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Agriculture

Forest  
Service

Southwestern  
Region



# **Environmental Assessment for The Sleeping Beauty Grazing Complex**

## **Tonto National Forest**

**Globe Ranger District  
Gila County, Arizona**

**August 17, 2005**

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# Chapter 1 – Purpose and Need

## Background

The Sleeping Beauty Complex is comprised of four separate grazing allotments covering about 34,180 acres, which include Sleeping Beauty, Bohme, Bellevue and Gerald Hills allotments. Within the allotment boundaries there is about 8,670 acres of private land. Currently, there are four separate Term Grazing Permits for the four allotments. One Term Grazing permit authorizes grazing on the Sleeping Beauty, Bohme and the Shultze pasture of the Bellevue allotment. Two of the four permits, are held by permittees for the Bellevue Allotment's three other pastures, which are managed as a combined herd. The fourth permit is for the Gerald Hills allotment. Forest personnel reviewed existing information, collecting field data where needed, to develop the purpose and need for action. District Ranger Larry Widner formally initiated the NEPA analysis process in February of 2003. A scoping letter was sent to interested/affected parties to solicit comments from the public concerning the proposed action for the Sleeping Beauty Complex. Public comments were analyzed in April 2003 to: (1) analyze comments received from interested/affected parties; (2) define issues with the proposed action; and (3) develop alternatives to address the significant issues identified. District Ranger reviewed the issues and the alternatives to be considered in detail during May, 2003.

## Purpose and Need for Action

The purpose and need of the proposed actions are to authorize a level of domestic livestock grazing in conjunction with allotment management plans that is commensurate with resource needs as defined by the goals and objectives in the Tonto National Forest Plan, as amended, and other legal and regulatory constraints. The goal of the Forest Range Management Program is to bring the permitted grazing use in balance with the forage allocated for the use by domestic livestock and to have all allotments under appropriate levels of management by the third time period (2015) (Tonto Forest Plan, pg. 24).

## Proposed Action

The proposed action is to authorize grazing of domestic livestock on the Sleeping Beauty, Bohme, Bellevue and Gerald Hills Allotments by issuing ten year term grazing permits to four separate permittees. Refer to Chapter 2, Alternative 2, The Proposed Action.

## Decision Framework

Given the purpose and need, the deciding official reviews the proposed action and the other alternatives in order to make the following decisions:

The Globe District Ranger is responsible for deciding whether or not to authorize grazing on these four allotments. If the District Ranger chooses to authorize grazing through selection of one or combination of the alternatives, the decision will specify the type of management scheme, including permitted numbers and range improvements; and the necessary mitigation measures and monitoring, if any, which will be implemented. If the deciding officer determines that there are no significant impacts, the decision will be documented in a Decision Notice and implemented through the issuance of a new 10-year Term Grazing Permit and an Allotment Management Plan. If there is a finding of significant impacts, an environmental impact statement will be prepared.

## Public Involvement

The proposal has been listed in the Schedule of Proposed Actions since February 3, 2003. A scoping document was sent to the public on February 12, 2003, along with a notice published in

the Arizona Silver Belt. The purpose of the document and notice was to describe the proposed action to any interested/affected parties, and solicit comments from those who may have concerns with the proposed action. The scoping document was sent to the following: 15 individuals, 18 private organizations, 9 tribes, 10 state/county officials, 2 federal agencies and 3 congressional delegates and 5 corporations. From these scoping activities, 7 letters were received. The Forest performed a content analysis on this information and the information gained through internal scoping. The comments received and content analysis is located in the project record.

## **Issues**

The Forest Service separated the issues into two groups: significant and non-significant issues. Significant issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 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 for Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)..." There were no significant issues identified on this project.

# Chapter 2 - Alternatives

This chapter describes and compares the alternatives considered for this project. It includes a description and map of each alternative considered. This section also presents the alternatives in comparative form, sharply defining the differences between each alternative and providing a clear basis for choice among options by the decision maker and the public. Some of the information used to compare the alternatives is based upon the design of the alternative and some of the information is based upon the environmental, social and economic effects of implementing each alternative. Alternatives are broken down into three grazing units. Each unit represents an existing permit. **Permittee A** – This permit is issued for the Sleeping Beauty Allotment, Bohme Allotment and the Shultze pasture of the Bellevue Allotment. **Permittee B/C** – This permit is currently for the remaining three pastures of the Bellevue Allotment. **Permittee D** – This permit is for the Gerald Hills Allotment.

