]. During the summer, elk tend to stay in the higher elevations in the ponderosa pine habitat types. They move into the pinyon-juniper woodlands during the cold winter months. In years when winters are mild, elk remain in the higher elevations and never move to their winter range. This results in yearlong grazing throughout much of the area. Pinyon and juniper woodlands can be used year round.

Other impacts on elk include the lack of reliable water and overstory encroachment into meadows and openings. Most of the stock tanks and natural lakes only provide an intermittent water source. Tree and shrub encroachment has reduced the availability of forage over large areas. This may funnel elk into sensitive areas such as wetlands, meadows, or other grasslands resulting in heavy use on forage in these areas.

Early-seral stages of ponderosa pine have not increased to any large degree since implementation of the Forest Plan, while some early-seral stage mixed conifer habitat has been created. Population levels do not appear to be closely tied to these specific indicator habitats. While early-seral stages of ponderosa pine and mixed conifer are important, elk are generalists and use a wide variety of seral stages and habitats (USDA 2002a).

Environmental Consequences

Direct and Indirect Effects of Alternatives 1, 3, and 4

Implementation of the action alternatives will not impact early-seral stage ponderosa pine, mixed conifer, or spruce-fir habitat because there are no vegetation treatments. The fencing of Post and Perry Lakes in Alternatives 3 and 4 will be beneficial for elk because competition for forage with cattle will be reduced. The fence work along the Anderson Mesa rim in Alternatives 3 and 4 will also be beneficial for elk because cattle will not be able to access the springs, along the Anderson Mesa rim, again reducing forage competition in these small areas. Installation of pipelines and drinkers in these alternatives will improve water distribution for elk in two pastures below the Anderson Mesa rim.

Elk diets overlap with those of cattle to some extent. Forage competition will be similar in all three alternatives one-quarter mile from water because both cattle and wildlife tend to concentrate around water. Alternative 1 will have the most effect on elk forage because it permits the longest duration of cattle within pastures and consequently there will be higher impacts to the uplands and browse areas. Alternative 4 will have the least effect on elk forage because upland grazing and grazing on cliffrose will be less due to 20 percent use and lower cattle numbers. Alternative 3 will result in more impact to uplands than Alternative 4 due to a higher utilization level. The potential effects of cattle exclosures in Alternatives 3 and 4 around the wetlands at Indian Tank,

Ducknest, Post and Perry Lakes will provide additional forage for elk. High use on browse species would continue to occur during the winter months.

Cumulative Effects of Alternatives 1, 3, and 4

Elk reduce the cover and vigor of highly palatable plants and contribute to trampling and soil compaction. Despite reductions in the elk population since 1993, impacts to meadows and riparian areas from elk can be substantial and additive to that of livestock use.

Grazing in adjacent areas would have similar effects as described above. **Recreational use, such as off-road vehicle use, camping and hunting cumulatively affect this species.** Off-road vehicle use occurs year round in dry years, with heavy periods of use during the spring, summer, and fall except where prohibited by forest closures (USDA 2002b). During the spring, antler hunters drive off-road throughout much of the pinyon-juniper and ponderosa pine country. This can influence wildlife movement patterns between winter and summer range. Heavy off-road vehicle use during summer has the potential to interrupt the rut, disturb cows while giving birth, and can frighten newborn calves. Hunter use during the fall can have similar impacts.

In general, vegetation treatments can cumulatively affect elk by opening up dense canopies and providing improved growing conditions for understory plants. This benefits elk by improving forage availability and nutritional value. Depending on the treatment type and goals for treatment, elk may benefit or be negatively affected by impacts on cover conditions. Approximately 50,600 acres are proposed for vegetation treatments in summer and winter ranges on the adjacent Anderson Springs and Bar T Bar Grazing Allotments. These treatments are expected to improve forage production, plant vigor, species composition, and nutritional value; open up large areas that were barriers to movements by elk and other species; create movement corridors between summer and winter ranges; and decrease competition for forage between livestock and wild ungulates.

Wildfires can negatively or positively effect elk. Large stand replacing fires may negatively impact elk by reducing cover and forage values for a number of years after the fire is out where soils were sterilized from the heat. Fires can also benefit elk by stimulating understory plant growth and increasing nutritional values of plants for several years after a fire has gone through. Elk use is usually heavy in burned areas due to the flush of new, highly nutritious plants that sprout once a burn area receives rain. This heavy use can continue for several years.

As a result of the recent fires on the Padre Canyon Allotment, about 20,000 acres of opening in the pinyon/juniper woodland and, to a lesser extent, in the ponderosa pine stringers found in Padre, Mormon, Yellow Jacket and Elliott Canyons have been created. Due to these fires, cover attributes for elk have decreased and are not expected to recover for decades. **Though recovery will be slower in the high severity areas of the pinyon/juniper woodlands, highly nutritious plants are expected to germinate in the fire areas, benefiting elk.**

Direct, Indirect, and Cumulative Effects of Alternative 2

Implementation of Alternative 2 would not have any direct, indirect or cumulative effects on elk due to lack of cattle grazing. There are no impacts to early-seral stage conifers for which elk are management indicators due to lack of cattle grazing on the understory and the lack of vegetative treatments.

Pygmy Nuthatches

The pygmy nuthatch is a management indicator species for late-seral ponderosa pine habitat on the Coconino National Forest (USDA 1987a). Pygmy nuthatches are tree trunk foragers that

occur in ponderosa pine and pinyon-juniper up to elevations of 10,000 feet. The pygmy nuthatch is tied to old ponderosa pine within younger stands, stands of old growth ponderosa, old large oak trees, and cavities. They feed on a variety of insects and seeds, and are more abundant in areas with a high, homogeneous canopy. They may also be more abundant in unburned areas. They are usually secondary cavity nesters, selecting larger trees for nesting and roosting.

The age class distribution of ponderosa pine has remained the same during Forest Plan implementation. Late-seral stage trees have remained largely unchanged on slopes greater than 40 percent. The loss of large old trees occurred on slopes less than 40 percent during the early stages of Forest Plan implementation due to natural loss and management activities (primarily timber sales planned before the Forest Plan). The rate of loss is now much reduced in part due to Forest Plan standards and guidelines for old growth (USDA 2002a). Stands of old growth ponderosa pine within the project area occur in small patches, on steep slopes, or in pine stringers in small drainages.

Snags on the forest have in general been lost faster than they are being replaced and large snags are lost at a disproportionate rate to small snags, resulting in a downward trend for snag recruitment (USDA 2002a). However, drought and insect mortality have converted live to dead trees in habitat within and outside the project area within a fairly rapid timeframe and result in an increase in snag recruitment in localized areas. The rate and extent of tree mortality in the future is not known. Mortality is expected to continue at a smaller scale if wet years are in the forecast because insect infestation will continue if host trees are present but adequate moisture will assist with tree resistance to attack by insects. The extent of mortality may increase if dry years are in the forecast because drought mortality will continue and drought will facilitate insect infestation and die off.

Despite concerns about habitat trends for pygmy nuthatches, especially future trends for snag recruitment, data from the Coconino National Forest, as well as statewide data, indicate that pygmy nuthatch populations are stable on a gross, long-range scale. Dramatic population fluctuations occur on a short-term scale (1 to 3 years). Small local populations, such as those in snowmelt drainages on the Mogollon Rim, may be temporarily extirpated indicating a need for a change in management in those areas (USDA 2002a).

Environmental Consequences

Direct and Indirect Effects of Alternatives 1, 3, and 4

Implementation of these alternatives would result in no change in habitat capability for this species within the project area because late-seral ponderosa pine is not impacted by livestock grazing. No other actions are proposed that would affect habitat for this species.

Cumulative Effects of Alternatives 1, 3, and 4

There are no timber sales or other activities that might affect pygmy nuthatches and late seral ponderosa pine within the Pickett Lake or Padre Canyon Allotments. The Lake Mary and Mormon Lake Basin thinning projects may affect late-seral ponderosa pine or pygmy nuthatches, **but are not cumulative to this project since late-seral ponderosa pine is not impacted by livestock grazing**.

The vast majority of the recent fires that burned on the Padre Canyon Allotment burned in pinyon-juniper habitats, which the pygmy nuthatch does not represent. The pine stringers burned in these fires may have provided habitat for the pygmy nuthatch, but were likely not large enough

to sustain a viable population of pygmy nuthatch given their small size, less than 5 acres each, and isolation.

Direct, Indirect, and Cumulative Effects of Alternative 2

Implementation of Alternative 2 would result in no change in habitat capability for this species because no grazing or grazing related activities are proposed. Cumulative effects are similar to Alternatives 1, 3, and 4.

Abert Squirrels

The Forest Plan designates Abert squirrel as a management indicator species for early-seral stage ponderosa pine forests although this species uses intermediate to older aged forest (trees 9-22 inches diameter breast height), where groups of trees have crowns that are interlocking or in close proximity (USDA 2002a).

The age class distribution of ponderosa pine has remained the same during Forest Plan implementation. Late-seral stage trees have remained largely unchanged on slopes greater than 40 percent. The loss of large old trees occurred on slopes less than 40 percent during the early stages of Forest Plan implementation due to natural loss and management activities (primarily timber sales planned before the Forest Plan). The rate of loss is now much reduced in part due to Forest Plan standards and guidelines for old growth (USDA 2002a).

Population trend for Abert squirrels on the Coconino National Forest was thought to be stable in the early 1980s and various research studies on the forest have likewise suggested a stable trend. Statewide information compiled by the Arizona Game and Fish Department also indicates a stable trend for hunter harvest of squirrels (USDA 2002a).

Ponderosa pine habitat on the forest remains predominately mid-aged, with some declines in the older age classes and old trees (see discussion on Turkeys). The recent emphasis on uneven-aged forest management should benefit Abert squirrels, except where treatments result in low tree densities and lack of interlocking crowns.

On the forest, past fire suppression combined with climate has resulted in dense stands of trees, many unhealthy, but with interlocking crowns that favor this species. Recent prescribed burning has removed some pole-sized trees, but in general has been beneficial from the standpoint of decreasing risk from catastrophic fire, nutrient cycling, and facilitating vigor of remaining trees. Abert squirrel populations fluctuate with ponderosa pine cone crops (BISON-M 2000). This is related to weather patterns and can be highly variable over time.

Drought and insect mortality have converted live to dead trees in habitat within and outside the project area and probably constitutes the biggest concern for the overstory. The rate and extent of tree mortality in the future is not known. Mortality is expected to continue at a smaller scale if wet years are in the forecast because insect infestation will continue if host trees are present but adequate moisture will assist with tree resistance to attack by insects. The extent of mortality may increase if dry years are in the forecast because drought mortality will continue and drought will facilitate insect infestation and die off.

Abert squirrel habitat within the project area occurs on the west and west-central portion of the allotments, on steep slopes, and in pine habitat in small drainages.

Within the cumulative effects area, the Pinegrove Quiet Area (about 12,000 acres) has a late fall motorized vehicle seasonal closure which provides an area of relatively low human disturbance for part of the year, of benefit to many forest dwelling species including squirrels. Other forest closures also reduce disturbance for squirrels (USDA 2002b).

Environmental Consequences

Direct, Indirect, and Cumulative Effects of All Alternatives

No vegetative treatments are proposed, therefore, there would be no modification of the overstory used by squirrels and no anticipated changes to population trend or trend of habitat forest wide due to grazing or grazing related activities. Cattle grazing on the Pickett Lake and Padre Canyon Allotments do not feed on this overstory. The Range Specialist Report indicates that rangeland trend in the pine type has improved or remained static since the 1960s.

Hairy Woodpeckers

The Coconino Forest Plan lists the hairy woodpecker as a management indicator species for the snag component of ponderosa pine, mixed conifer, and spruce-fir (USDA 1987a). Hairy woodpeckers are over-wintering cavity nesters that tend to need larger trees. For nesting purposes, they often select the dead or dying branches of live trees. Unlike the pygmy nuthatch, hairy woodpeckers tend to occur more often in burned areas. Seventy-five percent of food items are insects, including high numbers of wood boring larvae. Other foods include berries and acorns.

Overall, data from the Coconino National Forest, as well as statewide data, indicate that hairy woodpecker populations are stable, or slightly increasing, on a long-range scale. Minor population decreases occur on a short-term scale (1 to 3 years), but are generally followed by a recovery. Habitat trend in ponderosa pine cover type for snags is declining, but the trend in mixed conifer and spruce-fir is increasing (USDA 2002a).

The age class distribution of ponderosa pine has remained the same during Forest Plan implementation. Late-seral stage trees have remained largely unchanged on slopes greater than 40 percent. The loss of large old trees occurred on slopes less than 40 percent during the early stages of Forest Plan implementation due to natural loss and management activities (primarily timber sales planned before the Forest Plan). The rate of loss is now much reduced in part due to Forest Plan standards and guidelines for old growth (USDA 2002a). Stands of old growth ponderosa pine within the project area occur in small patches, on steep slopes, or in pine stringers in small drainages.

Snags on the forest have in general been lost faster than they are being replaced and large snags are lost at a disproportionate rate to small snags, resulting in a downward trend for snag recruitment (USDA 2002a). However, drought and insect mortality have converted live to dead trees in habitat within and outside the project area within a fairly rapid timeframe and result in an increase in snag recruitment in localized areas. The rate and extent of tree mortality in the future is not known. Mortality is expected to continue at a smaller scale if wet years are in the forecast because insect infestation will continue if host trees are present but adequate moisture will assist with tree resistance to attack by insects. The extent of mortality may increase if dry years are in the forecast because drought mortality will continue and drought will facilitate insect infestation and die off.

Environmental Consequences

Direct, Indirect, and Cumulative Effects of All Alternatives

Implementation of all alternatives would not change population or habitat trend for this species due to the lack of impacts on snags. There are no direct, indirect, or cumulative effects from livestock grazing or other actions on old growth ponderosa pine, mixed conifer, and spruce-fir

stands, including snags. No other actions are proposed that would affect habitat for this species. There are no effects from Alternative 2 due to lack of grazing.

Mexican Spotted Owl

The Mexican spotted owl (MSO) was identified as a management indicator species for the late-seral stage of mixed conifer and spruce/fir. An analysis of effects to this species is described earlier under the Threatened and Endangered Species section of this chapter. However, the MIS status of MSO is independent of its threatened status under the ESA. Therefore, impacts to potential habitat and population trends for MSO are described here.

On the Coconino National Forest, extensive monitoring has been conducted for the Mexican spotted owl. However, much of this monitoring provides occupancy data rather than population trend information. The demography study that occurred, in part, on the forest between 1991 and 1998, indicated a declining trend on two study areas in the Southwestern Region. This study did not span a sufficient time period to make long-term population trend estimates, nor are results from this study area sufficient to estimate forest- or region-wide trends. This study concluded that unpredictable changes in the environment, driven by climatic factors, likely play a large role in population dynamics and are probably responsible for part of the decline observed (USDA 2002a).

Wide fluctuations in occupancy and reproductive rates do not coincide with the overall stable trends in mixed conifer habitats or declining trends in pine-oak. Other factors, such as precipitation patterns and extended drought conditions, may be influencing survival and reproduction of Mexican spotted owls on the forest.

Environmental Consequences

Direct, Indirect, and Cumulative Effects of Alternatives 1, 3, and 4

Livestock grazing does not impact late-seral stages of mixed conifer and spruce-fir. No spruce-fir or mixed conifer habitat exists within the project area. Grazing effects on Mexican spotted owl habitat are generally related to effects on prey species habitat and were discussed earlier under the Threatened and Endangered Species section of this analysis. No vegetative treatments are proposed that would modify the overstory. No other actions are proposed that would cumulatively impact late-seral mixed conifer or spruce-fir habitat or population trends for this species forest wide.

Direct, Indirect, and Cumulative Effects of Alternative 2

Implementation of Alternative 2 would meet Forest Plan standards and guidelines for Mexican spotted owls. No grazing or related actions are proposed in this alternative, so habitat capability would remain unchanged as a result and there are no direct, indirect or cumulative effects.

Mule Deer

Mule deer was selected as an management indicator species of early-seral stages of aspen and pinyon-juniper woodlands. Early-seral stages of ponderosa pine, mixed-conifer, and chaparral habitats are also used for this species. There is no aspen within the project area. Mule deer typically summer in pine and winter in woodlands. They are browsers and feed on shrubs and mast as well as forbs and grasses.

On the forest, age class distribution has remained relatively stable in pinyon-juniper; however, the vigor of understory components, including mule deer forage, continues to be affected in dense

areas. Loss of herbaceous understory and vegetative ground cover has resulted in accelerated sheet and rill erosion.

Although widespread and abundant statewide and nationally, mule deer populations have been variable on the Coconino National Forest since the Forest Plan was implemented (see Figure 7), possibly due to many factors, such as disease, poaching, climatic conditions, and habitat changes (USDA 2002a). Creation of early-seral aspen and pinyon-juniper has not occurred at a sufficient scale to positively influence browse production that would benefit mule deer. Mule deer occur in GMU 6A and 5B. The fawn/doe ratio is down from the 5-year average in GMU 5A and 5B (see Figure 8).

Based on observed trends in survey observation rates and reproduction, forest-wide mule deer populations have declined and will probably continue to decline for the foreseeable future.

Habitat for mule deer within the project area is located largely on the central portions of the Pickett Lake Allotment and east. Mule deer would use the spring areas as well as the shrub dominated areas along and adjacent to the Anderson Mesa rim.

According to the vegetation, soil and water report [PRD 58], the mule deer habitat (pinyon-juniper and steep slopes) has both satisfactory and unsatisfactory range land management status. Approximately half is unsatisfactory due to steep slopes and dense woodland. They have low vegetative cover, low litter and relatively high amounts of bare soil with various erosion hazards due to slopes. Little cattle grazing occur on steep slopes (due to access) and in areas of high canopy cover (due to lack of vegetative cover) so there is little effect due to grazing. These areas produce less than 100 pounds per acre forage. Overall, the area produces 100-350 pounds of forage per acre with tree density and precipitation main determining factors for this low amount

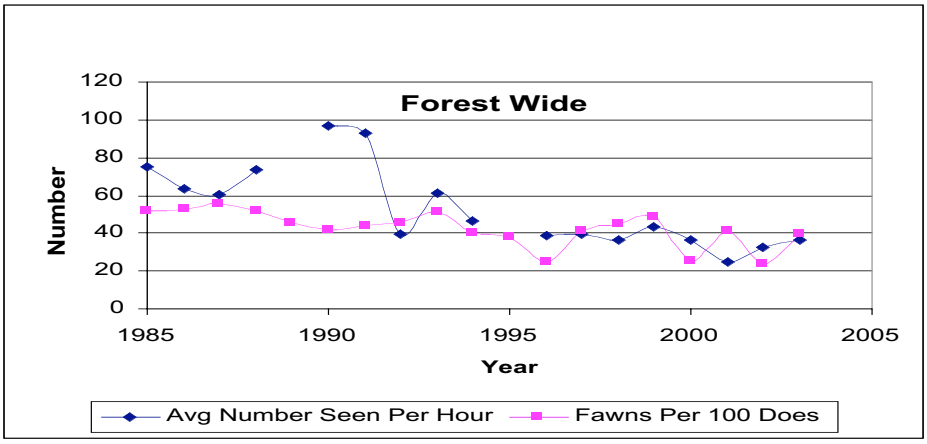


Figure 7. Trend of mule deer population on the Coconino National Forest (GMUs 5A, 5B, 6A, 6B, 7 combined) (USDA 2002a)

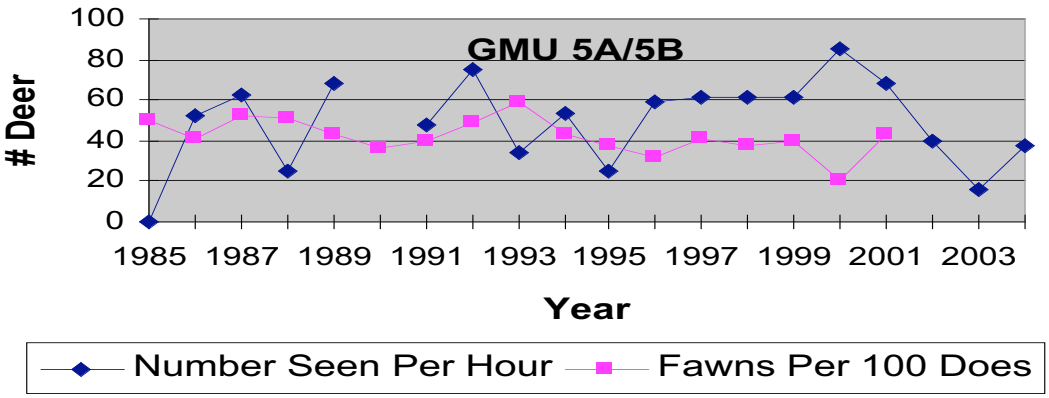
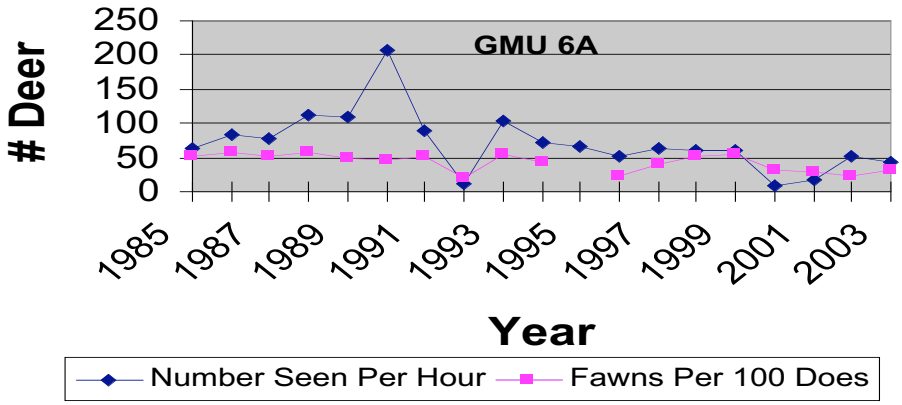


Figure 8. Number of mule deer seen per hour (above) and number of fawns per 100 does (below) in the project area (USDA 2002a)



of forage. Cattle and wildlife grazing can affect grass, forb and shrub heights, vigor and abundance, particularly within one-quarter mile of water.

Range monitoring suggests range conditions in pinyon and juniper grassland both above and below rim show a static to downward trend. Some young pinyon and juniper trees have increased since the early 1960s. Tree establishment in some created openings creates cover for mule deer yet will ultimately result in loss of ground cover and forage plants and an increase in bare soil as canopy cover and tree density increases [PRD 57].

Distribution of reliable waters also affects the quality of habitat. Water sources in the analysis vary in reliability depending on precipitation and are fairly well distributed. Ashurst Spring is fenced from cattle, deer, and elk. Yellow Jacket Spring and Mormon Canyon Spring are dry and do not have any riparian vegetation. Boot Spring, Billy Back and Elliot Spring have sedges, rushes and other riparian vegetation. Steep and rocky terrain excludes cattle grazing from Elliot Spring; however, livestock can access Boot Spring and Billy Back Spring.

Environmental Consequences

Direct and Indirect Effects of Alternatives 1, 3, and 4

Cattle grazing at moderate levels in early-seral pinyon-juniper habitat types on the Pickett Lake and Padre Canyon Allotments should maintain food and cover for mule deer overall. The fencing of Post and Perry Lakes and fence work along the rim should improve forage composition within the lake basins for mule deer. Up to 20 percent seasonal utilization or possible fencing at Boot and Billy Back Springs (in Alternatives 3 and 4) will improve habitat in these small areas for deer. They will also reduce cattle access to browse below the Anderson Mesa rim, reducing competition for cliffrose and other mast species. The pipeline and drinkers should improve water distribution for deer, elk, and pronghorn.

Grazing use by wildlife and cattle around one-quarter mile of water will remain high regardless of the alternative. Duration of use is similar between Alternatives 3 and 4 and the grazing schedules should offer rest and deferral for various mule deer foods. Although grazing schedules in Alternative 1 will provide rest and deferral, this alternative has the longest duration of cattle in pasture thus higher magnitude of impact to mule deer. Upland use is expected to be less in Alternative 4 than Alternative 3 due to the reduced utilization level and number of cattle. This will be beneficial to mule deer locally and should reduce the combined grazing impact of cattle, pronghorn, and elk in winter range.

Cumulative Effects of Alternatives 1, 3, and 4

Encroachment of pinyon-juniper vegetation into openings and historic grasslands would continue to occur over time. **This would result in increased canopy cover and tree density that will ultimately result in loss of vegetative ground cover and be additive to the current low production in some of the formerly treated areas.**

There is a proposal for about 50,000 acres of vegetation treatments to remove early seral juniper that has encroached into historical grasslands on the adjacent Anderson Springs and Bar T Bar Allotments. The majority of these treatments would be done in MA 7 (pinyon-juniper woodland with less than 40 percent slopes) and MA 10 (grassland and sparse pinyon-juniper). These treatments are aimed at removing early-seral juniper trees (pinyon would not be cut). Many of these treatments are designed to improve conditions for grassland species like pronghorn. **Wildlife corridors are also proposed to provide some level of cover post-treatment (about 117 acres of wildlife corridors would be created) and will cumulatively benefit mule deer.**

Restoration treatments are proposed on about 8,200 acres. Vegetation treatments proposed under the Anderson Springs and Bar T Bar Allotments Final EIS will not reduce habitat for mule deer and may be beneficial by providing an increase in forb and browse species.

In pinyon-juniper woodland, fires normally burn infrequently and only affect small areas due to lack of fuels. Small openings are generally the result. Scorched soils and tree removal occurs when the infrequent high intensity wildfire occurs. Scorched soils can delay positive vegetation results. As a result of recent fires on the Padre Canyon and Angell Allotments, cover attributes for mule deer have decreased and are not expected to recover for decades. **Though recovery will be slower in the high severity areas of the pinyon/juniper woodlands, highly nutritious plants are expected to germinate in the fire areas, benefiting mule deer.**

Firewood cutting impacts pinyon-juniper habitat. Early seral pinyon-juniper is not generally cut for firewood, with firewood cutters preferring large dead trees, so little cumulative impacts on habitat for mule deer occurs as a result.

Game hunting cumulatively affects this species. Although hunting does not impact habitat trends, it does regulate populations. Statewide, populations of mule deer are declining. Arizona Game and Fish Department's management goal for deer is to maintain deer populations at levels which provide diverse recreational opportunities, while avoiding adverse impacts to the species and its habitat. Both white-tail and mule deer are combined for the purposes of hunt permits for deer. Harvest data for mule deer has shown a decrease in total harvest from 1986 to the present (AGFD 2001). In 2001, the department recommended a reduction of deer hunting permits statewide. This was the lowest number of deer permits recommended since the draw system began.

Direct, Indirect, and Cumulative Effects of Alternative 2

No actions are proposed that would impact pinyon-juniper or aspen habitat types. Thus there is no impact to the forest-wide trend for this species or this species habitat. Over time, pinyon-juniper habitat types can be expected to increase where there are no vegetative treatments and no insect or drought die off. This would be slow and would not contribute to habitat capability goals within the lifetime of the Forest Plan. No other actions are proposed that would impact habitat for mule deer.

Juniper (Plain) Titmouse

Now known as the juniper titmouse, this species is an indicator for late-seral pinyon-juniper, particularly the snag component. The plain titmouse is a cavity nester in pinyon-juniper woodlands.

The forest-wide trend for the juniper titmouse is stable to declining. Analysis done at the time of the original Forest Plan, predicted slight declines in habitat capability for the juniper titmouse as a result of implementing the plan (USDA 1987a). This was the only MIS where trends were predicted to decrease. Old age classes of pinyon-juniper were expected to decrease as treatments to increase the amount of early successional habitat were implemented. Not many of those planned treatments have occurred, therefore, observed population trends are probably largely explained by other factors. Juniper titmouse breeding bird density has been documented to decrease with increased tree density, increasing total bird densities, increasing proportion of junipers in a stand, and increasing canopy cover (Latta et al. 1999).

Because the juniper titmouse uses snags for nesting, firewood cutting can influence nest site availability. Firewood cutting, both commercial and personal use, and fire currently have the

greatest impact on pinyon-juniper snag habitat for juniper titmouse. It is currently legal to cut standing dead juniper snags and these are preferred over dead and down trees. As a result snags suitable for this species can be in short supply in most areas, especially in areas adjacent to cities and towns, such as Flagstaff and Winslow.

Since the age class distribution of pinyon-juniper has not changed much, the snag component has probably remained relatively stable. Firewood cutting has probably reduced snag densities of both pinyon and juniper snags, especially close to Flagstaff. The loss of older pinyon pine trees due to drought creates new snags, but insect attacks result in rapid deterioration of snags, affecting their longevity and value to wildlife.

Habitat for this species is common in the project area. Approximately 10,000 acres of pinyon-juniper woodland burned in 2003 and 2004 on the Padre Canyon Allotment, yet continues to increase on other parts of the forest. Old growth trees that provide nest cavities are decreasing due to drought, insect and fire mortality and the removal of large diameter trees for firewood. A substantial die off of pinyon and juniper has occurred recently due to insect infestation and drought in localized areas on the forest. This has resulted in a temporary increase in large dead trees but recruitment in the future is a concern due to loss of various age classes.

Environmental Consequences

Direct and Indirect Effects of Alternatives 1, 3, and 4

Implementation of these alternatives is not expected to impact forest-wide trends of juniper titmice or trends for their habitat. The grazing levels proposed or currently used would not provide for extensive change in juniper woodland. Cattle grazing does not impact pinyon-juniper snags. No other actions are proposed that would impact this species.

Cumulative Effects of Alternatives 1, 3, and 4

Cumulative effects on juniper titmouse would include actions that affected late-seral stages of pinyon-juniper and pinyon-juniper snags. These include firewood cutting, pinyon-juniper treatments, drought, insects and prescribed and natural fires.

Pinyon-juniper treatments for watershed protection and grassland restoration have also had cumulative effects on juniper titmouse. Many of the early treatments did not consider the effects of removal of large trees and snags on wildlife species such as juniper titmouse. As a result, many late-seral stands of pinyon-juniper, including snags, were chained or pushed with few, if any, trees left for wildlife habitat. More recent treatments have taken these species into account and only younger trees are being removed, but much of the habitat loss occurred early on.

Prescribed burning and natural fires have impacted pinyon-juniper habitat to some degree, but generally at a small scale. Prescribed burning is rarely done in pinyon-juniper habitats and is usually done to improve watershed and forage conditions for grazers. These burns are usually light intensity and do not affect older pinyon-juniper trees and snags. A few larger trees and snags may be lost, but as a rule, this is very limited. Wildfires burn at high enough intensity to kill older trees and burn snags at times, but wildfires in the pinyon-juniper are rare and are usually one-tenth of an acre in size or less. There have been exceptions, but these are rare. In these larger burn areas, snags can be created if the fire intensity is hot enough.

Direct, Indirect, and Cumulative Effects of Alternative 2

No actions are proposed that would impact pinyon-juniper snags or development of old growth pinyon-juniper. Thus, there is no impact to the forest-wide trend for this species or this species

habitat. Over time, pinyon-juniper habitat types can be expected to increase where there are no vegetative treatments and no insect or drought die off. This would be slow and would not contribute to habitat capability goals within the lifetime of the Forest Plan. No other actions are proposed that would impact habitat for this species.

Pronghorn Antelope

Pronghorn are grassland and opening dependent species. Throughout their range, they use areas where slopes are less than 30 percent, precipitation of about 10 to 15 inches per year, and water available every 1 to 4 miles. Pronghorn tend to like areas recovering from wildfire. Low vegetative structure averaging 10 to 15 inches in height is preferred. Vegetation greater than 30 inches in height is not used much (Lee et al. 1998).

Figure 9. Group of pronghorn antelope below the Anderson Mesa rim in pinyon-juniper habitat (USDA photo)

Pronghorn antelope populations are declining although not equally on the forest (USDA 2002a). GMU 7 appears to be maintaining at the break-even point, while other GMUs remain below the break-even point of 20 to 35 fawns per 100 does in many years (see Figure 10). The Pickett Lake and Padre Canyon Allotments lie within GMUs 5B and 6A. Arizona Game and Fish Department survey data suggest declining trends in number of observed animals in all but GMU 7.

Since implementation of the Forest Plan, the amount of grassland forest wide has generally remained stable, with the exception of about a 4 percent increase in seral grasslands due to firewood treatments and fire. Forest-wide habitat trend is stable to declining due to tree encroachment, fire suppression, long- and short-term climate and ungulate grazing. Establishment of woodland and pine seedlings and saplings in meadows and previously treated openings decreases quality. Openings have been maintained and created through activities such as firewood treatments.

The range specialist report documents range conditions broadly in grasslands above and below the Anderson Mesa rim and in lake and deep soils all of which are used by pronghorn [PRD 57]. Above the Anderson Mesa rim, trends are generally static with some spots of both upward and downward trends. The points of downward trend are generally associated with higher densities of trees and are areas where plant cover is lower than potential for the site and bare soil is increasing.

In pinyon and juniper grasslands below the rim, range conditions have generally remained static to downward responding to an increase in pinyon and juniper trees since the early 1960s, often in old pushes. There are some areas with high plant cover and others with low. Likewise, there are some areas with litter and bare soil ranging from high to low. Overall forage production is low on slopes greater than 40 percent and where there is relatively closed canopy of pinyon-juniper. Forage production in formerly cleared pinyon and juniper areas is lower than potential [PRD 57]. Generally speaking, monitoring in lake and deep soils showed most areas had high plant cover, or plant cover near potential; litter ranging from low to near potential and high to low bare soil.

The project area lies within GMUs 6A and 5B. According to a statewide evaluation of pronghorn habitat, the majority of GMU 6A is poor to fair quality and the majority of 5B is moderate to poor quality. This is based on fragmentation of habitat resulting from fenced rights-of-way on highways and railroad corridors; traffic on roads and highways; abundant cattle fences (some of which were poorly designed for pronghorn passage); topography; and closed canopies in ponderosa pine and pinyon-juniper vegetation types, which reduce the openness and understory in antelope habitat. Other considerations included vegetation cover with reduced species richness and shrub invasion, recreation, human encroachment, and lack of dependable water (Ockenfels et al. 1996).

Largely because of the concern with recruitment, AGFD developed the Anderson Mesa Pronghorn Plan as a way to guide improvements in conditions for this species in GMU 5A and 5B. The plan summarizes the history of pronghorn in this area and has an associated implementation plan for grazing, fences, vegetative treatments, drought relief, research and monitoring (AGFD 2002). Along with other organizations, the Coconino National Forest is active in the implementation of the Pronghorn Plan and adaptive management to improve habitat conditions (AGFD 2002 and 2005). Figure 11 shows an example of a pronghorn habitat improvement project on Anderson Mesa.

GMUs 5B and 5A consist of Forest Service, state and private ownership. Many pronghorn seasonally migrate between the spring, summer and fall range on Anderson Mesa, which includes part of the project area, and the winter range below the Anderson Mesa rim on state and private lands. Another herd resides year round below the rim on state and private land. There is an additional small herd associated with the Pinegrove Quiet area and Upper Lake Mary in GMU 6A. The Pronghorn Plan also shows wide historical variability in the herds in GMU 5A and 5B.

Pronghorn diet consists of forbs, grasses and shrubs and varies seasonally depending on availability, palatability and succulence. Pronghorn diet is generally higher in forbs and shrubs when compared to other ungulates. There is a higher diet overlap with mule deer. However, deer tend to choose more rugged areas compared to open areas preferred by pronghorn, so spatial segregation offsets competition to some degree. Pronghorn diet also overlaps with elk and less so with cattle since both cattle and elk have relatively higher proportion of grasses in their diet.

Ockenfels et al. (1996) found that plant species richness varies by month in many grassland and shrub-steppe habitats in Arizona, with the greatest species richness expressed in spring. Based on range monitoring data and work conducted by Northern Arizona University, there are at least 80

vegetative species known from the project vicinity. Forb abundance and diversity is strongly influenced by precipitation and is especially important during the fawning period.

Pronghorn does choose fawning areas within one-half mile or so of water due to increased nutritional and water needs during pregnancy and lactation.

Understory species composition and residual height of vegetation is influenced by climate and grazing. This in turn influences forage, nutritional status, as well as fawn hiding cover. Grazers overlap diets. Vegetation height is reduced when grazed. The ability of the area to recover from grazing is influenced by climate and rest. Amount, distribution and quality of fawn hiding cover varies spatially and temporarily on these allotments and is influenced by amount and timing of precipitation, timing and intensity of grazing by ungulates and area productivity. Cover heights can be low at fawning time compared to other areas in the state and the West. This is due to low productivity soils, soils with a high clay content, plant phenology, climate and grazing.