## Alternatives eliminated from detailed study

Following are the alternatives that were considered but eliminated from detailed study from the Environmental Assessment, as well as the rationale as to why these will not be considered further:

Eliminate using any pasture containing significant riparian habitat or limit grazing in pastures containing riparian areas to fall and winter.

The forest plan does not exclude riparian areas from livestock grazing. The utilization limits will be established specifically for these proposed actions. Based on research and on-the-ground knowledge of the area, we believe that these measures will be adequate to insure riparian recovery and sustainability.

## Alternative 1

### No Action - Continuation of Current Management

Four allotments comprise the Sleeping beauty Complex: Sleeping Beauty, Bohme, Bellevue and Gerald Hills. At this time, grazing is permitted on these four allotments by four 10-year Term Grazing Permits. Permitted numbers of domestic livestock are as follows:

Under the No Action alternative, current management plans would continue to guide management of the project area. No new grazing strategy would be implemented to accomplish project goals.

Refer to Tables 1,2 and 3 for comparisons.

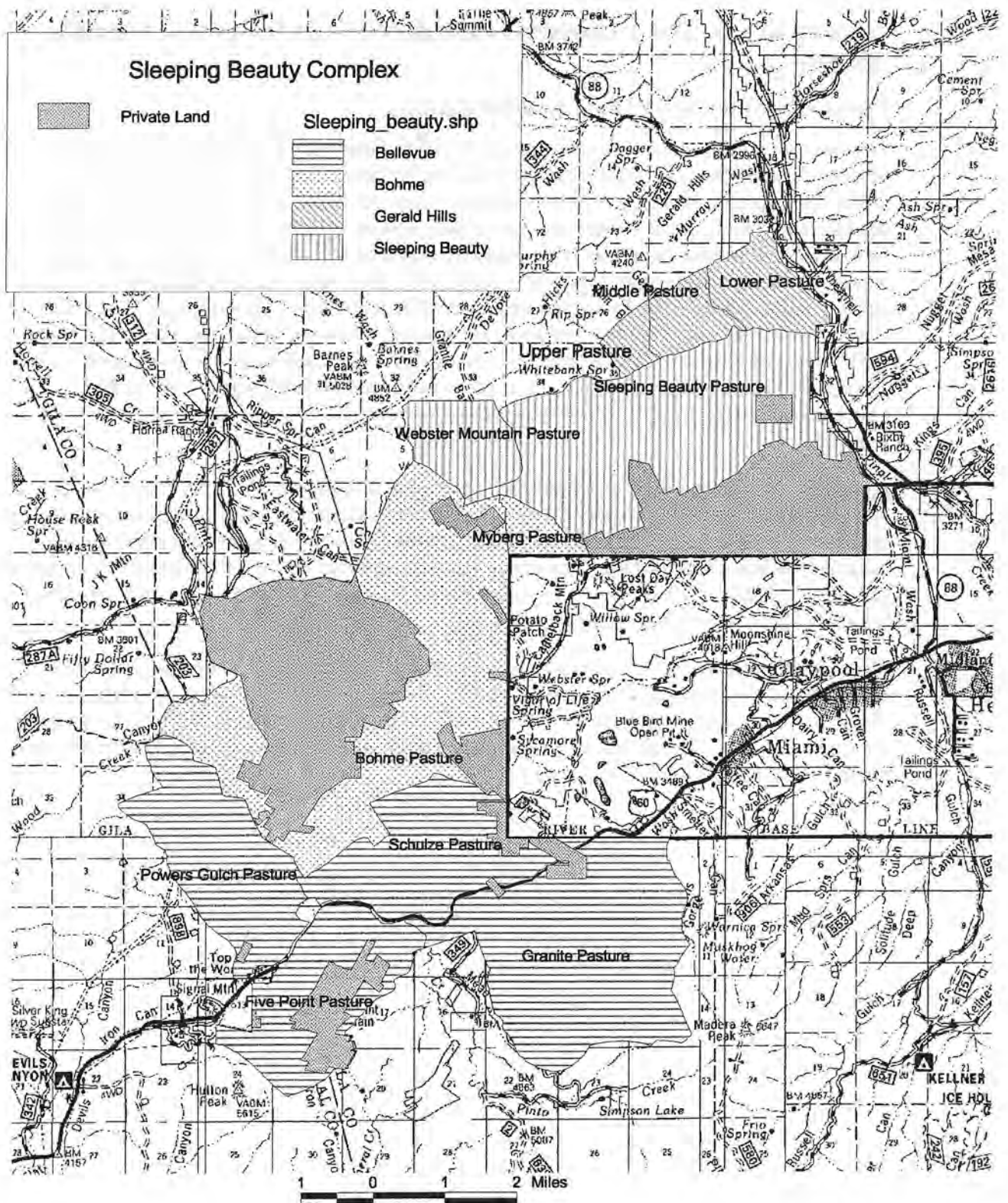


Figure 1. Allotment and Pasture Locations

## **Alternative 2, The Proposed Action and Alternative 3, Flexible Stocking**

### **Items Common to All Units and Permittees.**

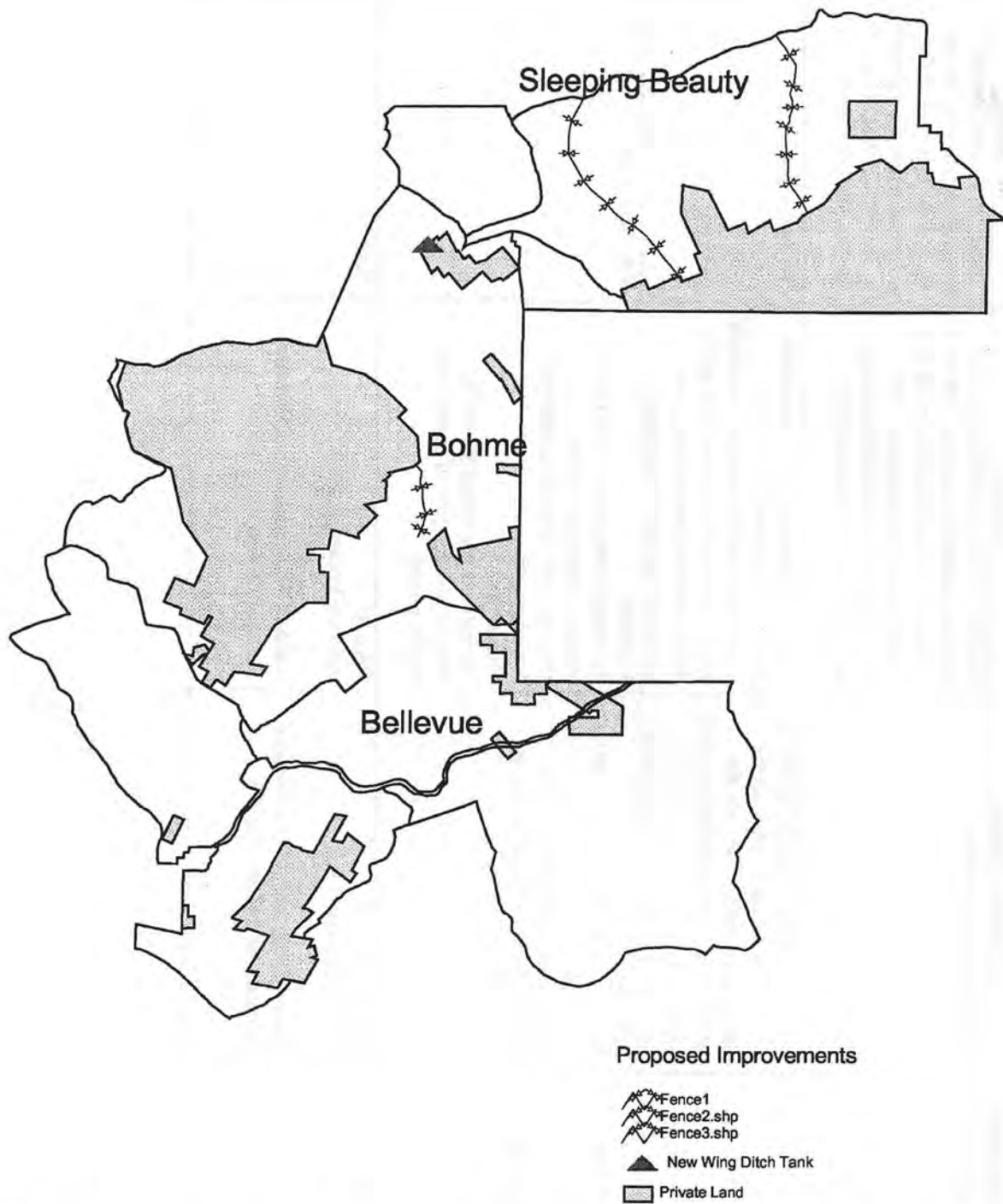
The time allowed for grazing in each pasture would be based on percent utilization in key areas measured during the time cattle are using a specific key area. This would be 35% - 45% utilization of preferred forage or browse species unless otherwise specified in the tables. Key monitoring areas would be established within each pasture. Utilization of herbaceous forage is to be measured in percent use. This is the percentage used of key species by weight. The use of woody plants in riparian areas would not exceed 50%. Key areas would conform to the definitions contained in the Tonto National Forest Plan as amended (Amendment 22, replacement page 41-1) except where riparian key areas are selected. Once the utilization level is reached, the cattle would be moved to the next pasture. Actual move dates will be based on achieved allowable use levels. After a pasture is grazed, it could not be stocked again until resource conditions permit (generally, one growing season which includes spring and summer growing periods).