Specifically, habitat suitable for pronghorn fawning occurs in Ashurst, Boot, Breezy and Ducknest pastures on the Pickett Lake Allotment. Under the current AOIs, Boot pasture has been rested from cattle grazing since 2002 and Ducknest pasture has been deferred from cattle grazing between August 15 and June 15 since 2002.

Fawn recruitment is a concern in the project area. As mentioned in the Pronghorn Plan, coyote control was completed in another area on Anderson Mesa is underway until a larger integrated management approach can take effect. Ongoing nutrition and disease research may also shed some light on condition and productivity of pronghorn within the project area (AGFD 2002).

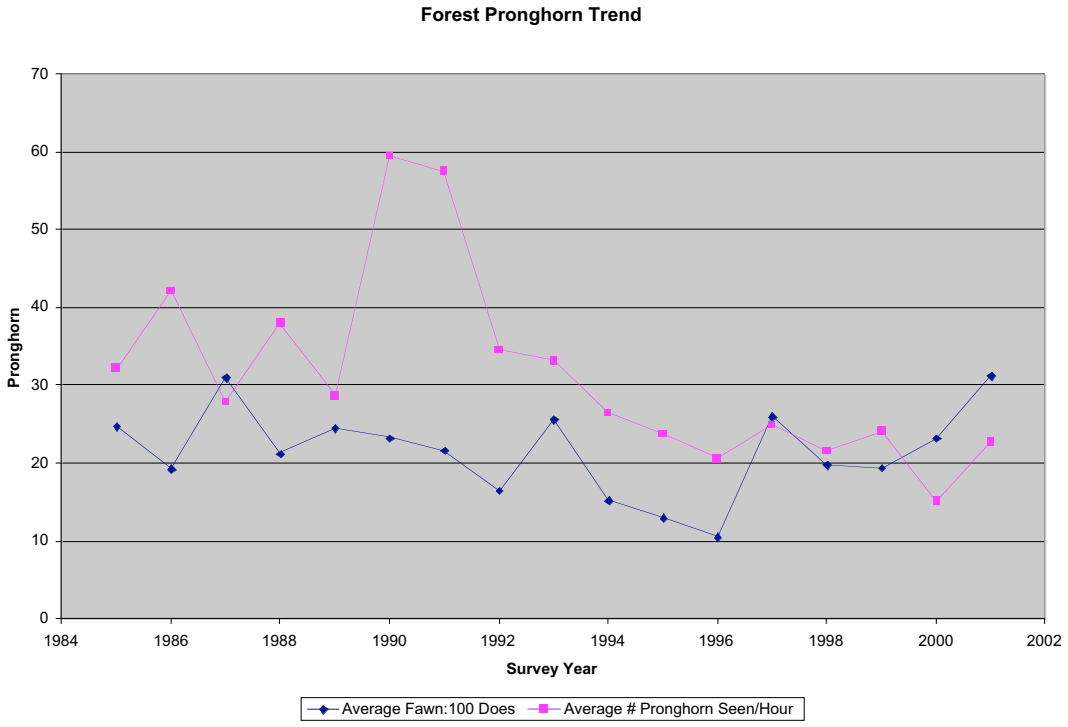


Figure 10. Population trend of pronghorn antelope on the Coconino National Forest (Source: AGFD)

Figure 11. Example of a pronghorn habitat improvement project (pinyon-juniper thinning) on Anderson Mesa (USDA photo)

Fawn recruitment is influenced by a variety of factors, including predation, nutritional and disease status of adults, fawn hiding cover, and climate. Predation has been shown by past research to be a serious problem on Anderson Mesa and historic coyote control has been effective in boosting fawn survival for the years control is in effect.

Antelope are shy and do not respond well to disturbance. Adults have been known to leave fawns when disturbed by humans. Disturbance is a concern due to the potential for disruption during breeding or fawning (Neff 1989; AGFD 2002).

Water in the project area consists of stock tanks and a variety of wetlands, most of which contain stock tanks (USDA 2003). Water is well distributed on the Pickett Lake Allotment and there is a lower density of waters on the Padre Canyon Allotment. Water is not dependable in portions of the project area because it is dependent on precipitation, flooding regimes, and size of the closed basin.

Areas surrounding waters receive heavier grazing use by cattle and wildlife in general. Unless there is grazing deferral, rest from grazing or fencing, the height, diversity and abundance of vegetation close to lake basins or waters is below potential. The timing and intensity of cattle use varies between years with some waters and lake basins receiving deferred use, total rest for one or more years or use during the grazing season. Long Lake on the Pickett Lake Allotment has been fenced to exclude cattle.

Environmental Consequences

Table 24 displays how semipermanent and seasonal wetlands will be fenced in Alternatives 3 and 4. Table 20 on page 76 shows late use and grazing in key pastures by alternative. Rest years are those in which competition between pronghorn and cattle is reduced and the pastures may recover.

Late use is a factor to consider because the later in the season grazing occurs, the less time there is for regrowth to occur prior to pronghorn establishing fawning territories in the spring.

Because plant phenology can be so variable, residual cover (from the previous year) can be an important feature in providing fawning cover from predators. This can vary year to year depending on the timing of moisture and temperature, and duration and timing of snowpack (which can flatten vegetation). Grazing in key pastures during fawning season is another key factor because grazers shorten vegetation height, which can facilitate predation. Grazers also concentrate around waters which, as mentioned above, are key foraging areas for does during late pregnancy and lactation.

Table 24. Grazing status of wetlands on the Pickett Lake and Padre Canyon Allotments

Pasture Name	Waterbody Name	Waterbody Type	Grazing In Alternatives 1, 3* and 4*
Breezy	Breezy	Wetland, seasonal	Grazed after July 15. Adaptive management option to fence in 3 and 4.
	Indian Lake	Wetland, seasonal	Grazed after July 15. Adaptive management option to fence in 3 and 4 with a lane to the stock tank.
	West Breezy	Wetland, seasonal	Grazed after July 15. Adaptive management option to fence in 3 and 4.
	Long Lake	Wetland, seasonal	Excluded
Elliot Driveway	Ashurst Tank	Closed basin	Grazed
	Billy Back Spring	Spring	Grazed in 1. Would be excluded in 3 & 4 if seasonal utilization by cattle reaches 20%.
	Elliot Tank	Closed basin	Grazed
	Elliot Spring	Spring	Poor Access
Ashurst	Al's Lake	Wetland seasonal	Grazed after July 15.
	Antelope North	Wetland, seasonal	Grazed after July 15.
	Antelope Tank	Wetland, seasonal	Grazed after July 15.
	Ashurst Lake	Reservoir	Mostly excluded
	Ashurst Spring	Spring	Excluded by fencing
	Deep Lake	Semipermanent on the Deep Lake Allotment side of the fence.	Grazed after July 15.
	Horse Tank	Wetland, temporary	Grazed after July15.
	Pickett Lake	Wetland seasonal	Grazed after July15.
	Post Lake	Wetland, semipermanent	Grazed in 1 after July 15. Excluded by fencing in 3 & 4.
	Potato Lake	Wetland, seasonal	Grazed after July 15.
Boot	Boot Lake	Wetland, seasonal	Grazed after July 15. Adaptive management option to fence in 3 and 4.
	Boot Spring	Spring	Grazed in 1.Would be excluded in 3 & 4 if seasonal utilization by cattle reaches 20%.
	East Tank	Closed basin	Grazed
	Far East Tank	Closed basin	Grazed
	McDermott	Wetland, temporary	Grazed

Pasture Name	Waterbody Name	Waterbody Type	Grazing In Alternatives 1, 3* and 4*
	Replacement Tank	Closed basin	Grazed
Holding	Grass Lake	Wetland, seasonal	Grazed after July 15.
Ducknest	Coconino Dam	Permanent reservoir	Grazed
	Ducknest	Seasonal, wetland with good wildlife potential when has water.	Grazed in 1 after July 15. Excluded by fencing in 3 & 4.
	Indian Tank	Wetland, seasonal	Grazed in 1 after July 15. Excluded by fencing in 3 & 4 with a lane to the stock tank.
	Perry Lake	Semipermanent	Grazed in 1 after July 15. Excluded by fencing in 3 & 4 with a lane to the stock tank.

*Cattle exclosures will be built and rotation schedules will be adjusted to prevent cattle use in the semipermanent and seasonal wetlands during the waterfowl nesting season, May 1 to July 15.

All of the action alternatives would continue to meet the needs of the Anderson Mesa Pronghorn Plan. Management objectives from this plan, along with Forest Service monitoring and improvements, began in 2002 for the Pickett Lake and Padre Canyon Allotment areas. Improvements to pronghorn habitat would continue under the Pronghorn Plan, despite any alternative selected [PRD 7].

Much of the habitat has small trees on the edge of openings or has regrowth of trees following treatment in the past. Growth of pine and pinyon-juniper threaten the future use of isolated forest openings, grassland and travel corridors. Lack of fires to maintain grasslands and forest openings is evident in the area. Cattle and wildlife grazing, historic and current, can affect shrub and tree encroachment by removing fine fuels that might otherwise carry fire that would kill woody growth. Climate also influences the establishment of trees in existing openings. Recent drought conditions have created abnormally high amounts of dead pinyon, which have fueled fires in the pinyon/juniper woodlands consuming over 15,000 acres in 2003 and 2004, resulting in type conversions to early seral woodlands and the potential for grassland.

Fences can be complete or partial barriers to pronghorn movements depending on location (near waters, migration routes, roads), size of area fenced and design (hog wire, number of strands, bottom wire height, etc.) and snowfall depth. (Neff 1986; O'Gara et al. 1986; Lee et al. 1998).

Barbwire fence is generally considered wildlife friendly with bottom and top wire heights that allow for easier animal passage below or above the fence. For new or reconstructed fence, Coconino Forest Plan Amendment 11 (1996) specifies an 18-inch smooth bottom wire height, which exceeds the bottom wire height in the Pronghorn Management Guides (Lee et al. 1998) and a 42-inch top wire height, which is intended to accommodate wildlife that jump over fences.

On the Pickett Lake and Padre Canyon Allotments there are about 96 miles of fence. During 2001 and 2002, beginning with the best pronghorn habitat, about 68 miles of fence were inventoried to determine the status of these fences. At the same time this inventory was completed, goat bars were installed at least every mile. Goat bars are pieces of PVC pipe installed on a raised bottom wire that make it easier for pronghorn to crawl underneath.

As of January 2005, about 35 miles of fence within the Pickett Lake and Padre Canyon Allotments have been modified to the 18-inch smooth bottom wire height as part of Arizona

Game and Fish Pronghorn Plan. Twenty-eight miles of fence that currently have goat bars need additional improvements such as raising the bottom wire to 18 inches or smooth bottom wire installation. During 2005, funding will be utilized to continue work on improving these fences.

Tree encroachment is a concern within the project area because it reduces the amount and quality of pronghorn habitat. Pinyon-juniper and ponderosa pine have established in areas that were historically grassland, savannah-like grassland interspersed with trees, and in areas where antelope were historically more common. Many areas have been treated to remove or limit this encroachment and to increase grass and forb production. Regrowth of shrub and tree species since the treatments were done has reduced the quality of habitat for antelope in these areas. As tree density and canopy cover increases, predator hiding cover may increase; herbaceous understory can decline in vigor, abundance and diversity, and erosion may increase.

Recreation use within the analysis is generally low with areas of high to moderate use, as well as areas of low use. Recreational use around some lakes may reduce use of the lakes by pronghorn. There is a campground and boat launch at Ashurst Lake. Nearby Coconino Reservoir also receives moderate use. The Arizona Trail is located in the Railroad pasture and accesses some pronghorn habitat. Antelope habitat is used by antler gatherers during the spring and by hunters during the fall and winter with other recreational users during the summer.

Firewood gathering, both for personal and commercial use, occurs in this area from mid-April through mid-December, as is year-round off-road vehicle use, except in few areas where motorized traffic is restricted. A nearly 20,000-acre fawning season motorized vehicle closure in the project area has been in place since 1989. The nearly 12,000-acre Pinegrove closure limits motorized traffic during the fall. Most roads are in poor condition which restricts traffic to high clearance vehicles.

Direct and Indirect Effects of Alternative 1

Alternative 1 impacts pronghorn antelope both negatively and positively. Early season grazing by cattle or wildlife reduces fawn hiding cover, provided by new growth and residual growth from the prior year, facilitating predation. The magnitude and effect of this varies by the number of animals, and timing and duration of graze during the fawning season; however, this alternative grazes early in two pastures 1 year in 4 and allows annual rest like Alternative 3. Not all fawning habitat is grazed by cattle during fawning season every year because different pastures are used at different times between years.

Grazing effects on hiding cover is dependent on the amount of regrowth that occurs between cattle removal in the fall and fawn use the following spring; the density and height of the residual vegetation following cattle grazing; the amount and timing of wildlife grazing and how these variables interact with snowpack (which flattens vegetation), precipitation and temperature. Alternative 1 also has the latest graze, thus has the highest potential impact on residual vegetation that might be available for fawning habitat the following year. This duration of grazing impacts structure, height, diet competition, and uplands the most.

Fence modifications and fencing of wetlands is not proposed, both of which would benefit pronghorn habitat if implemented. Not all fawning habitat is grazed late because different pastures are grazed at different times between years. A photographic assessment of vegetation cover for pronghorn fawns was conducted in 2001. This assessment compared cover in 4-year-old exclosures and adjacent grazed areas managed with high cattle stocking densities for short duration rotations. These comparisons did not show any significant differences in percent hiding cover (Mezulis et al. 2001). This study is expected to continue to gain a better understanding of long term grazing effects on cover.

Over time, cattle grazing can alter plant composition, species diversity, vegetative ground cover, plant community structure, and plant vigor over large areas. These changes are largely dependent on the grazing intensity, number of cattle grazed, season of use, climatic conditions, and amount of rest an area receives. Competition for forage between domestic cattle and antelope is usually minimal, but competition for early spring forage occurs at times (Lee et al. 1998). Loeser et al. (2001) compared the effects of four grazing regimes on plant communities in semiarid grassland for 3 years. Their preliminary results suggested that interannual variability is high and that different grazing strategies did not have a dramatic short-term effect on the plant community in regards to native and exotic species richness and ground cover of grasses and forbs (ibid).

Cumulative Effects of Alternative 1

The pronghorn herd that frequents Anderson Mesa migrates between the mesa and areas below and to the east of the mesa. Therefore, the area analyzed for cumulative effects to pronghorn includes Anderson Mesa and state and private land below and to the east of the Anderson Mesa rim.

Cumulative effects include those associated with wild ungulate grazing; cattle grazing on adjacent allotments, as well as private, state, and tribal lands; hunting; off-road vehicle use; antler hunting; recreational use; highways and right-of-way fencing; prescribed fires; vegetation treatments on adjacent allotments, state, private, and tribal lands; and firewood gathering. **Wildlife and cattle grazing within the range of these pronghorn on other allotments, state and private lands will remove fawning cover, influence vegetation around waters, result in forage competition and diet overlap cumulatively affect pronghorn**. This can fall within a range of effects that pronghorn successfully live with under good conditions or may stress adults or young if predators, forage, nutrition, climate or other factors have an undue influence on populations or habitat.

Pronghorn have co-existed with various recreational uses for decades, however, may be unduly influenced at critical time periods like fawning, breeding or wintering or when human uses increase above a certain level. This could result in increased stress to animals, fawn drop spread over a long time period or less time spent with young. Human use in this area is expected to increase over the life of the permit. Trash or gut piles and other human related food sources could provide a nutritional boost to predators resulting in higher reproductive output and better condition.

Prescribed burning and vegetation treatments, as described in the Anderson Mesa Pronghorn Plan, should result in a vegetation mosaic favorable for this species and be additive to effects to other vegetation treatments for pronghorn. A number of burning and vegetation treatments that are ongoing and planned on state and private lands, as well as fence improvements and removals, are considered beneficial. Implementation of the Anderson Mesa Pronghorn Plans is an anticipated positive and integrated approach, with a number of collaborating groups, to improvement of habitat for the pronghorn in this area.

The fences built along the railroad and Interstate 40 are considered a negative cumulative effect because the combination of traffic and fence barriers have been shown to be significant barriers to pronghorn movements in both central Arizona and in areas north of the project near Wupatki National Monument. Old fences within and outside the project area, both on Federal and non-Federal lands, that fall significantly less than the recommended standards for pronghorn passage are also major negative effects.

On the Padre Canyon Allotment there were two recent fires that created about 20,000 acres of opening in the pinyon-juniper woodland and, to a lesser extent, in the ponderosa pine stringers

found in Padre, Mormon, Yellow Jacket and Elliott Canyons. The result of these fires for pronghorn will be greater visibility, fewer obstructions between winter and summer habitats, and more nutritious plants are expected to germinate in the fire areas.

Direct, Indirect and Cumulative Effects of Alternative 2

Implementation of Alternative 2 is not expected to have direct, indirect or cumulative impacts from cattle grazing. Forage competition, dietary overlap and reduction of cover in fawning habitat would not occur. Previously created openings and grasslands would slowly decline due to pinyon-juniper and ponderosa pine encroachment. In areas that did not burn in 2003 and 2004, woody species would continue to act as a barrier to migration of antelope between their summer and winter range. Woody species would continue to act as a firebreak, limiting the potential for fires to burn as they did historically. Existing water developments would infill with sediment due to lack of maintenance, gradually holding less water. Antelope rely on well-distributed water, especially during fawning. The majority of water sources in the project area are stock tanks, which need regular maintenance. **These effects would be negative and would cumulatively affect pronghorn.**

Direct and Indirect Effects of Alternatives 3 and 4

The effects of Alternatives 3 and 4 are similar. Alternatives 3 and 4 have fewer effects than Alternative 1 because the duration of grazing is less. The fencing at Post, Indian Tank, Ducknest and Perry Lakes in Alternatives 3 and 4 should improve habitat conditions in the wetland for pronghorn and decrease diet competition with cattle. The fencing will be a partial barrier to pronghorn, however, these fences will meet Forest Plan standards for wildlife passage. Fence modifications along Anderson Mesa rim in the Eliott Driveway pasture will benefit pronghorn by improving browse conditions below the rim due to reduction of cattle.

In a personal conversation with Mike Dunbar from Hart Mountain National Wildlife Refuge, he encorages the use of wildlife friendly fencing to manage areas where cattle use may be a concern. The proposed fencing of Perry, Indian Tank, Ducknest and Post Lakes in Alternatives 3 and 4 may have some negative effects to pronghorn movements. When considering the potential for improved pronghorn fawning and waterfowl and macroinvertebrate habitat, the potential negative effects to pronghorn are largely mitigated.

The pipeline and drinkers proposed for Padre Canyon in Alternatives 3 and 4 will be accessible to pronghorn and assist with water reliability and distribution in the area. All alternatives are expected to impact structure height around waters which will vary by grazing schedule and precipitation. The 20 percent utilization proposed in Alternative 4 should provide less use in the uplands and a benefit to pronghorn. The timing of use during fawning season will vary by year with Alternative 4 having the least grazing in key pastures during fawning season, followed by Alternative 3. The deferral of Ducknest Pasture and rest in Boot Pasture (annual operating instructions) will be beneficial and the monitoring associated with this will be instrumental in understanding the impacts of grazing schedules on vegetation height and other key habitat factors.

Cumulative Effects for Alternatives 3 and 4

The effects of grazing in these alternatives are additive to cattle and wildlife grazing in the wetlands on adjacent allotments. Wetland productivity is strongly influenced by precipitation. Historically pronghorn numbers have varied considerably on the mesa, concurrent with wildlife and cattle grazing (Mormon Lake District wildlife records). **Over the years, a variety of closures on the forest have been implemented that can improve habitat conditions for species like pronghorn**, including motorized vehicle closures at Pine Hill on Anderson Mesa and

seasonal recreation restrictions such as at nearby Hay Lake (USDA 2002b). Habitat quality for species that rely on wetlands forest wide has increased over time through improvements (such as fencing) and restriction of grazing (e.g. Marshall Lake, Ashurst Spring, Long Lake, Vail Lake, and Horse Lake) and recreation use over time (USDA 2002c). Implementation of the Pronghorn Plan will likewise improve habitat for pronghorn (AGFD 2003 and 2005).

Cinnamon Teal

Cinnamon teal are indicators of lakes and wetlands. Productivity, distribution, and size of wetlands are profoundly affected by the amount and timing of precipitation, influencing whether the basins have water or not; how long they hold water within and between years; and, consequently, the type of vegetation and wildlife species that can be supported and when. The types of wetlands present on Anderson Mesa are described in the Vegetation, Soil and Water Report [PRD 58] and listed in the Appendix.

The cinnamon teal is a summer resident in the project area that feeds on plants and invertebrates (Terres 1991). They nest within 100 meters of seasonal and semipermanent wetlands, choosing taller and denser cover for nesting. Since Forest Plan implementation, open water habitats have remained stable, semipermanent wetlands have improved, and seasonal wetlands are stable, but well below potential. Some habitat has improved, and some has been acquired (Hay Lake) (USDA 2002b and 2002c). Since Forest Plan implementation, several years of drought conditions have resulted in many wetlands being unavailable for waterfowl use (NOAA 1975-1993).

The forest-wide trend for cinnamon teal is inconclusive, however, there appears to have been lower numbers of breeding pairs in the mid-1990s compared to the early 1980s. This is complicated by the fact that studies in the early 1980s were preceded by unusually wet years. The breeding bird surveys conducted from 1980-2000 suggest a downward trend statewide although the sample size is small (USDA 2002a). Population data on the forest is limited to two studies on Anderson Mesa which reported low nest success and low reproductive success on Anderson Mesa, compared to other areas in Arizona and the U.S., largely as a result of nest losses to avian predators (Myers 1982; Gammonley 1996).

About 59 known lakes and wetlands were considered in the Forest Plan in addition to about 230 acres of unnamed lakes on Anderson Mesa. Of the 59 lakes and wetlands, 19 (32 percent) are considered teal nesting habitat on Anderson Mesa (excluding open water sites like Ashurst Lake which might be used for resting during migration). The waterfowl nesting season is May 1 to July 15. Many wetlands on Anderson Mesa have been modified by creation of tanks or dams within the natural lake basins. Stock tanks are often deeper than the surrounding ephemeral lake basin and hold water well past the time when the surrounding, more shallow lake basin will have dried up. Surface area, aquatic and emergent vegetation interspersion and aquatic macroinvertebrate production is often less in a stock tank. However, stock tanks can provide better distributed, longer lasting and more reliable waters than wetlands and are of great benefit to many wildlife species. However, they do not provide the quality or quantity of feeding or nesting habitat present in a semipermanent, seasonal, or ephemeral wetland in a good to moderate water year.

The quality and quantity of wetlands are directly affected by precipitation received during the winter and spring. In wet years, many ephemeral lake basins are watered and provide feeding and nesting sites for teal and other waterbirds. In drought years, ephemeral lake basins may have little to no water resulting in greatly reduced surface area for waterbirds or none at all.

All wetland types have some value to wildlife although this may differ depending on individual needs of the species. In general, those basins that are larger, hold water longer, and have a

combination of vegetation types will retain wildlife values longer. From a waterbird standpoint, and by definition, semipermanent and seasonal wetlands have higher values, followed by temporary and ephemeral wetlands. Teal nest in seasonal and semipermanent wetlands. They may use the other wetland types for resting and feeding when there is water. Closed basins function similarly to uplands in dry years, and have some wetland values in wet years, though for a short period of time.

Nesting success and teal habitat is influenced by grazing, recreation, predation, and climate. Development of dense cover is influenced by temperature and the amount and timing of winter and spring precipitation. Grazing can have two primary effects on water birds and their habitat. Cattle presence during nesting and incubation can crush nests and eggs or disturb hens, causing them to flush, facilitating nest predation. Cattle and wildlife grazing during nesting season may reduce nest hiding cover, facilitating predation. Fall grazing around key lake basins can reduce the amount of residual vegetation available in April and the amount of residual vegetation would vary by the amount of regrowth that would occur following grazing. However, snow is the main factor affecting standing residual vegetation in the project area. Cattle grazing may reduce potential nest sites to isolated patches of cover often associated with unpalatable plant species.

Recreational activities can result in nest damage, habitat deterioration or disturbance that can result in nest loss, abandonment, facilitated predation or death, particularly if vehicles, dogs or dispersed use negatively interface with habitat or teal. The nearly 26,000 acres of motorized vehicle closures on Anderson Mesa (including part of the Pickett Lake Allotment) during all or part of the waterfowl nesting and spring migratory season includes a number of important nesting areas for teal. Motorized vehicle use in the remainder of the area is largely unregulated and varies by season and area.

Predation is a key factor in teal breeding success and predator success is influenced by a number of factors. The number of crows and ravens in the project vicinity may be increasing in response to increased human development and increased food availability from an urban setting. Wetlands in the project area tend to be small and unconnected, especially when compared to the White Mountains of Arizona or more productive nesting areas in the United States. Ephemeral lake basins and their associated uplands can be incorporated in regular search patterns once they have been identified as potential foraging sites by aerial predators.

Crows and ravens fly at low levels over wetlands and can easily detect nests prior to the growth of dense vegetation. They forage along shorelines seeking invertebrates and frogs and in the wheatgrass zone of the basin upland. Ponderosa pine trees are frequent perch sites adjacent to water. Predation pressure can be intense within the 100 meters of water preferred by nesting teal.

Environmental Consequences

There are effects to teal habitat in Alternatives 1, 3 and 4 based on direct, indirect and cumulative impacts to wetlands but it is emphasized that wetland use is driven by precipitation. The majority of wetlands lie within Ashurst, Breezy, Boot and Ducknest pastures. The value of wetlands to wetland wildlife species varies by species and wetland type. Semipermanent and seasonal wetlands have higher values for teal due to habitat interspersion within the wetland, extended flooding regimes, and higher plant species diversity within and adjacent to the basin.

The cinnamon teal nesting season occurs from May 1 to July 15. Waterfowl disturbance and reduction in vegetation height can occur when cattle graze during this time period. Pasture graze periods between alternatives do not vary greatly in these pastures during this time (refer to Table 20 on page 76). There are year-to-year variations between alternatives, but overall they are similar.

Direct and Indirect Effects of Alternative 1

The following direct and indirect effects are anticipated for cinnamon teal with the implementation of Alternative 1:

- Ashurst, Breezy, Boot and Ducknest pastures are rested every fourth year, benefiting the wetlands and uplands in these pastures.
- Cattle do not graze semipermanent or seasonal wetlands before July 15.
- Cattle use occurs after spring migration for waterbirds. As a result, vegetation production during migration is primarily influenced by climate, recreation or wildlife factors.
- Cattle use during the fall migration season in the last 2 weeks of September is limited. Cattle graze Breezy pasture 2 years in 4 for 2 weeks. Cattle graze Ashurst pasture every 4 years for 2 weeks. Cattle graze Ducknest Pasture every 4 years for 2 weeks. Cattle grazing during this time period could cause waterfowl disturbance and reduce vegetation height.
- The hardstem bulrush community at Post and Perry Lakes are not fenced in this alternative and will be grazed by cattle, which may affect habitat for cinnamon teal.
- Cattle will graze Boot Spring and Billy Back Spring. This grazing may have an affect on these stop over sites for waterbirds during flight, including cinnamon teal.
- Cattle use in uplands for this alternative is more than cattle use in Alternative 4.
- The 35 percent utilization guideline in Alternative 1 is adequate to maintain residual regrowth, structure, diversity and seed head production in uplands.
- Cattle graze periods are longer in this alternative than in Alternatives 3 and 4. Longer graze periods gives each pasture less rest before they are grazed by cattle in the following year.

Direct and Indirect Effects of Alternative 2

No cattle grazing or other actions are proposed in the project area, so no direct, indirect, or cumulative effects from cattle grazing would occur. Wildlife would continue to graze wetlands, which will have effects on cinnamon teal, and could include disturbing the birds, stepping on nests, and reducing vegetation height.

Direct and Indirect Effects of Alternatives 3 and 4

The following direct and indirect effects are anticipated for cinnamon teal throughout the year with implementation of these alternatives:

- Ashurst, Breezy, Boot and Ducknest pastures are rested every fourth year, benefiting the wetlands and uplands in these pastures.
- Cattle do not graze semipermanent or seasonal wetlands before July 15.
- Cattle use during the fall migration season during the last 2 weeks of September is limited. Cattle graze Boot pasture 2 years in 4 for 1 week. Cattle graze Ashurst pasture every 4 years for 1.5 weeks. Cattle graze Ducknest pasture every fourth year for 1 week. In the one-herd rotation systems there is no cattle use during this time period. Cattle grazing during this time period could cause waterfowl disturbance and reduce vegetation height.
- The emergent vegetation at Post, Indian Tank, Ducknest and Perry Lakes is fenced in both alternatives, which benefits habitat for cinnamon teal.

- Up to 20 percent utilization by cattle on emergent and woody vegetation would be allowed at Boot and Billy Back Springs. If use by cattle exceeds this guideline, a fence would be constructed by the permittee to exclude cattle at these two springs which are springs that could be stop over sites for waterbirds during flight, including cinnamon teal.
- Alternative 4 has less use in uplands than in Alternatives 1 and 3.
- The 35 percent utilization guideline in Alternative 3 and 20 percent in Alternative 4 are adequate to maintain habitat in uplands because there should be adequate residual regrowth, structure, diversity and seedhead production.
- Cattle graze periods are shorter in Alternatives 3 and 4 than in Alternative 1. Shorter graze periods gives each pasture more rest before cattle graze them the following year.

In addition, Boot pasture was rested for 3 years, which began in 2002. Ducknest pasture was deferred between August 16 and June 14 for 3 years, which began in 2002. Additionally, Boot Lake, Replacement Tank, East Tank, McDermott Tank and East McDermott Lake were rested from cattle grazing for 3 years; starting in 2002 and cattle were deferred from Ducknest Lake, Indian Tank, Perry Lake and Coconino Dam Reservoir between August 16 and June 14. Monitoring will indicate whether or not the lack of cattle in the rested pastures or cattle grazing under the deferred schedule improved these areas and to what degree. This information can be used to make future decisions on improving wetlands and closed basins.

Cumulative Effects for All Alternatives

The area analyzed for cumulative effects to cinnamon teal includes Anderson Mesa and the Canyon Diablo, Lake Mary, and Mormon Lake 5th code watersheds. **The effects to vegetation in the vicinity of wetlands are cumulative to use by elk.** Cattle and wildlife use occurs in wetland areas at similar times of the year as cinnamon teal. In addition, recreation activities also occur in wetland areas in the summer months. **The effects of grazing in these alternatives are additive to cattle and wildlife grazing in the wetlands on adjacent allotments**. This is because wetland productivity as it relates to cinnamon teal habitat is strongly influenced by precipitation.

Historically, high waterbird numbers have been observed on the mesa, concurrent with wildlife and cattle grazing (Mormon Lake District wildlife records). Over the years, a variety of closures on the forest have been implemented that improve habitat conditions for species like cinnamon teal, including motorized vehicle closures at Pine Hill on Anderson Mesa and seasonal recreation restrictions such as at nearby Hay Lake (USDA 2002b). Habitat quality for wetland dependent species forest wide has improved over time at some sites through fencing, restriction of grazing (Marshall Lake, Ashurst Spring, Vail Lake and Horse Lake), and recreation use over time.

Populations of avian predators will remain high, and this may continue to offset reproductive success.

Past actions may have affected cinnamon teal. Cinnamon teal habitat is generally static with current cattle grazing. Under the action alternatives, cattle grazing would continue. There would be some variation in cinnamon teal habitat due to timing of the cattle grazing season related to wildlife grazing, recreation use, and climatic conditions. Effects to cinnamon teal habitat would vary because the effects may overlap for habitat in the wetland ecosystems.

Lincoln's Sparrow

The Lincoln's sparrow is a management indicator species for high elevation riparian scrub habitat, comprised primarily of willows (USDA 1987a and 1987b). Lincoln's sparrows are

ground nesting neotropical migrant songbirds. They occur in wet areas like riparian thickets and wet meadows, along forest edges, and in open forests with a good understory. They tend to nest in shallow depressions with clumps of vegetation. Lincoln's sparrows eat insects, spiders, grains, and seeds.

Lincoln's sparrows are not known to occur within the project area. Potential habitat is Ashurst Spring, Boot Spring and Billy Back Spring. Ashurst Spring is fenced from cattle and elk. Yellow Jacket Spring and Mormon Canyon Spring have been dry and do not have any riparian vegetation. Boot Spring, Billy Back and Elliot Spring have sedges, rushes, willows and other riparian vegetation. Steep and rocky terrain excludes cattle grazing from Elliot Spring; however, cattle can access Boot Spring and Billy Back Spring.

Other concerns for this species include preferences by recreationists for camping, picnicking, and driving through wet meadow habitat. Human disturbance to nests and nesting habitat are of great concern where dispersed camping occurs in meadows and adjacent to riparian areas.

The trend for Lincoln's sparrow on the forest is inconclusive. Currently, Lincoln's sparrows are only known to nest on the Coconino National Forest in the inner basin on the San Francisco Peaks. Otherwise, nesting information is lacking, and population trend is unknown. Overall, data from the Coconino National Forest indicate stable to increasing wintering populations.

In the late 1980s, grazing by cattle and wildlife were resulting in adverse impacts to headwater meadows and upper reaches across the forest (USDA 1987a). The willow community had been declining for some time, prior to Forest Plan development, and willows are now gone from many drainages, particularly along the Mogollon Rim. Although they may have potential, other reaches do not show any evidence that they ever contained willows. Potential for willow re-establishment is unknown in many reaches.

On the south end of the forest, springs and seeps above 7,000 feet have generally remained in poor condition, except for a few that have been fenced to exclude cattle and/or wild ungulates. The north end of the forest does not have as many springs, but many have been fenced or have other grazing and recreation restrictions that contribute to improved conditions.

Despite some trend toward improvement, especially in portions excluded from grazing, most high elevation riparian scrub reaches remain in poor condition and are functioning well below potential.

Environmental Consequences

Direct and Indirect Effects of Alternatives 1, 3, and 4

Generally speaking, grazing in potential habitat for Lincoln's sparrows can retard the growth of woody riparian vegetative species, slowing or arresting progression toward suitable habitat. Changes in vegetative structure, plant diversity, and density can occur. Cattle can also alter these areas by bedding, trampling, and trailing. Effects on these species resulting from cattle grazing include grazing of riparian habitat resulting in reduction of cover and impacts to seed heads. Other impacts from grazing include compaction of surface soils that reduces infiltration and increases surface runoff, reduction of bank stability which leads to accelerated erosion and increased sedimentation, and removal of organic material due to reduction in plant vigor and density. Use in spring areas is likely to be higher than the average utilization levels proposed because wildlife and cattle concentrate in riparian areas.

Alternative 1 has similar effects as Alternatives 3 and 4 with the exception of more impacts at Boot Spring and Billy Back Spring in Alternatives 3 and 4. With implementation of Alternative 1,

these two springs will continue to be grazed by cattle resulting in impacts to potential habitat. These impacts include: reduced height to vegetation in wet meadow and spring vegetation, soil compaction and possible shifts in understory species composition.

Cumulative Effects for Alternatives 1, 3 and 4

Wildlife use is cumulative to that of cattle. These impacts to vegetation may reduce habitat quality for Lincoln's sparrow.

Cumulative impacts from recreational uses could occur and could result in trampling of willows and other riparian vegetation and soil compaction. Visitation to all of the spring sites by recreationists is low and is expected to remain low in the foreseeable future due to poor road conditions.

Alternative 1 has the greatest impact due to cattle access to potential habitat and longer pasture duration than the other alternatives

The installation of pipelines and drinkers in Alternatives 3 and 4 may reduce cattle use at springs slightly and, thus, may offer a slight advantage for Lincoln's sparrows over Alternative 1.

Direct, Indirect and Cumulative Effects of Alternative 2

No cattle would be present in the project area if this alternative was implemented, so no direct, indirect, or cumulative effects would occur.

The proposed utilization levels are an average across a pasture, with some areas receiving much lower use and others receiving much higher use. Meadows are areas where cattle and other grazers concentrate, and unless grazing is excluded from these areas, high forage utilization levels can be expected. No other actions are proposed that would impact habitat for the Lincoln's sparrow.

Migratory Bird Species

President Clinton signed Executive Order 13186 on January 10, 2001, placing emphasis on conservation of migratory birds. This order requires that an analysis be made of the effects of Forest Service actions on species of concern listed by Partners in Flight; the effects on important bird areas (IBAs) identified by Partners in Flight (Latta et al. 1999); and the effects to important over-wintering areas. The Anderson Mesa IBA occurs within the project area.

The following is a description of migratory bird species status within the project area and an analysis of effects for each alternative. Species of concern are organized by the type of habitat they use.