Permittee monitoring will be recommended by the term grazing permit. The Permittee would employ or contract trained personnel (could be the individual permit holder) to monitor utilization and contact the Forest Service prior to reaching the target utilization so that the key areas could be inspected in a timely manner. Key areas would be approved by the Forest Service in advance and delineated in the Allotment Management Plan or Annual Operating Instructions. Refer to Tables 1, 2, and 3 for further descriptions.

Where yearling carryover is specified, it will be considered on a case by case basis. It will be necessary for the allotment to have received fall and winter moisture sufficient to create a flush crop of annuals. Other allotment conditions will be considered. If yearlings of natural increase are approved they will meet utilization standards on annual grasses so that there will be adequate ground cover for soil protection.

**Table 1: Comparison of Alternatives - Permittee A (Sleeping Beauty Allotment, Bohme Allotment, Shultze pasture of Bellevue Allotment)**

FEATURES	ALTERNATIVE 1 No Action (Current Management)	ALTERNATIVE 2 Proposed Action	ALTERNATIVE 3 Flexible	ALTERNATIVE 4 No Grazing
<b>Permitted Use</b>	193 adult cattle year-long plus 110 yearlings for 5 months	150 adult cattle year-long	Flexible – 50 to 150 adult cattle year-long plus natural increase for 5 months. The number of cattle permitted for any single year will be determined by monitoring data of actual utilization of key plants in key areas and forage availability	The Term Grazing Permit currently authorizing use on the two allotments would be cancelled following guidance in 36 CFR 222 and Forest Service Manual 2231.62
<b>Pasture Management</b>	Rotation system	6 pasture deferred rotation, utilization based not time based. Once all the pastures are used for the year, the cattle would be moved to private land until the first pasture had sufficient rest (generally one growing season).	6 pasture deferred rotation, utilization based not time based. Once all the pastures are used for the year, the cattle would be moved to private land until the first pasture had sufficient rest (generally one growing season).	Not Applicable
<b>Utilization Standards – these apply to key species in key areas.</b>	<b>Uplands:</b> Herbaceous and browse = 50% <b>Riparian:</b> Herbaceous = 50% Woody Plants = 50% of current year leader growth.	<b>Uplands:</b> Herbaceous and browse = 35 - 45% <b>Riparian:</b> Herbaceous vegetation 35 – 45% Woody plants = 50% of current year leader growth	<b>Uplands:</b> Perennial Herbaceous = 35 - 45% Annual Herbaceous = 50% Browse = 45 - 55% of current years leader growth <b>Riparian:</b> Herbaceous vegetation 35 – 45% Woody plants = 50% of current year leader growth	Not Applicable
<b>Improvements at permittee expense constructed within 3 years after final approval</b>	None	<b>Fences:</b> About 5.3 miles (3 fences)  <b>Tanks:</b> Wing ditch tank at Webster Mountain Horse Basin Saddle	<b>Fences:</b> About 5.3 miles (3 fences)  <b>Tanks:</b> Wing ditch tank at Webster Mountain Horse Basin Saddle	None