Table 25. Pine habitat migratory bird species on the Pickett and Padre Allotments

Species	Vegetation Composition/ Structure	Abiotic/Landscape Factors	Special Factors
Cordilleran Flycatcher	-Ponderosa pine, Douglas-fir, maple, oak, aspen. -Dense canopy closure. -Mid-late successional.	-Drainages to create a cool microclimate	Snags and downed trees for nesting. -Rare cowbird host.
Purple Martin	-Ponderosa pine. -Open canopy. -Open midstory cover.	-Large snags, cavities. -Open space for flying. -Snags need to be close to or in	-Often prefers habitat near open water. -Prefers tall snags

Species	Vegetation Composition/ Structure	Abiotic/Landscape Factors	Special Factors
	-Open understory cover. -High snag density.	open areas. -Just above and below Mogollon Rim, Mormon Lake area	adjacent to open areas.

Pine Habitat Type Priority Species: Ponderosa pine and pinyon-juniper/ponderosa pine transitional habitat types are one of the dominant vegetation types in the project area. Partners in Flight identified four species of concern for pine habitats: northern goshawks, olive-sided flycatchers, Cordilleran flycatchers, and purple martins. Table 25 describes the habitat needs for these species. The northern goshawk and olive-sided flycatcher will not be addressed under this "Migratory Birds" section. Northern goshawks were previously discussed in detail under the "Sensitive Wildlife Species" section and the olive-sided flycatcher is associated with aspen, which does not occur in the project area.

Cordilleran Flycatcher

Cordilleran flycatchers are considered a common summer resident and uncommon transient (Morrall and Coons 1996). They are associated with snags and high overstory canopy closure. Stands of old growth ponderosa pine and closed canopy forest within the project area occur in small patches, on steep slopes, or in pine stringers in small drainages. Cordilleran flycatchers are considered to be on the increase, but at risk due to concerns about loss of suitable habitat and habitat components such as snags, downed logs, and loss of closed canopy. Within the project area, it is expected that this species is static to increasing.

Environmental Consequences

Direct and Indirect Effects of Alternative 1, 3, and 4

Concerns about the loss of suitable habitat and habitat components ideal for Cordilleran flycatchers are primarily: (1) loss of snags and downed logs for nesting and (2) loss of closed canopy causing reduction in cool microclimate that they are most frequently associated with (Latta et al. 1999). Cattle grazing at the levels proposed in these alternatives does not impact recruitment of snags and downed logs. Cattle grazing in pine habitats at utilization levels of 35 percent or less is considered to have no impact on habitat for Cordilleran flycatchers. No other actions are proposed that would impact this species.

Snags on the forest have in general been lost faster than they are being replaced and large snags are lost at a disproportionate rate to small snags, resulting in a downward trend for snag recruitment (USDA 2002a).

However, drought and insect mortality have created snags in habitat within and outside the project area within a fairly rapid timeframe resulting in an increase in localized snag recruitment. The rate and extent of tree mortality in the future is not known. Mortality is expected to continue at a slower rate if wet years are in the forecast. The extent of mortality may increase if dry years are in the forecast because drought mortality will continue and drought will facilitate Insect infestation and die off.

Cumulative Effects for Alternatives 1, 3, and 4

Overgrazing in the past, combined with fire suppression and favorable climatic conditions, has probably contributed to the development of dense stands of young to middle-aged timber, an important habitat component for this species, but these dense stands are susceptible to high intensity, stand-replacing fires. **Cumulative effects from past logging include the loss of large trees and the loss of old-growth stands, reducing recruitment snags. In general, cattle and wildlife grazing can cumulatively impact this species by decreasing forage quality and quantity**.

Wildfire can result in the loss of trees and snags with negative impacts to this species habitat. It can also result in decreased water availability and increased runoff. There were two recent fires that created about 20,000 acres of opening in the pinyon-juniper woodland and, to a lesser extent, in the ponderosa pine stringers found in Padre, Mormon, Yellow Jacket and Elliott Canyons. The majority of the fires that burned were on the Padre Canyon Allotment and burned in pinyon-juniper habitats, which are not considered habitat for the cordilleran flycatcher. The ponderosa pine stringers involved in these fires may have been habitat, which is now lost as a result of the fires.

Direct, Indirect and Cumulative Effects of Alternative 2

No effects would occur to Cordilleran flycatchers from cattle grazing if this alternative was implemented. No other actions are proposed.

Purple Martin

Purple martins are an uncommon summer resident in ponderosa pine (Morrall and Coons, 1996; USDA 2000c). This species has been nearly extirpated from ponderosa pine forests since fire suppression has resulted in much denser conditions and logging has reduced the number of snags and large old trees. Breeding bird survey (BBS) data indicates that this species is static to slightly declining in the project area.

Environmental Consequences

Direct, Indirect, and Cumulative Effect of All Alternatives

Effects are similar to those for the Cordilleran flycatcher. Habitat loss, especially snags and large old trees, is the primary concern with purple martins. Cattle grazing is not expected to impact this species. As with the Cordilleran flycatcher, there may be some long term cumulative impacts from overgrazing in habitat for this species, but moderate grazing levels do not result in loss of snag recruitment or large old trees. Moderate grazing at levels of 35 percent utilization or less are considered to have no impact on habitat for this species. No other actions are proposed that would impact this species.

Pinyon-Juniper Habitat Type Priority Species: Pinyon-juniper habitat is some of the most common within the project area. Partners in Flight have identified five priority bird species of concern for this habitat type: gray flycatchers, pinyon jays, gray vireos, black-throated gray warblers, and juniper titmouse. Table 26 lists the habitat needs for each of these species. Juniper titmouse was addressed in detail under the “Management Indicator Species” section, and the project area is not considered habitat for gray vireos (USDA 2000c), so these species will not be discussed here.

Gray Flycatchers

Gray flycatchers primarily occupy pinyon pine and juniper, or ponderosa pine with an open overstory. These birds may need some ground cover to support insect populations for foraging. Larger taller stands of sagebrush and greasewood are also used. The forest status of the gray flycatchers is expected to be static to increasing and is expected to be common in project area. Large-scale chaining and juniper pushes were done in much of the pinyon-juniper vegetation types on Anderson Mesa. Large acreages affected with few trees being left regardless of size, age, or value from a wildlife perspective. These early treatments greatly reduced the availability of mature stands of pinyon and juniper trees tied mainly to rocky, inaccessible sites.

The status of gray flycatchers is expected to be static to increasing and expected to be common in the project area. Large-scale chaining and juniper pushes were done in much of the pinyon-juniper vegetation types on Anderson Mesa. As a result, large acreages were affected with few trees being left regardless of size, age, or value from a wildlife perspective. These early treatments greatly reduced the availability of mature stands of pinyon and juniper trees tied mainly to rocky, inaccessible sites.

Environmental Consequences

Direct and Indirect Effects of Alternatives 1, 3, and 4

Impacts on gray flycatchers are usually related to breeding habitat loss and modification of pinyon-juniper woodlands that has occurred through chaining, clearing, and burning of large, mature woodland tracts for cattle and wildlife forage, house and road development, and firewood cutting.

Table 26. Pinyon-juniper habitat migratory bird species on the Pickett and Padre Allotments

Species	Vegetation Composition/ Structure	Abiotic/Landscape Factors	Special Factors
Gray Flycatcher	-Primary: pinyon pine and/or juniper, with an open overstory of ponderosa pine. -Larger stands of PJ with open understory, some areas with sagebrush. -May need some ground cover to support insect populations for foraging. -Larger taller stands of sagebrush and greasewood.	-Elevation 4,500 to 7,500 ft, locally to 9,000 ft. -Mid to late successional stages. -Edge effect and fragmentation do not appear to be an issue.	-Brown-headed cowbird host (maybe increasing). -Insectivore low forager – often ground gleaner.
Pinyon Jay	-Breeds in pinyon and ponderosa pine. -Usually in pinyon-juniper where pinyon is dominant. -Over 85 percent of nests found in bottom half of canopy. -Commonly in extensive stands of pinyon-juniper with open physiognomy. -May increase as mid and	-Nest and cache on south side of trees. -Elevation 5,000 to 7,500 ft. -May key in on warmest microclimate for nesting. -Mid-late successional (pine nuts in mature trees). -Use extensive stands for foraging, colony may have up to an 8 sq mi. home range.	-Roost and nest colonially up to 250 individuals. -Only one nest per tree, usually. -Communal feeders of fledglings between 3-6 weeks old. -Long-term pair bonds. -Coevolved with

Species	Vegetation Composition/ Structure	Abiotic/Landscape Factors	Special Factors
	understory decrease.		pinyon trees. -May suffer from common raven predation.
Black-throated Gray Warbler	-Mostly pinyon. -Also commonly occurs in Madrean oak/pine-oak in southeastern AZ w/shrub component. -In taller and denser PJ woodland. -Usually nest 2-15 ft. -Low to mid-story nester. -Prefers relatively heavy conifer cover. -Forage most often in pinyon.	-Not found where juniper becomes dominant. -In PJ, usually between 6,500 and 8,000 ft. in AZ. -Locally below 6,500 ft in PJ. -Commonly found in lower elevations in SE AZ habitats. -May prefer woodlands w/ interspersed shrubby openings. -Successional stage: mid to late pinyon woodland. -Unknown if fragmentation has an effect on species.	-Brown-headed cowbird parasitism occurs, but effect unknown. -Forages low to mid-canopy, foliage gleaner.

Grazing by wildlife and cattle reduces ground cover, inhibits regeneration of shrubs, and increases local cowbird populations (Latta et al. 1999). Cattle grazing in the project area is expected to occur at a level that maintains grass cover and the shrub component, although there will be some impact to grass and shrubs. Gray flycatchers may get parasitized when grazing occurs in nesting habitat during the nesting season. This is offset by grazing schedules that rest or vary the timing of grazing in gray flycatcher habitat, so that not all nesting habitat has the potential for parasitism every year. No other actions are proposed in habitat for gray flycatchers.

Cumulative Effects for Alternatives 1, 3 and 4

Cumulative effects on gray flycatchers include cattle grazing in adjacent areas, wild ungulate grazing, vegetative treatments in adjacent areas, prescribed and natural fires, house and road development, firewood cutting, and recreational uses.

Cumulative effects from prescribed and natural fires are less common, but have similar impacts to grazing, and chaining and clearing of pinyon-juniper woodland depending on fire intensity. Intense wildfires have the potential to destroy nesting habitat, while less intense fires can have short-term impacts on vegetative ground cover and prey availability. On the Padre Canyon Allotment there were two recent fires that have created about 20,000 acres of opening in the pinyon/juniper woodland and, to a lesser extent, in the ponderosa pine stringers found in Padre, Mormon, Yellow Jacket and Elliott Canyons. The majority of these fires burned in mature pinyon-juniper habitats and will result in a loss of habitat for gray flycatchers.

Development of roads and subdivisions has the potential to permanently destroy nesting habitat, as well as provide a permanent source of disturbance to habitat that survives. Bird feeders, cattle or horses in subdivisions create a food source and attractant for cowbirds and facilitate parasitism in surrounding areas.

Firewood cutting has the potential to alter or destroy nesting habitat, as well as provide a source of disturbance during nesting.

Cumulative effects from recreational use can include disturbance to individual birds during nesting and alteration or destruction of nesting habitat. Pinyon seed collectors, off-road vehicle users, campers, picnickers, and antler hunters can all disturb nesting birds or impact their habitat.

Direct, Indirect, and Cumulative Effects of Alternative 2

No effects would occur to gray flycatchers from grazing Alternative 2 was implemented.

Pinyon Jays

Pinyon jays are common to uncommon permanent residents in the pinyon influenced portion of the project area (Morrall and Coons 1996; USDA 2000c).

Three major factors are considered to affect the long-term success of pinyon jays: (1) size of pinyon pine seed crops; (2) amount of nest predation; and (3) harshness of the physical environment, particularly the amount of snow during the nesting season (Marzluff and Balda 1992). Cattle grazing does not directly affect this species. This species is expected to be significantly affected by drought and beetle kill that has occurred recently and could continue in the foreseeable future.

Pinyon jays are thought to be relatively stable in Arizona. Mixed stands of pinyon-juniper occur over large areas and pinyon trees are heavily impacted by drought and beetle kill. In general, trees greater than 75 years old are preferred in large numbers. Pinyon jays were common to the project area prior to beetle kill. Their presence and breeding behavior is dependent upon the availability of pine seed crops.

Environmental Consequences

Direct, Indirect Effects for Alternatives 1, 3, and 4

None of the grazing or grazing related activities in any of the alternatives should have an impact on these species due to lack of impact to pinyons.

Cumulative Effects of Alternatives 1, 3 and 4

Vegetative treatments associated with past cattle grazing activities probably removed pinyons in some areas, removing mast producing trees for this species. **Cumulative impacts from proposed vegetation treatments on the adjacent Anderson Springs and Bar T Bar grazing allotments are expected to be minimal**. No mature stands (greater than 100 years old) are proposed for treatment so nesting habitat would not be affected. This species prefers open, mature stands of pinyon-juniper, which would generally not be treated. Only dense stands of young trees and areas where seedling and sapling trees are invading grasslands would be treated. Foraging habitat would be improved as dense stands of pinyon-juniper are opened up providing habitat for insects during the breeding season.

Drought and insect mortality have converted live to dead trees in localized habitat patches within and outside the project area and probably constitutes the biggest concern for this species. In some areas, all of the pinyon has died resulting in loss of existing and recruitment mast producing species. The rate and extent of tree mortality in the future is not known. Mortality is expected to continue at a smaller scale if wet years are in the forecast because insect infestation will continue if host trees are present but adequate moisture will assist with tree resistance to attack by insects. The extent of mortality may increase if dry years are in the forecast because drought mortality will continue and drought will facilitate insect infestation and die off.

Although infrequent, prescribed and natural fires can impact dense stands of pinyon-juniper woodland habitats to a large degree, fires that occur in this habitat type are generally of two types, low intensity ground fires or very high intensity crown fires. Low intensity ground fires are generally beneficial and may increase understory plant production, while reducing growth or killing young pinyon or juniper trees. High intensity crown fires generally burn so hot that they kill the trees and sterilize the soils, resulting in poor or no plant production and increased erosion.

On the Padre Canyon Allotment recent fires burned about 20,000 acres in the pinyon-juniper woodland and, to a lesser extent, in the ponderosa pine stringers found in Padre, Mormon, Yellow Jacket and Elliott Canyons. The majority of these fires burned in mature pinyon-juniper habitats and resulted in a loss of habitat for pinyon jays.

Firewood cutting has the potential to reduce habitat quality through removal of cone-bearing trees and loss of nesting habitat. Although Forest Service regulations only allow cutting of dead and down pinyon, some live pinyon is removed illegally. Other cumulative effects would include disturbance during nesting.

Pinyon nut collecting has the potential to reduce seeds available for food. Pinyon nut collecting generally occurs during the fall after nesting is complete, so no effects to nesting are expected. Food availability is considered to be one of the most important factors determining breeding site selection (Gabaldon 1979), so depending on the level of collecting occurring, there is potential for harmful effects on seed availability to occur.

Direct, Indirect and Cumulative Effects of Alternative 2

Implementation of this alternative would have no impact on pinyon jays from either cattle grazing or associated vegetation treatments. No actions are proposed.

Black-throated Gray Warblers

This species is a rare summer resident in ponderosa pine riparian and a fairly common summer resident and transient in lower elevation riparian. Potential habitat for this species is Ashurst Spring, Boot Spring and Billy Back Spring. This species is thought to be stable or slightly increasing in Arizona. They are common within the project area and are considered to be stable to increasing.

Environmental Consequences

Direct, Indirect, and Cumulative Effects of Alternatives 1, 3, and 4

Grazing in potential habitat for this species can impact the structure and vigor of riparian species. Changes in vegetative structure, plant diversity, and density can occur. Cattle can alter these areas by bedding, trampling, and trailing. Grazing of riparian habitat results in reduction of cover and impacts to seed heads. Other impacts from grazing includes compaction of surface soils that reduces infiltration and increases surface runoff, reduction of bank stability which leads to accelerated erosion and increased sedimentation, and removal of organic material due to reduction in plant vigor and density. Use in spring areas is likely to be higher than the average utilization levels proposed because wildlife and cattle concentrate in riparian areas. Ashurst Spring is already excluded from elk and cattle grazing. The installation of pipelines and drinkers in Alternatives 3 and 4 may reduce cattle use at springs slightly and, thus, may offer a slight advantage for Lincoln's sparrows over Alternative 1.

Alternative 1 has similar effects as Alternatives 3 and 4 except Alternative 1 has more impacts at Boot Spring and Billy Back Spring. With implementation of Alternative 1, these two springs will

continue to be grazed by cattle resulting in impacts to potential habitat. These impacts include: reduced height to vegetation in wet meadow and spring vegetation, soil compaction and possible shifts in understory species composition. Wildlife use is additive to that of cattle. These impacts to vegetation may reduce habitat quality. Alternative 1 has the greatest impact due to cattle access to potential habitat and longer pasture duration than the other alternatives.

Cattle indirectly affect this species by facilitating cowbird parasitism which can reduce reproductive potential. All grazing alternatives will facilitate parasitism because cowbirds can travel several miles from feeding areas to nest sites. Alternative 1 has greater impacts than Alternatives 3 and 4 because potential habitat is grazed and duration of grazing in pastures is generally longer. The potential for cowbird parasitism would be mitigated to some extent by grazing schedules that vary annually and the proposed rest of Boot Pasture for the next 3 years.

Cumulative effects from recreational uses could occur and could result in trampling of willows and other riparian vegetation at springs and soil compaction. Visitation to all of the spring sites by recreationists is low and is expected to remain low in the foreseeable future due to poor road conditions.

Direct, Indirect, and Cumulative Effects of Alternative 2

No cattle would be present in the project area if this alternative was implemented, so no direct, indirect, or cumulative effects would occur.

High Elevation Grassland Habitat Type Priority Species: High elevation grassland habitat types are interspersed throughout the project area with the largest acreage occurring above the Anderson Mesa rim on the Pickett Lake Allotment. There are a few dry meadows within the ponderosa pine vegetation types along the western portion of the project area. Partners in Flight have identified four species of concern for high elevation grasslands: ferruginous hawks, Swainson's hawks, burrowing owls, and grasshopper sparrows. Habitat descriptions for these species can be found in Table 27. Grasshopper sparrows are not known from the project area and will not be discussed. In Arizona, grasshopper sparrows are limited to southeastern Pima County (Buenos Aires National Wildlife Refuge) east through Santa Cruz and southern Cochise County and south into northern Sonora, with a separate population breeding in the plains grasslands of Chino Valley in Yavapai County (Latta et al. 1999).