**Figure 2: Improvements to be Reconstructed or Constructed - Permittee A - Alternative 2 and 3.**

**Table 2: Comparison of Alternatives Permittee B and Permittee C (Bellevue Allotment minus Shultze pasture)**

FEATURES	ALTERNATIVE 1 No Action (Current Management)	ALTERNATIVE 2 Proposed Action	ALTERNATIVE 3 Flexible Stocking Rates	ALTERNATIVE 4 No Grazing
Permitted Use	45 adult cattle year-long plus 22 yearlings for 5 months	24 adult Cattle of which 6 will be permitted to Permittee B and 18 permitted to Permittee C.	10 to 24 adult cattle year-long plus natural increase for 5 months. The number of cattle permitted for any single year will be determined by monitoring data of actual utilization of key plants in key areas and forage availability.	The Term Grazing Permit currently authorizing use on the two allotments would be cancelled following guidance in 36 CFR 222 and Forest Service Manual 2231.62
Pasture Management	Rotation system Managed as one herd	<b>Recommended use: actual based on monitoring and utilization, Managed as one herd.</b> Estimated percent of forage capacity: Powers Gulch, 20% Five Point, 22% Granite, 58%	<b>Recommended use: actual based on monitoring and utilization. Managed as one herd.</b> Estimated percent of forage capacity: Powers Gulch, 20% Five Point, 22% Granite, 58%	Not Applicable
Utilization Standards – these apply to key species in key areas.	<b>Uplands:</b> Herbaceous and browse = 50% <b>Riparian:</b> Herbaceous = 50% Woody Plants = 50% of current year leader growth.	<b>Uplands:</b> Herbaceous = 35 - 45% Browse = 50% of current years leader growth <b>Riparian:</b> Riparian Areas: 50% of current years leader growth, 30% use of apical meristems of seedlings and saplings (willows and cottonwoods), and 30 % use on key non-woody species (sedges, deergrass).	<b>Uplands:</b> Perennial Herbaceous = 35 - 45% Annual Herbaceous = 50% Browse = 45 - 55% of current years leader growth <b>Riparian:</b> Herbaceous vegetation 35 – 45% Woody plants = 50% of current year leader growth	Not Applicable
Improvements	None	None	None	None

# Bellevue Allotment

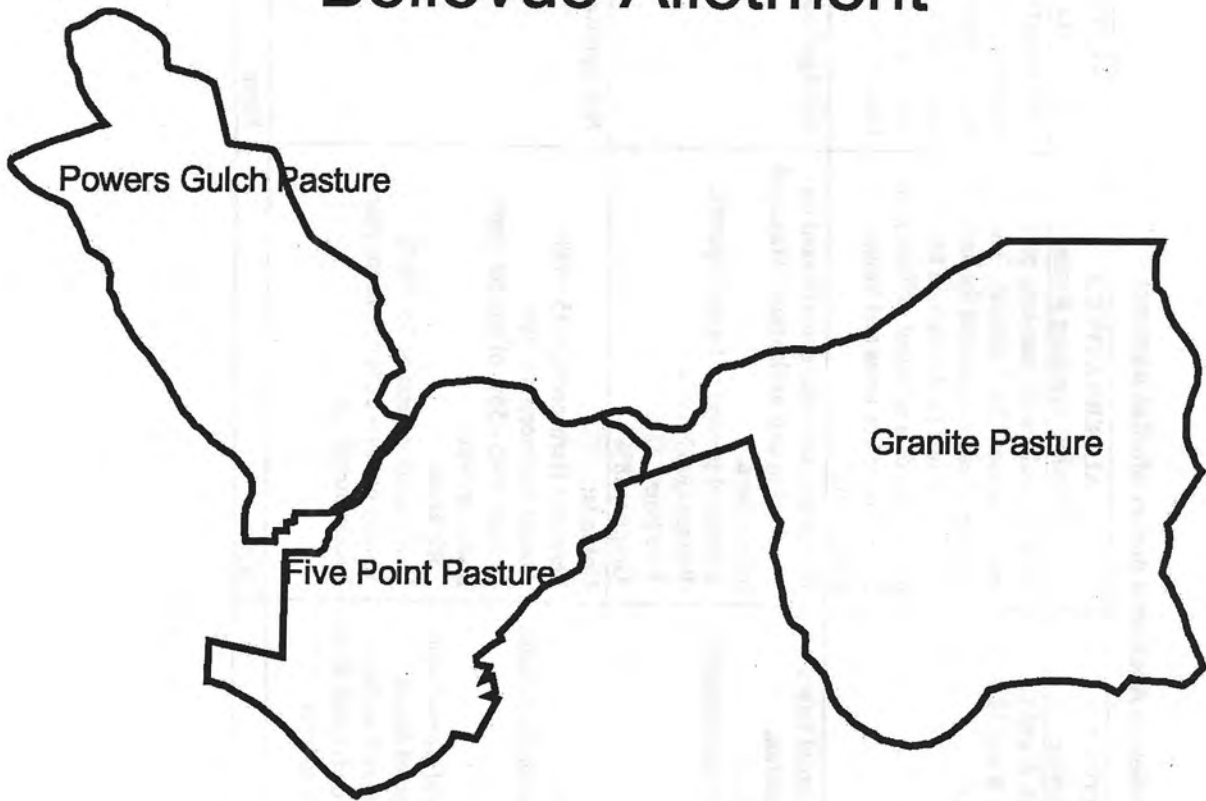
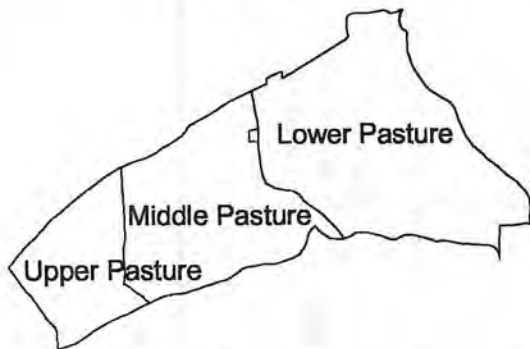


Figure 3. Bellevue Allotment Pastures

**Table 3: Comparison of Alternatives - Permittee D (Gerald Hills Allotment)**

FEATURES	ALTERNATIVE 1 No Action (Current Management)	ALTERNATIVE 2 Proposed Action	ALTERNATIVE 3 Flexible Stocking Rates	ALTERNATIVE 4 No Grazing
Permitted Use	27 adult cattle year-long plus 22 yearlings for 5 months	11 yearlings permitted for 6 months. The permitted use will not exceed 6 months in any one grazing season. The 6 months use may occur within a 7-month period between October 1, and April 3 <sup>rd</sup> . Actual on dates within this period may vary based on range readiness and Permittees operation.	5 to 20 adult cattle year-long plus natural increase for 5 months. The number of cattle permitted for any single year will be determined by monitoring data of actual utilization of key plants in key areas and forage availability.	The Term Grazing Permit currently authorizing use on the two allotments would be cancelled following guidance in 36 CFR 222 and Forest Service Manual 2231.62
Pasture Management	Rotation system	Rotation System - Upper Pasture would not be used.	Deferred Rotation System – Upper Pasture may be used. The rotation will be based on utilization and monitoring.	Not Applicable
Utilization Standards – these apply to key species in key areas.	Set by Annual Operating Instructions	<b>Uplands:</b> Herbaceous = 35 - 45% Browse = 50% of current years leader growth	<b>Uplands:</b> Perennial Herbaceous = 35 - 45% Annual Herbaceous = 50% Browse = 45 - 55% of current years leader growth	Not Applicable
Improvements	None	None	Stock tanks will be Fenced w/gate to better manage forage in pastures	None

**Gerald Hills Allotment**



**Figure 4. Gerald Hills Allotment Pastures**

## Alternative 4

### No Grazing

All four Term Grazing Permits allowing the use of the Sleeping Beauty, Bohme, Bellevue, and Gerald Hills Allotments by domestic livestock would be cancelled in accordance with Forest Service Policy. Following the guidance in Forest Service Manual 2231.62, twenty percent of the permitted numbers from the face of each Term Grazing Permit would be removed from the allotments each year until no more grazing is permitted (5 years).

### Comparison of Alternatives

This section provides a summary of the effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives. The “no action” alternative sets the environmental baseline.