Ferruginous Hawks

Ferruginous hawks are uncommon winter residents and fairly common transients (Morrall and Coons, 1996; USDA 2000c). They are regularly spotted in late fall in open grasslands on the Anderson Springs Allotment. This species is expected to be static within the project area. There is fall migratory use in grasslands on Pickett Lake Allotment, but no known nesting sites.

Environmental Consequences

Direct, Indirect, and Cumulative Effects for Alternatives 1, 3, and 4

Impacts on ferruginous hawks are generally related to prey availability and habitat loss. Rodents such as prairie dogs are important as prey for this species. Many prairie dog colonies were eradicated in the early part of the century and have never recovered.

Additionally, the shift from open grasslands to shrublands and pinyon-juniper woodlands has reduced habitat availability for prey species. Cattle grazing as proposed in any alternative is not expected to impact this species to any great degree. Prairie dog control is not part of management of cattle on these allotments. Woodland encroachment would continue to occur since no

vegetation treatments are proposed. Long-term negative trends in loss and alteration of grasslands resulting from combined climate change, grazing, and fire suppression would continue.

Direct, Indirect, and Cumulative for Alternative 2

Impacts from cattle grazing would not occur if this alternative was implemented. As described for the other alternatives, long-term negative trends in loss and alteration of grasslands would continue. Although cattle grazing would not be permitted, wild ungulate grazing (primarily elk) would continue at the same or at a slightly decreased level. This combined with fire suppression and climate changes would continue the trend toward loss of grassland habitat types throughout the project area.

Table 27. High elevation grassland habitat migratory bird species on the Pickett and Padre allotments

Species	Vegetation Composition/ Structure	Abiotic/Landscape Factors	Special Factors
Ferruginous Hawk	-Scattered, isolated junipers for nesting -Sparsely vegetated grassland. -Nest on elevated areas	-Elevation: 4,900 to 6,200 ft. -Nest sites in isolated junipers, ledges, knolls, rock outcrops or pillars, cliffs faces. -Nests are placed in open with grand view. -Shows no preference for shading.	-Occur where larger populations of prairie dogs, ground squirrels, rabbits, and pocket gophers exist. -High sensitivity to human disturbance around nests.
Swainson's Hawk	-More grass and less small woody shrubs than Ferruginous Hawk habitat. -Sparse shrublands, small, open woodlands -Nest trees include: cottonwood, catclaw acacia, tall cholla, juniper -Will forage in agriculture fields, but the crop cannot be taller than local grass; prey difficult to locate. -Nest in small trees in smaller clumps, wind breaks, woody washes esp. when adjacent to red-tailed hawks.	-Elevation 4,900 to 7,000 ft, locally to 9,500 ft. in the White Mountains. -Prefer large expanses of grasslands with interspersed trees or large shrubs. -Primarily a tree nester, but also nest on utility poles, windmills.	-Eat grasshoppers during migration and on wintering grounds. Foods: lizards, snakes, birds, ground squirrels, voles, pocket gophers. -Non-breeders hunt communally and eat primarily insects. -not as sensitive to human activity as ferruginous hawk.
Burrowing Owl	-Grasses and plant communities in early succession. -Grasses and plant communities in early successional stage. -Rock outcrops that attract burrowing mammals to provide burrows.	-Elevation 4,900 to 7,000 ft. -Little to no slope. -Dry, open, short grass, treeless plains, often associated with burrowing mammals. -Need perches: fencepost, mounds, power lines, etc. -Early successional stage (grassland).	-Limited to areas with active small and/or burrowing mammals. -Food: insects (grasshoppers, crickets, beetles) and small mammals, herps, birds.

Swainson's Hawks

Swanson's hawks are rare transients in ponderosa pine grasslands and in pinyon juniper grasslands at lower elevations (Morrall and Coons, 1996; USDA 2000c).

Swainson's hawks occupy grassland habitats within the project area, although habitat is limited to short grass prairie habitats. Woodland encroachment into these grasslands and global decreases in this species' numbers are expected to be resulting in static to decreasing numbers of Swainson's hawks within the project area.

Environmental Consequences

Direct, Indirect, and Cumulative Effects for Alternatives 1, 3, and 4

Impacts on Swanson's hawks are generally related to habitat loss and alteration. The shift from open grasslands to scrublands and pinyon-juniper woodlands has reduced habitat availability for prey species, primarily insects. Cattle grazing proposed in the grazing alternatives are not expected to impact this species to any great degree. Woodland encroachment would continue to occur since no vegetation treatments are proposed. Long-term negative trends in loss and alteration of grasslands resulting from the combination of climate change, grazing, and fire suppression would continue.

Prescribed and natural fires may have both positive and negative impacts. Positive impacts would include restoration and maintenance of grassland sites through removal of woody species encroaching into native grasslands. Negative short-term effects could occur to prey species habitat. Decreased food and cover can result from fires, but over time, burning would enhance prey species habitat by increasing nutritional value of forage species and increasing plant vigor and cover.

Recreational uses have the potential to impact this species through disturbance to individual birds and nests.

Direct, Indirect, and Cumulative for Alternative 2

Impacts from cattle grazing would not occur if this alternative was implemented. Long-term negative trends in loss and alteration of grasslands would continue. Although cattle grazing would not be permitted, wild ungulate grazing (primarily elk) would continue at the same or at a slightly decreased level. This combined with fire suppression and climate changes would continue the trend toward loss of grassland habitat types throughout the project area.

Burrowing Owls

Burrowing owls are an uncommon grassland species in the project area but have been documented in the area. Habitat is limited to grasslands on Pickett Lake Allotment. Burrowing owls are considered to be declining throughout the majority of their range. Population numbers vary with burrow availability. Within the project area, they are expected to be stable to slightly declining.

Environmental Consequences

Direct, Indirect, and Cumulative Effects for Alternatives 1, 3, and 4

The presence of nest burrows is a critical habitat requirement for this species. Indirect effects of cattle grazing can include prairie dog control that reduces prairie dogs and the number of burrows available for burrowing owls. No prairie dog control will be done within the project area, so no

impacts on burrows should occur. As described for the ferruginous hawk and the Swanson's hawk, woodland encroachment would continue to occur since no vegetation treatments are proposed. Long-term negative trends in loss and alteration of grasslands resulting from the combination of climate change and fire suppression would continue. Vegetation treatments as proposed on the adjacent Anderson Springs and Bar T Bar Allotments that benefit grasslands will be beneficial for this species if implemented.

Direct, Indirect, and Cumulative for Alternative 2

Impacts from cattle grazing would not occur if this alternative was implemented. As described for the grazing alternatives, long-term negative trends in loss and alteration of grasslands would continue. Although cattle grazing would not be permitted, wild ungulate grazing (primarily elk) would continue at the same or at a slightly decreased level. This combined with fire suppression and climate changes would continue the trend toward loss of grassland habitat types throughout the project area.

High Elevation Riparian Habitat Type Priority Species: The tree species indicative of high elevation riparian habitat are: maple, sycamore, walnut, willow, cottonwood, alder, box elder, ash, aspen, Douglas-fir, white fir, oak and cypress. High elevation riparian habitat types are limited to the springs along the Anderson Mesa rim, which do not contain the tree species described above. Partners In Flight identified five species of concern for this habitat type: common black-hawks, elegant trogons, southwestern willow flycatchers, MacGillivray's warblers, and red-faced warblers (see Table 28). No potential or suitable habitat is present within the project area for common black-hawks, elegant trogons, southwestern willow flycatchers, therefore, they will not be discussed.

Table 28. High elevation riparian habitat migratory bird species on the Pickett and Padre allotments

Species	Vegetation Composition/ Structure	Abiotic/Landscape Factors	Special Factors
MacGillivray's Warbler	-Mesic/marshy willow thickets. -Wet meadows/edges -Ribes sp. (gooseberry). -Nests under new growth of Gambel oak, snowberry. -Needs dense understory	-Elevation 6,000 to 9,000 ft. -Associated w/riparian habitat at the edges of conifer and deciduous forests.	-Obligate understory (dense) nester. -Primarily breed in the White Mountains and locally above the Mogollon rim, in a relatively small geographic area.
Red-faced Warbler	-Maple, oak, sycamore, willow (and associated conifers). -Midstory important, dense preferred. -Not necessarily tied to dense understory.	-Elevation 7,000 to 9,000 ft. -Steep gradients. -Sloped riparian edges. -Mostly in steep canyons	-Ground nester

MacGillivray's Warblers and Red-faced Warblers

MacGillivray’s warblers are considered fairly common transients and uncommon summer residents in their preferred riparian, high elevation habitat. Red-faced warblers are uncommon to fairly common summer residents in ponderosa pine, mixed conifer riparian (Morrall and Coons 1996; USDA 2000c). There is potential habitat (springs) for both species within the project area.

Environmental Consequences

Direct, Indirect, and Cumulative Effects for Alternative 1

Of primary concern for MacGillivray's warblers is habitat loss, frequency of disturbance regimes (fire and natural disturbances) and human disturbance. Cattle grazing has the potential to alter or destroy migration, wintering, and breeding habitat for this species. Habitat is very limited within the project area. In general, riparian areas exhibiting the necessary habitat characteristics for this species are inaccessible to cattle. Grazing at Boot and Billy Back Springs will alter potential habitat for this species. Areas with dense, low shrubs and trees are often located on steep slopes, which cattle avoid. Overall, impacts on this species and habitat would be at low levels. No other actions are proposed that would impact MacGillivray's warblers. The cumulative effects are the same as what is described for Alternatives 3 and 4.

Direct, Indirect, and Cumulative for Alternative 2

No cattle would be present in the project area if this alternative was implemented, so no direct, indirect, or cumulative effects would occur.

Direct and Indirect Effects of Alternatives 3 and 4

The fence modifications in these two alternatives will restrict cattle grazing in Boot and Billy Back Springs, potential habitat, which will be of benefit to this species. The two grazing use levels and different rotations proposed should not alter habitat. The proposed pipelines and drinkers may divert some wildlife use from springs to the drinkers.

Cumulative Effects of Alternatives 3 and 4

Cumulative effects would include cattle grazing on their habitat on adjacent allotments, wildlife grazing, prescribed and natural fires, and recreational uses.

Grazing can modify the vegetation structure needed by these species and compact soil.

Prescribed and natural fires have the potential to create, alter, or destroy shrubby habitats used by this species. Fire-adapted shrubby species require burning to stimulate plant growth. Fire also has the potential to alter shrubby and riparian habitats by thinning out dense stands or shrubs or by stimulating growth of shrubs. Very hot fires can sterilize soils and reduce the habitat potential in some cases.

Recreational uses, primarily in riparian areas, have the potential to disturb nesting birds and destroy habitat for this species.

Important Bird Areas

The Important Bird Areas (IBAs) program is an international, site-based approach to bird conservation that began in Europe in the mid-1980s when Bird Life International sponsored a continent-wide inventory of key sites for birds. The effort spread to the United States, and in the mid-1990s the American Bird Conservancy and National Audubon Society completed a pilot project to identify and describe the important bird areas of Pennsylvania.

The IBA program recognizes that there are places on the landscape that provide exceptionally valuable or essential habitat for one or more species of birds, including breeding, wintering or migratory habitat. In early 2004, the Northern Arizona Audubon Society nominated Anderson Mesa as a new IBA. The nomination was submitted to Arizona Partners in Flight and was accepted as a new IBA by the summer of 2004.

Environmental Consequences

Direct, Indirect, and Cumulative Effects for All Alternatives

The Anderson Mesa IBA is particularly important to migrating species that use the seasonal and semipermanent wetlands found on the mesa. Alternatives 2, 3 and 4 will have no effect on the seasonal and semipermanent wetlands found within the project area, since they will not be grazed under any of these alternatives. Only Alternative 1 proposes to continue grazing within seasonal and semipermanent wetlands, which may affect the vegetative structure of the wetland. The vegetative structure of all wetlands in the project areas is dependent on precipitation patterns. Cattle grazing has little effect on hydrophytic vegetation when there is sufficient water in the wetland basin to discourage excessive grazing. Cumulatively, the expected exclusion of seasonal and semipermanent wetlands in the Bar T Bar and Anderson Springs Allotments and restoration of the Hay Lake complex by the Natural Resource Conservation Service is expected to improve habitat for migrating birds across Anderson Mesa.

Economy

Although the contributions of grazing to local economies and county government is small in relation to other businesses and funding sources, this section will discuss the effects and differences between each alternative based on jobs, national forest fees, and other revenues.

Domestic cattle grazing contributes to the livelihood of the Pickett Lake and Padre Canyon permittees as well as to the economy of local communities and nearby counties. Individual allotments provide incremental contributions to local economies, so changes in several allotments could cumulatively impact the rural economy. The Pickett Lake and Padre Canyon Allotments are in Coconino County. These allotments are currently permitted for 845 head of cattle, so the economic effect is low to moderate for the local communities and nearby counties.

Income associated with cattle grazing represents a small percentage of the Flagstaff area economy. The nearest community to the allotments is Mormon Lake, which is primarily supported by recreation and summer homes. The Flagstaff economy is large and fairly diverse and grazing and associated revenues make up a very small portion of that economy. Permittees contribute a small percentage to county tax revenues. Cattle grazing permit revenues are a small percentage, but an important contributor, to the funds Coconino County receives from national forest grazing fees.

Cattle grazing operations make a larger contribution to the economy of rural landowners in the area. There are 1,100 acres of private land on the allotments, a portion of which is owned and operated by the permittee. Outside of the Pickett Lake and Padre Canyon Allotments, some of the private land on Anderson Mesa is owned and operated as ranches by different permittees.

The economy of Coconino County gains revenue from several sources: county sales taxes, state-shared sales taxes, highway user revenues (gasoline taxes), property taxes and national forest fees. The greatest revenues come from the county and state-shared sales taxes. National forest fees—which include payments from timber harvesting, mining, recreational uses, and cattle

grazing—are an important part of county revenues, but provide only a fraction of available funds. Coconino County also receives fees from uses on the Kaibab and Apache-Sitgreaves National Forests. Coconino County uses national forest fees for highway maintenance and schools.

The Pickett Lake and Padre Canyon permittees directly contribute revenues to Coconino County through property taxes on range structural improvements. They also pay taxes to Arizona for using Federal and Arizona State Trust lands for a commercial purpose. These state taxes equal a percent of the assessed value of the permit based on grazing fees.

Environmental Consequences

Estimates of direct and indirect jobs and payments to Coconino County from Federal receipts provide a relative comparison of economic effects that could occur due to changes in cattle grazing. Table 29 estimates the effects expected on these indicators in Coconino County from implementing Alternatives 1 through 4 on the Pickett Lake and Padre Canyon Allotments.

Quantifiable factors such as economic costs and outputs, along with projected animal months (AM) or animal unit months (AUM) have been used to help describe the economic effects of grazing on the Pickett Lake and Padre Canyon Allotments. A computer economic analysis program called Quicksilver was used to calculate these factors [PRD 62].

Table 29. Economic effects for Coconino County by alternative

Economic Effects	Alt 1	Alt 2	Alt 3	Alt 4
Direct and Indirect Jobs* (No.)	9.6	0	10.4	8.5
Federal Payments to Counties**	$1,510	0	$1,306	$1,073

*About 1.14 jobs per 100 cattle

**The amount shown under the alternatives is a projection of 25 percent of all grazing fees to Coconino County at the 2004 grazing fee rate of $1.43. Not shown in this amount are the taxes that counties collect on range structural improvements. These taxes are based on a percentage of the assessed values of those improvements.

Although projections from the Quicksilver model are precise in measurement, they serve best as an indicator of change rather than a precise measurement. Additionally, identifying some of these effects is difficult, if not impossible, as economic effects tend to deal with personal issues.

An investment analysis anticipates the rate of return for the projected expenditures by the permittee and Forest Service on the Pickett Lake and Padre Canyon Allotments. Measures used to conduct an investment analysis include: present value of benefits, present value of costs, present net value and the benefit/cost ratio. Table 30 displays the results of this investment analysis, by alternative, for the Pickett Lake and Padre Canyon Allotments [PRD 62]. These figures have been rounded to the nearest dollar.

Effects to Pickett Lake and Padre Canyon Permittee for All Alternatives

Gross revenue estimates are created by estimating the amount of calves produced each year for each alternative. For calves, the following figures are used in the calculations, although these figures may vary, depending on current market prices: 90 percent cow to calf ratio, 500 pounds per calf at $0.80 per pound. The estimated gross annual revenue for Alternative 1 two herds is $304,200 per year. In Alternative 2, the estimated gross annual revenue is $0. The estimated gross annual revenue for Alternative 3 is $328,680. The estimated gross annual revenue for Alternative 4 is $270,000. These gross revenue figures are somewhat misleading because cattle do not graze

on the Coconino National Forest yearlong. Cattle graze on the forest 5 months in Alternative 1 and 4 months in Alternatives 3 and 4, and are on private or state lands the remainder of the year.

In Alternative 2, the permit for grazing cattle on these allotments would be temporary cancelled for a 10-year period. The permittee would lose future potential revenue derived from the sale of cattle that would have been produced on the Pickett Lake and Padre Canyon Allotments. Private land owned by the permittee could also be affected. When the public land permit associated with the ranch operation is lost, the permittee's economic ability to maintain a ranching operation may be greatly diminished or eliminated. Without the public land permit, the base property controlled by the permittee would be greatly affected. No complete projections were made for the permittee's actual costs, the ability to cover costs, or any supplemental income that may be available.

Table 30. Investment analysis by alternative

Investment Analysis	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Forest Service				
Present Value of Benefits_	$55,046	0	$47,580	$39,086
Present Value of Costs[2]	($22,645)	($6,605)	($63,325)	($63,325)
Present Net Value[3]	$32,401	($6,605)	($15,745)	($24,240)
Benefit/Cost Ratio[4]	2.43	0	0.75	0.62
Permittee				
Present Value of Benefits	$318,726	0	$275,500	$226,315
Present Value of Costs	($84,132)	0	($142,301)	($133,504)
Present Net Value	$234,594	0	$133,199	$92,811
Benefit/Cost Ratio	3.79	0	1.94	1.70
All Partners				
Present Value of Benefits	$373,772	0	$323,081	$265,400
Present Value of Costs	($106,777)	($6,605)	($205,627)	($196,830)
Present Net Value	$266,995	($6,605)	$117,454	$68,571
Benefit/Cost Ratio	3.50	0	1.57	1.35

Note: Dollar figures in ( ) indicate a negative amount, or loss of money

[1] *Present value of benefits* represents the income generated from grazing on the Pickett Lake and Padre Canyon Allotments by the permittee, along with the present value of the grazing fees collected by the Forest Service.

[2] *Present value of costs* represents the cost of maintenance and range improvements (for the permittee), along with the costs of range inspections, permit administration, monitoring and materials for range improvements (for the Forest Service).

[3] *Present net value* represents present value of benefits minus present value of costs.

[4] *Benefit/cost ratio* represents the present value of benefits divided by the present value of costs.

Effects to Local and Federal Economy for All Alternatives

In Alternative 2, the loss of the Pickett Lake and Padre Canyon Allotment permits would eliminate $1,510 at the 2004 fee rate of $1.43/AUM for the current permit from the treasuries of Coconino County. This loss, by itself, is not substantial. The county would also lose revenues from taxes on structural improvements and the state would lose tax revenues based on the permittee's use of Federal lands

Under Alternatives 1, 3 and 4, ranching on the Pickett Lake and Padre Canyon Allotments may help maintain current jobs within communities around these allotments and revenues for Coconino County and the state. If changes are made in the use of the Pickett Lake and Padre Canyon Allotments in the future, contributions to state, county and local economies from fees, taxes and jobs associated with cattle grazing on these allotments would change accordingly.

The loss of direct and indirect jobs shown for Alternative 2 is also shown in Table 29. All jobs directly associated with the permit (as outside businesses) would be eliminated with this alternative. Some of the jobs indirectly associated with the permit (as outside businesses) would be eliminated, however, some would still exist because other ranches and portions of communities that use ranching supplies and services on the Pickett Lake and Padre Canyon Allotments also support these businesses.

Other Required Disclosures

NEPA at 40 CFR 1502.25(a) directs "to the fullest extent possible, agencies shall prepare draft environmental impact statements concurrently with and integrated with other environmental review laws and executive orders."

The Forest Service has consulted with the U.S. Fish and Wildlife Service and the State Historic Preservation Office, as required under the following acts and laws:

- Fish and Wildlife Service under the Endangered Species Act regulations for projects with threatened or endangered species.
- State Historic Preservation Office under the National Historic Preservation Act for causing ground disturbing actions in historical places.

The Forest Service did not consult with the National Marine Fisheries Service because there are no threatened or endangered fish species within the project area. The Forest Service did not need to consult USFWS under the Fish and Wildlife Coordination Act because no water is proposed to be impounded or diverted.

Cultural Resources

The archaeological clearance report for the project documents the archaeological inventory, results of consultations with tribes, and the determination of no adverse effect in compliance with the National Historic Preservation Act (P.L. 89-665, as amended). This clearance report contains site-specific protection measures for implementation and monitoring requirements [PRD 20]. Consultation with tribes resulted in no specific concerns about the effect of the Proposed Action or alternatives.

Since there was a *no effect* determination to cultural resources as a result of the project activities, there would be no indirect or cumulative effects to cultural resources based on other past, present, or reasonably foreseeable future actions.

Air Quality

The Pickett Lake and Padre Canyon Allotments and adjacent lands are within the Little Colorado Airshed. This airshed is a nonsensitive airshed. The resource value most affected by air pollution is visibility. The effect or potential for deterioration of visibility is from smoke and dust. No burning is proposed for any alternative in this analysis. Cattle grazing on the Coconino National Forest does not impact air quality over the long term.

Under the action alternatives, short-term, isolated effects on air quality on the Pickett Lake and Padre Canyon Allotments may occur from dust when cattle are herded and transported, or from odor in the immediate vicinity of the animals. There is also dust in the air because this area of Arizona is windy for a good part of the year. There are no substantial effects to accumulate to other actions. Other allotments have dust, but the isolated and short-term dust effects are not measurable.

Public Safety

The human environment is defined in CFR 40 1508.14. Chapter 3 contains information about economic impacts, and the project record has information on social values including recreation opportunities, aesthetics, and perceptions [PRD 61].

There is little human interaction between cattle and people on the Pickett Lake and Padre Canyon Allotments. Fences and cattle guards are interspersed across the landscape and do not currently pose a public safety risk. There are no direct, indirect, or cumulative effects to public safety from this project.

Inventoried Roadless Area

The 9,424-acre Padre Canyon Inventoried Roadless Area (IRA) is shown in Figure 12. This area was inventoried under the roadless area review and evaluation (RARE I and RARE II) process during the late 1970s and early 1980s. The Padre Canyon IRA, like other roadless areas on the Coconino National Forest, is a rugged canyon area not easily traversed by roadways and, thus, has remained roadless. Historically, use has been cattle grazing and hunting within the roadless boundary and firewood gathering from perimeter roads.

Approximately 8,810 acres of the IRA are within the northern portion of Padre Canyon Allotment. The remaining 614 acres are within the adjacent Deep Lake Allotment. The Padre Canyon Roadless Area is noted for its important wildlife and heritage values (J. Nelson, pers. comm., 2005). With significant areas of semiprimitive motorized and semiprimitive nonmotorized forest lands surrounding the Padre IRA, this place is also a valuable backcountry area of opportunity for people seeking solitude, which is not necessarily found in nearby designated wilderness or other primitive areas of the forest [PRD 16].

The Proposed Action and alternatives would not affect the character or status of the Padre Canyon Inventoried Roadless Area. There are no permanent or temporary roads proposed in this project and no structural improvements (e.g. fencing or pipelines) proposed within the Padre Canyon IRA. Existing stock tanks or fences may be maintained by the Forest Service or permittee as needed. The amount of hunting and other recreational uses that occur within the roadless area is light due to its rugged nature. Access or the ability to use the Padre Canyon Roadless Area

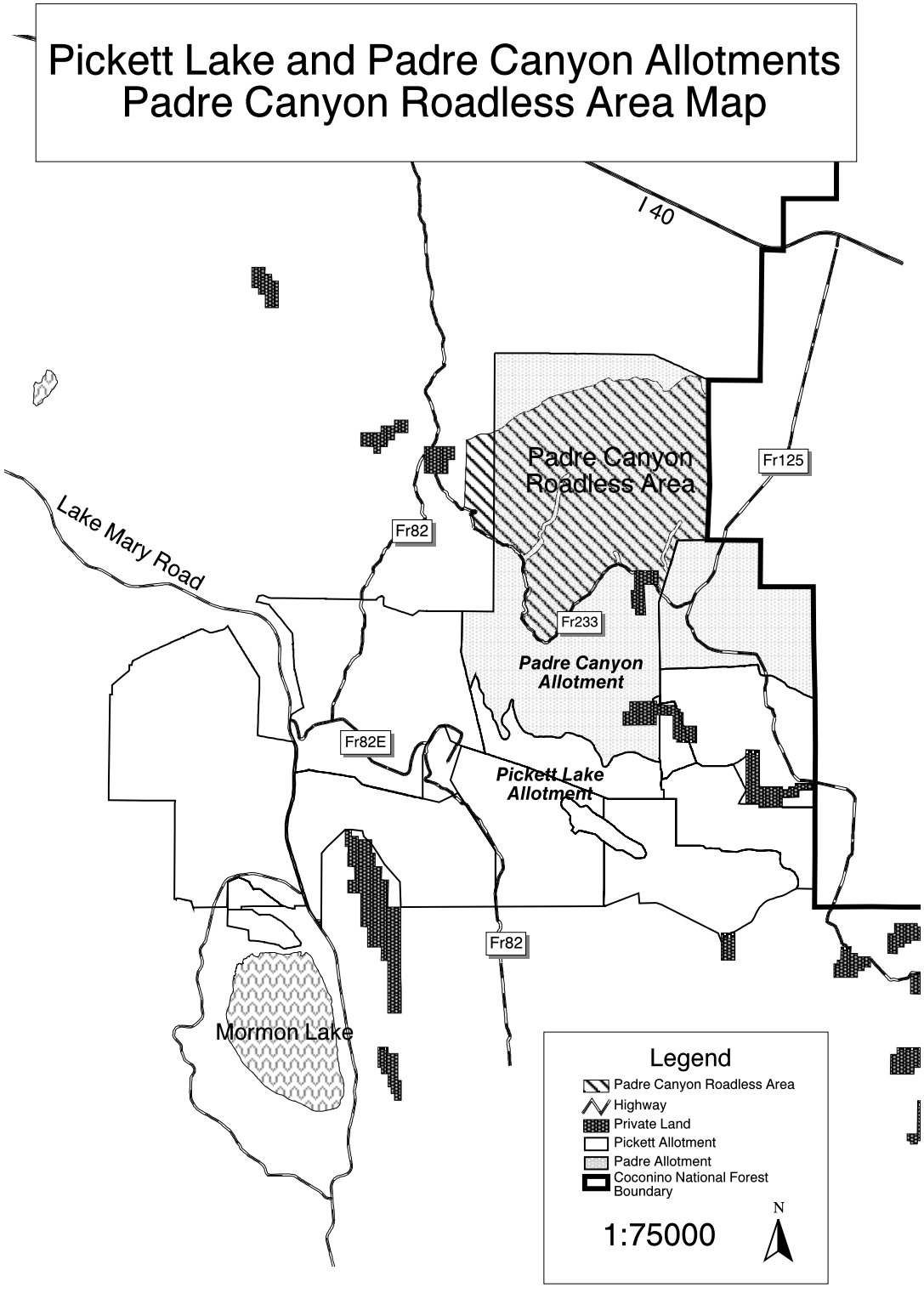


Figure 12. Map of the Padre Canyon Inventoried Roadless Area

would not be prevented by continuing cattle grazing. Recreationists using the area may occasionally see cattle but this is no change from how the area has been used or managed over the past 30 years since its designation.

Short-term Uses and Long-term Productivity

NEPA requires consideration of "the relationship between short-term uses of man's environment and the maintenance and enhancement of long-term productivity" (40 CFR 1502.16). Short-term use of the land includes the day-to-day and year-to-year activities that the permittee, Forest Service land managers, and even visitors engage in on the Pickett Lake and Padre Canyon Allotments. This includes activities that remove resources from the land, such as cattle grazing or firewood gathering, as well as activities that do not, such as hiking and wildlife viewing. Short-term actions also include management activities such as vegetation management, structural improvements, and road maintenance. Long-term productivity refers to the land's continuing ability to produce commodities, such as plant products, wildlife, or recreation opportunities, for future generations. This includes management practices and uses that do not impair soil productivity and water quality, provide habitat without altering the natural landscape to recover, or impair geologic features to the extent they lose identity.

In summary, the "Environmental Consequences" chapter of this DEIS discloses that:

- Continued cattle grazing on the Pickett Lake and Padre Canyon Allotments would have some minimal effects to plant height and cover but little overall effect to rangeland vegetation. There would be some minor effects to unsatisfactory and impaired soils and mycrophytic soil crusts. Range conditions in the project area would continue to be static with an upward trend.
- In Alternatives 3 and 4, cattle would affect wetlands by reducing vegetative cover within the lanes to stock tanks, resulting in minor effects to cinnamon teal. The overall effects of cattle grazing would still maintain or improve wetlands and wetland vegetation in the project area.
- The action alternatives would have some overall effects on pronghorn, a management indicator species for grasslands. Less fencing may have an additive benefit to pronghorn under Alternatives 1 and 2. Late use in key pastures in Alternatives 3 and 4 and less upland use under Alternative 4 could potentially provide greater hiding cover for fawns.
- For other management indicator species and migratory bird species of concern, there would be little to no impact on forest-wide habitat or population trends.
- Findings include a *no effect* determination for bald eagle and black-footed ferret and a *may affect but is not likely to adversely affect* determination for Mexican spotted owl. The determination for peregrine falcon, northern goshawk, and northern leopard frog is *may impact individuals, but is not likely to result in a trend toward Federal listing or loss of viability*.
- Continued cattle grazing would have little to no effect on the local economy, cultural resources, air quality, public safety, or the Padre Canyon Inventoried Roadless Area.

Although some short-term environmental effects would occur as a result of implementing the action alternatives, the cumulative effects analysis provides evidence that these impacts are minor and would not result in significant adverse effects to long-term productivity.

Unavoidable Adverse Effects

Implementing any alternative would result in some degree of environmental effects. Following mitigation measures (described in Chapter 2) is intended to lessen adverse effects or keep the extent and duration of these effects to acceptable levels. Adjusting the season of cattle grazing, rotating pastures, and installing exclosure fences are examples of mitigation measures built into the design of some alternatives. However, mitigation cannot eliminate all negative effects and implementing any of the alternatives would still result in some unavoidable adverse effects:

- Alternative 1 (Current Management) would result in adverse direct effects to plant height and cover, rangeland vegetation, cinnamon teal, pronghorn, and wetlands. These effects are not considered to be significant.
- Alternative 2 (No Action/No Grazing) would result in adverse effects to the permittee's ranching business, the permittee's access to water rights and claims, and direct jobs associated with the permit.
- Alternative 3 (Proposed Action) would result in less adverse direct effects to plant height and cover, rangeland vegetation, cinnamon teal, pronghorn, and wetlands compared to Alternative 1.
- Alternative 4 (Reduction in Permitted Cattle Numbers and Utilization) direct effects would be similar to Alternative 3, except plant height and cover and rangeland vegetation would be affected less due to a lower utilization guideline and reduction in cattle.

The knowledge base is less then complete regarding many of the relationships and conditions of wildlife, fish, forests, jobs, and communities. The ecology, inventory, and management of a large forest area combined are a complex and developing science. The biology of wildlife species prompts questions about population dynamics and habitat relationships. The interaction of resource supply, the economy, and communities is the subject matter of an inexact science. However, the basic data and central relationships are sufficiently well established in the respective sciences for the responsible official to make a reasoned choice between the alternatives, and to adequately assess and disclose possible adverse environmental consequences. New or updated information would be unlikely to reverse or nullify these understood relationships.

None of the effects described in this chapter are uncertain, unique, or unknown. The Forest Service has had ample experience implementing similar types of projects. Monitoring described for this project would add to our knowledge of possible effects and the level of these effects. Moreover, management of the Pickett Lake and Padre Canyon Allotments under any alternative does not set a precedent for adjacent allotments.

Irreversible and Irretrievable Commitments of Resources

Irreversible commitments of resources are those that cannot be regained, such as the extinction of a species or the removal of mined ore. Irretrievable commitments are those that are lost for a period of time such as the temporary loss of timber productivity in forested areas that are kept clear for use as a power line right-of-way or road.

The interdisciplinary approach used to identify specific practices was designed to eliminate or lessen adverse consequences. The application of Forest Plan standards and guidelines, best management practices, project-specific mitigation measures, and monitoring are all intended to further limit the extent, severity, and duration of potential effects. The Pickett Lake and Padre Canyon Allotments, a renewable resource, are managed in such a way they will be available for

future generations. There are no irreversible or irretrievable commitments associated with this project.

Environmental Justice

Under Executive Order No. 12898, Environmental Justice ensures that, to the greatest extent practicable and permitted by law, all populations are provided the opportunity to comment before decisions are rendered on, are allowed to share in the benefits of, are not excluded from, and are not affected in a disproportionately high or adverse manner by government programs and activities affecting human health or the environment. One goal of Environmental Justice is to provide the opportunity for minority and low-income populations to participate in planning, analysis, and decisionmaking that affects their health or environment, including identification of program needs and designs.

An interdisciplinary team of Forest Service personnel looked at the social, economic, and environmental impacts of this project and determined that none of the alternatives considered in this analysis would have a disproportionate impact on any minority or low income population in the immediate area, within surrounding counties, or in the northern Arizona region.

Eliminating 845 head of cattle from the current grazing operations along with about 10 employees in Alternative 2 would have an impact to the current permittee, who are considered minorities (Native Americans). This is especially true because this permit is for 4 to 5 months and the remainder of the year the cattle are on private and/or state land. The permittee would have to find an alternate area on which to run their cattle during the time they would have normally run on the Pickett Lake and Padre Canyon Allotments.

Chapter 4. Monitoring

Monitoring will occur under all action alternatives during the permit term and includes the following activities: permit compliance, allotment inspections, range readiness, forage production, rangeland utilization, condition and trend, soil condition, noxious weeds, and threatened and endangered species. Under Alternative 2 (No Action), condition and trend and wildlife utilization would continue to be monitored. Monitoring frequency varies by each activity and may be accomplished by either the permittee and/or Forest Service personnel.

Compliance: Throughout each grazing season Forest Service personnel will monitor to determine accomplishments of the permit terms and conditions, the AMP, and the AOI.

Allotment Inspections: Allotment inspections are a written summary done each fall by Forest Service personnel to document compliance monitoring and to provide an overall history of that year's grazing. This document may include weather history, the year's success, problems, improvement suggestions for the future, and a monitoring summary.

Range Readiness: Each spring, Forest Service personnel and/or the grazing permittee will assess range readiness prior to cattle coming on the allotment to determine if vegetative conditions are ready for cattle grazing. The range is generally ready for grazing when cool season grasses are leafed out, forbs are in bloom, and brush and aspen are leafed out. These characteristics indicate the growing season has progressed far enough to replenish root reserves so that grazing will not seriously impact these forage plants.

Forage Production: Production surveys for these allotments will be done every 9 to 13 years. Methods used for these surveys will use the best available methods at that time. These values will be used as tools to manage this allotment, but will not be the sole measurement to establish carrying capacity. The most recent forage production surveys were done as part of this analysis in 2001. The next survey is scheduled to occur after 2010.

Rangeland Utilization: Utilization guidelines are for both cattle and/or wildlife. The *seasonal utilization* guideline is applied before the end of the growing season and is used when determining pasture moves. *Utilization* is measured at the end of the growing season when the total annual production can be accounted for and the effects of grazing in the whole management unit can be assessed. Utilization data will not be used alone, but will be used along with climate and condition/trend data, to set stock levels and pasture rotations for future years.

Depending on the alternative selected, pasture moves would be determined by a seasonal utilization guideline of 35 percent or 20 percent seasonal utilization. Seasonal utilization is an approximate value because it takes into account any additional growth which might occur that year and considers season of use, wildlife use, weather conditions, availability of forage, and water in pastures. For example, if wildlife use exceeds this guideline in a pasture, cattle would skip this pasture and move to the next pasture in the rotation.

Condition and Trend: Watershed and vegetative condition and trend monitoring will help determine the effectiveness of the allotment management plan, and long-term range and watershed trends.

Parker Three-Step and paced transect monitoring points were established throughout this allotment in the 1950-60s. These transects are one of best historic records of range condition and trend. The photo points and vegetative ground cover data show how the site has changed over time. Canopy cover and frequency plots were placed with the Parker Three-Step transects in 2001 to add to this historic data.

Ocular plant canopy cover 0.10-acre plots were used to compare existing conditions with potential and desired vegetative community conditions. Over time, these plots will show how

canopy cover changes. Canopy cover will provide an indication of how plants are growing, assuming that if they are getting bigger and occupying more space, then they are doing well and can be a relative gauge of vigor.

Frequency and ground cover data were collected using the widely accepted plant frequency method (University of Arizona, Extension Report 9043, 1997). These plots will monitor trends in plant species abundance, plant species distribution and ground cover. This will provide information on plant composition and additional information on regeneration.

These transects will be read at least every 10 years by Forest Service personnel. These plots will help determine the effectiveness of current management.

Precipitation: Precipitation is currently recorded at the Flagstaff National Weather Service Office at Bellemont. Precipitation data may be recorded within or near the allotments for more localized information. Precipitation data may be recorded throughout the year and summarized in the annual inspection. This data assists managers with forage utilization and production data collection.

Soil and Riparian Condition: The Intergovernmental Agreement between the Forest Service and the State of Arizona that controls water quality and the Clean Water Act requires implementation and effectiveness monitoring. The objectives of monitoring are to: (1) collect data sufficient to evaluate effects of management activities on soil and water resources; and (2) support changes in management activities to protect soil and water quality. Monitoring will help determine how successfully managers are implementing guidance practices and how effectively those practices are protecting soil and water quality. Arizona Department of Water Quality (ADEQ) will continue to monitor water quality in the area.

Evaluating watershed condition can be assessed using information from the monitoring schemes above. Monitoring of plant abundance, ground cover, species diversity and estimates of overall soil condition (using the methods described throughout this monitoring section) will indicate whether or not management practices are effectively meeting management goals. Trends toward improvements in species abundance and diversity should indicate that management practices are effectively improving soil condition and by inference, maintaining or improving downstream water quality and complying with water quality standards. Conversely, decreases in plant abundance and species diversity may indicate that management practices are not effective and need to be changed. Environmental factors, especially precipitation, will be considered when evaluating monitoring results.

Condition and trend monitoring was established at the following wetlands using photo point and plant inventories in the fall of 2003: Indian Lake, Long Lake, Al's Lake, Antelope Tank, Pickett Lake, Boot Lake, Ducknest Lake, Grass Lake, Indian Tank Lake, Long Lake, Perry Lake, Deep Lake, West Breezy Lake, and Breezy Lake. Additional monitoring of these plots may occur in the next 10 years if funding is available.

Canopy cover, frequency and composition plots were established at Perry Lake, Boot Lake, Ducknest Lake, Breezy Lake, West Breezy Lake, Indian Lake, Post Lake, Long Lake, Deep Lake and Prime Lake. Additional monitoring of these plots may occur in the next 10 years if funding is available.

Possible Fences for Boot, Breezy, West Breezy and Indian Lakes: Added pressure may be put on Railroad and Ducknest pastures after Indian Tank, Ducknest, and Perry Lakes are fenced because no grazing is allowed from June 1 through July 15 in seasonal or semipermanent wetlands. Upland monitoring in these two pastures will determine if there is a need to add flexibility in the grazing rotation schedule for Alternatives 3 and 4. The clusters, canopy cover,

frequency and ground cover plots in these pastures will help determine trends in these areas. These plots will be reread as necessary. These additional wetland fences would allow Boot and Breezy pastures to be grazed from June 1 through July 15 with no disturbance to wetland nesting birds.

Noxious Weeds: State-listed noxious weeds located in these allotments will be treated as necessary. The permittee and Forest Service will coordinate the weed inventory and treatment with responsibilities identified through the AOI. Noxious weed monitoring is carried out at the same time allotment inspections are conducted. As noxious weed populations are found they are mapped, monitored and in some areas, manually removed. Other treatment methods will follow guidelines established in the "Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds" (USDA 2005).

Threatened and Endangered Species: Threatened and endangered species are monitored in compliance and consultation with the USFWS. Vegetation monitoring points (key areas) have been established on the allotment and are monitored according to consultation requirements.

These key areas will normally be one-quarter to 1 mile from water, located on productive soils on level to intermediate slopes, and be readily accessible for grazing. Size of the key forage monitoring areas could be 20 to 500 acres. In some situations such as high mountain meadows with perennial streams, key areas may be closer than one-quarter mile from water and less than 20 acres. Within key forage monitoring areas, select appropriate key species to monitor average allowable use (USDA 1987a, p. 66-1)

One Mexican spotted owl (MSO) key area plot is already established on the Pickett Allotment and monitored annually:

- Management Area: Ponderosa pine/oak
- Pasture: Railroad
- Location: Southwest portion of this pasture
- Key Species: Squirreltail, June grass, Blue grass, Carex

Cultural Resources: Archeological sites located adjacent to proposed structural improvement areas have been marked for avoidance and will be avoided by all project activities. The district will periodically monitor the sites to ensure that they have been avoided. Such inspections are to be reported in writing to the forest archeologist, indicating the date of inspection, site number of the site(s) inspected, and condition of the site(s).

Chapter 5. Consultation and Coordination

Preparers and Contributors

The Forest Service consulted the following individuals, Federal, state, and local agencies, tribes and non-Forest Service persons during development of this environmental impact statement:

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Experience:	17 years of range conservation for the Coconino National Forest

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Contribution:	Watershed Specialist, Wetland Inventory, Wetland Stock Tank Review
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Experience:	17 years of hydrology experience for the Coconino National Forest

John Nelson, Recreation and Engineering Staff, Peaks and Mormon Lake Districts

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Experience:	Over 6 years of GIS experience for the Forest Service

Federal, State, and Local Agencies

Animal and Plant Health Inspector
Arizona Department of Environmental Quality
Arizona Game and Fish Commission
Arizona Game and Fish Department
Arizona State Land Department
City of Flagstaff
Coconino County Board of Supervisors
Coconino County Public Works
National Park Service, Flagstaff Area Monuments
USDA Natural Resource Conservation Service
USDA Forest Service Rocky Mountain Research Station
U.S. Fish and Wildlife Service

Tribes

Cocopai RC&D
Dine' Medicine Man's Association
Fort McDowell Yavapai Nation
Havasupai Tribe
Hopi Tribe
Hualapai Tribe
Navajo Nation
Pueblo of Acoma
San Carlos Apache Tribe
San Juan Southern Paiute Council
Tonto Apache Tribe
White Mountain Apache Tribe
Yavapai-Apache Nation
Yavapai-Prescott Indian Tribe

Organizations

American Rights Association
Arizona Cattlemen's Association
Arizona Wildlife Federation
CO Bar Cattle Ltd. Partnership
Flagstaff Public Library
Flagstaff Shooting Association
Forest Guardians
Friends of Walnut Canyon
Grand Canyon Trust
Center for Biological Diversity
Hopi's Three Canyon Ranch LLC
Horse Trails Coalition
Maricopa Audubon Society
Morrison Brother's Ranch
National Wildlife Federation
Native Plant and Seed Society
Nature Conservancy
Northern Arizona Audubon Society
Northern Arizona University, School of Forestry
People for the West
Rocky Mountain Elk Foundation
Sierra Club, Plateau Group
Southwest Forest Alliance
The Arboretum at Flagstaff
University of Arizona, College of Agriculture
Wildlife Society, Arizona Chapter
Windmill Ranch

Distribution of the Draft Environmental Impact Statement

This environmental impact statement has been distributed to individuals who specifically requested a copy of the document. In addition, copies of the DEIS and/or an executive summary have been sent to the following Federal agencies, state and local governments:

Advisory Council on Historic Preservation
Arizona Department of Environmental Quality
Arizona Game and Fish Department
Arizona State Land Department
Coconino County Board of Supervisors
Coconino County Public Works
Environmental Protection Agency
Federal Aviation Administration, Western-Pacific Region
Federal Highway Administration
National Marine Fisheries Service, Southwest Region
National Park Service, Flagstaff Area National Monuments
U.S. Army Engineer Division, South Pacific
U.S. Coast Guard, Environmental Impact Branch
U.S. Department of Agriculture, Animal and Plant Health Inspection Service
U.S. Department of Agriculture, National Agricultural Library
U.S. Department of Agriculture, Natural Resources Conservation Service
U.S. Department of the Interior; Office of Environmental Policy and Compliance
U.S. Department of Energy, Office of NEPA Policy and Compliance

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Appendix: Wetlands and Springs Within the Cumulative Effects Area

Table 31 displays the wetlands by wetland type, the acres of these wetlands, the current/planned grazing scheme, the proper functioning condition (PFC) and the number of stock tanks within the wetland basin [PRD 10]. The PFC rating is an indication of the residual amount of biomass left after grazing that will occur after July 15. If enough residual vegetation is left to promote nutrient cycling, then the site would be rated at PFC. If the site is heavily grazed with little or no residual vegetation left onsite, then the site is functional at-risk due to lack of nutrient cycling. Depending on how a particular wetland is grazed during the year, some wetlands may have either a PFC or functional at-risk rating.

Table 31. Wetlands and springs within the cumulative effects area

Name	Acres	Wetland Type	Grazing Status	PFC Class	Stock Tank
Driveway	5	Ephemeral	Grazed by cattle within Lakes pasture (Bar T Bar).	PFC	1
Gonzalo	18	Ephemeral	Grazed by cattle within the Anderson Springs Allotment.	PFC	1
Unnamed_16_11_28	5	Ephemeral	Grazed by cattle within West Melatone pasture (Bar T Bar).	PFC	
Total Acres of Ephemeral Wetland — 28					
Crater Lake	22	Temporary	Grazed by cattle in Broomy pasture (Bar T Bar).	PFC	1
Daze Lake	44	Temporary	Grazed by cattle in West Melatone pasture (Bar T Bar).	PFC	
Horse Tank	8	Temporary	Grazed by cattle within Ashurst pasture (Pickett/Padre).	Functional at-risk/PFC	1
McDermott Lake	72	Temporary	Grazed by cattle within Boot pasture (Pickett/Padre). This pasture rested 1999-2004.	Functional at-risk/PFC	1
Pollino	8	Temporary	Grazed by cattle, North Yeager pasture (Anderson Mesa).	Functional at-risk/PFC	2
Total Acres of Temporary Wetland — 154					
Al's Lake	40	Seasonal	Grazed by cattle within Ashurst pasture (Pickett/Padre) after July 15.	Functional at-risk/PFC	1
Antelope North	5	Seasonal	Grazed by cattle within Ashurst pasture (Pickett/Padre) after July 15.	PFC	
Antelope Tank	8	Seasonal	Grazed by cattle within Ashurst pasture (Pickett/Padre) after July 15.	Functional at-risk	1

Name	Acres	Wetland Type	Grazing Status	PFC Class	Stock Tank
Boot Lake	70	Seasonal	Lane constructed to tanks, protection of wetland from cattle grazing outside of lane on Anderson Springs and Pickett/Padre Allotments.	PFC	1
Breezy	33	Seasonal	Grazed by cattle within Breezy pasture (Pickett/Padre) after July 15. This pasture rested 2000-2002. Possible cattle exclosure to be built in 2006-2007.	PFC	4
Camillo Tank	46	Seasonal	West half grazed in Mud/Tinney allotment after July 15. Excluded from cattle by exclosure on east half on Anderson Springs Allotment.	PFC	3
Corner Lake	38	Seasonal	Lane constructed to tanks, protection of wetland from cattle grazing outside of lane on Anderson Springs.	PFC	2
Corral Tank	11	Seasonal	Grazed by cattle within East Mud Lake pasture (Anderson Springs).	PFC	1
Cow Lake	30	Seasonal	Total exclosure from cattle grazing cattle within North Grapevine pasture (Bar T Bar).	PFC	1
Ducknest	42	Seasonal	Exclosure from grazing by cattle within Ducknest pasture (Pickett/Padre).	PFC	1
Grass	86	Seasonal	Grazed by cattle after July 15 within the Holding pasture.	PFC	1
Hay Lake	459	Seasonal	NRCS wetland easement, no cattle grazing.	PFC	1
Indian Lake	25	Seasonal	Grazed by cattle within Breezy pasture (Pickett/Padre). Possible exclosure with lane to stock tank. Grazed after July 15 until exclosure built	Functional at-risk/PFC	1
Indian Tank	13	Seasonal	Grazed by cattle within Ducknest pasture (Pickett/Padre) at lane only. Exclosure planned, grazed after July 15 until	Functional at-risk/PFC	1

Name	Acres	Wetland Type	Grazing Status	PFC Class	Stock Tank
			exclosure built.		
Long Lake (D-5)	367	Seasonal	Excluded from cattle grazing in early 1990s. New fence constructed in 2003-2004.	PFC	1
Melatone Lake	12	Seasonal	Protected with only lane grazed in East Melatone pasture (Bar T Bar).	PFC	1
Pickett Lake	11	Seasonal	Grazed by cattle within Ashurst pasture (Pickett/Padre) after July 15.	Functional at-risk/PFC	1
Pine Lake	53	Seasonal	Completely protected with exclosure (Anderson Springs).	PFC	2
Potato Lake	89	Seasonal	Grazed by cattle within Ashurst pasture (Pickett/Padre) after July 15.	Functional at-risk/PFC	1
Tony's Tank	9	Seasonal	Protected with exclosure with lane to tank in West Mud Lake pasture (Anderson Springs).	PFC	1
Wallace Lake	9	Seasonal	Grazed by cattle within North Tinny pasture (Mud-Tinny) after July 15.	Functional at-risk	1
West Breezy	5	Seasonal	Grazed by cattle within Breezy pasture (Pickett/Padre) after July 15. Possible exclosure site in the future.	Functional at-risk/PFC	1
Yeager Lake	87	Seasonal	Protected with exclosure with three lanes in Anderson Springs.	PFC	4
Youngs Lake	23	Seasonal	Grazed by cattle within Youngs pasture (Walnut) after July 15.	Functional at-risk/PFC	1
Total Acres of Seasonal Wetland — 1,297					
Deep Lake	63	Semipermanent	Grazed by cattle within Deep Lake Allotment after July 15, proposed for exclosure with lane in future.	Functional at-risk/PFC	1
Fisher Fry Lake	18	Semipermanent	Planned for protection with exclosure and lane to tank site in Observatory/Youngs pasture (Walnut).	PFC	1

Name	Acres	Wetland Type	Grazing Status	PFC Class	Stock Tank
Horse Lake	61	Semipermanent	Cattle exclosure present (Deep Lake).	PFC	1
Little Dry Lake	9	Semipermanent	Grazed by cattle within Marshall Lake Riparian pasture (Walnut) after July 15.	PFC	1
Marshall Lake	132	Semipermanent	Grazed by cattle within Marshall Lake Riparian pasture (Walnut) after July 15.	PFC	1
Perry Lake	27	Semipermanent	Exclosure to be built with two lanes, Pickett/Padre and Anderson Springs Allotments.	PFC	3
Post Lake	27	Semipermanent	Exclosure with no lane within Ashurst pasture (Pickett/Padre). Bull rush located on far north end of area.	PFC	
Prime Lake	13	Semipermanent	Exclosure planned within Observatory pasture, Walnut Allotment.	PFC	
Vail Lake	71	Semipermanent	Cattle exclosure (Walnut).	PFC	1
Lower Lake Mary	146	Semipermanent	Excluded from cattle grazing	PFC	0
Total Acres of Semipermanent Wetland — 421					
Ashurst Lake	199	Reservoir	Excluded from cattle grazing except for north end of lake, which is rocky.	Functional at-risk	
Coconino Dam	10	Reservoir	Grazed by cattle within Ducknest pasture (Pickett/Padre). Mid-summer grazing only 2002-04.	PFC	
Kinnikinick Lake	123	Reservoir	Excluded from cattle grazing (Anderson Springs/Bar T Bar).	PFC	
Long Lake	367	Reservoir	Grazed by cattle within Lakes pasture (Bar T Bar).	PFC	
Morton Lake	27	Reservoir	Grazed by cattle within North Grapevine pasture (Bar T Bar).	PFC	
Mud Lake	73	Reservoir	Grazed by cattle within East Mud Lake pasture (Anderson Springs).	PFC	

Name	Acres	Wetland Type	Grazing Status	PFC Class	Stock Tank
Soldier Annex	123	Reservoir	Grazed by cattle within Lakes pasture (Bar T Bar).	PFC	
Soldier Lake	32	Reservoir	Grazed by cattle within Trap pasture (Bar T Bar).	PFC	
Tremaine Lake	517	Reservoir	Grazed within (Bar T Bar).	PFC	
Upper Lake Mary	661	Reservoir	Excluded from cattle grazing.	PFC	0
Total Acres of Reservoir — 2,278					
Total of all Wetland Acres — 4,178					
Boot Spring	1*	Spring	Grazed by cattle within Boot pasture (Pickett/Padre). This pasture rested 1999-2004.		
Ashurst Spring	1	Spring	Fenced with an 8-foot fence.		
Billy Back Springs	1	Spring	Grazed by cattle within Elliot Driveway (Pickett/Padre).		
Youngs Spring and Tank	1	Spring	Excluded from cattle within Youngs pasture (Walnut).		1
Elk Spring	1	Spring	Grazed by Deep Lake pasture, (Deep Lake). Located in steep canyon, access is difficult.		
Mormon Canyon Spring	1	Spring	Grazed by cattle in Ashurst pasture (Pickett/Padre).		
Yellow Jacket Spring	1	Spring	Spring is in rocky outcrop, inaccessible to cattle.		
Elliot Spring	1	Spring	Grazed by cattle in Pickett/Padre in Woodland pasture. Spring is in canyon and access is poor.		
Unnamed	1	Spring	Is inaccessible to cattle in Anderson Springs, North Burro pasture.		
Anderson Springs	1	Spring	Grazed by cattle in Anderson Springs, North Burro Allotment.		
Kinnikinick Springs	1	Spring	Grazed by cattle in Anderson Springs, South Yeager pasture.		
Dove Spring	1	Spring	Elk exclosure, Bar T Bar, Broomy pasture.		

Name	Acres	Wetland Type	Grazing Status	PFC Class	Stock Tank
Grapevine Spring	1	Spring	Grazed by cattle in Bar T Bar in Broomy pasture.		
Turkey Seep	1	Spring	Poor access in canyon, grazed by cattle in Bar T Bar in East Melatone pasture.		
Little Moqui	1	Spring	Grazed by cattle in Bar T Bar in Moqui.		
Big Moqui	1	Spring	Grazed by cattle in Bar T Bar in Moqui.		
Hunter	1	Spring	Elk exclosure, Bar T Bar, Moqui pasture.		
Total Acres of Springs — 17					

*Spring sites are all arbitrarily given a 1 acre size.

Index