**Table 4. Comparison of Alternatives Summary of Effects**

Environmental Facet	Alternative 1	Alternative 2	Alternative 3	Alternative 4
<b>Wildlife</b>	Potential adverse impacts. TNF plan guidelines may not be achieved	Conditions for wildlife could improve with proper management	Conditions for wildlife could improve with proper management	Overall diversity and productivity for wildlife would likely increase.
<b>Vegetation</b>	No improvement anticipated.	Livestock not anticipated to be on allotment for full 12 months. Likely to prevent downward trend.	Most likely that livestock could remain on allotment for full year. Likely to prevent downward trend	Fastest improvement in condition of herbaceous vegetation
<b>Soil</b>	No improvement anticipated.	No improvement anticipated	No improvement anticipated	Most likely to show improvement long term, but probably not measurable within a 10 year period
<b>Riparian</b>	Riparian condition trend expected to remain stable	Condition trend expected to remain constant and improve on Bellevue allotment	Condition trend expected to remain stable.	Most likely to show improvement in riparian vegetation.

## Chapter 3 - Environmental Consequences

This section summarizes the physical, biological, social and economic environments of the affected project area and the potential changes to those environments due to implementation of the alternatives. It also presents the scientific and analytical basis for the comparison of alternatives presented in Table 1: Comparison of Alternatives.

### Wildlife

#### Affected Environment

In general, the quality of wildlife habitat is ultimately dependent on the quality of the soil resources, upland watersheds, vegetative conditions and riparian areas.

**Management Indicator Species:** The Land and Resource Management Plan for the Tonto National Forest, adopted in 1985, identified thirty management indicator species (MIS). The reason these species were selected as MIS is described in the Environmental Impact Statement, Tonto National Forest Plan, 1985. The objective was to select species which would indicate successional stages of each vegetation type and serve as an indicator for detecting major habitat changes (TNF Plan p. 211).

All thirty MIS were considered for the Sleeping Beauty Grazing Complex analysis (see Forest MIS Report in Project Record); however, because of habitat (vegetation) types found within the project area, only twenty-five MIS were identified as possibly occupying the analysis area. In addition, most, if not all, of the species that represent the woodland, ponderosa pine, mixed conifer, chaparral and desert scrub vegetation types will not be analyzed due to the lack of affects to these community types ie. There are no timber or range treatments under the proposed action to modify tree or shrub densities. As a result, only species that represent the herbaceous and riparian layers that may be affected by grazing will be analyzed in further detail. Those species are listed in Table 5. For additional MIS information refer to the Sleeping Beauty project record.

**Table 5: Tonto National Forest Management Indicator Species for the Sleeping Beauty Complex Analysis Area (9 species).**

Habitat Type	Reason for Selection
<b>P/J Woodland</b>	
Ash-throated flycatcher	Ground cover
<b>Ponderosa Pine/Mixed Conifer</b>	
None	None
<b>Chaparral</b>	
Spotted towhee	Shrub density
Black-chinned sparrow	Shrub diversity
<b>Low Elevation Riparian</b>	
Bald eagle	General riparian
Bell's Vireo	Well-developed understory
<b>High Elevation Riparian</b>	
Black hawk	Riparian streamside
<b>Aquatic</b>	
Macro-invertebrates	Water quality and fisheries habitat
<b>Desert Grassland</b>	
Savannah sparrow	Grass species diversity
Horned lark	Vegetation aspect
<b>Desert Scrub</b>	
None	None

**Table 6: MIS species trend for Sleeping Beauty Complex 2005**

<b>MIS Species</b>	<b>Forest Habitat Trend</b>	<b>Forest Population Trend</b>	<b>Acres of Habitat in Project Area</b>
Elk	Static	Stable	Not selected for this project
Turkey	Static	Stable	Not selected for this project
Pygmy Nuthatch	Static	Decreasing	Not selected for this project
Violet-green swallow	Static	Stable	Not selected for this project
Western Bluebird	Static	Stable	Not selected for this project
Hairy Woodpecker	Static	Stable	Not selected for this project
Goshawk	Static	Decreasing	Not selected for this project
Abert Squirrel	Static	Decreasing	Not selected for this project
Ash-throated Flycatcher	Static	Stable	22,845
Gray Vireo	Static	Decreasing	Not selected for this project
Townsend's Solitaire	Static	Stable	Not selected for this project
Plain Titmouse	Static	Decreasing	Not selected for this project
Common Flicker	Static	Stable	Not selected for this project
Spotted (Rufous-sided) Towhee (PJ)	Static	Stable	Not selected for this project
Spotted Towhee (chaparral)	Static	Stable	22,845
Black-chinned Sparrow	Static	Stable	22,845
Savannah Sparrow	Upward/Static	Stable	805
Horned Lark	Upward/Static	Decreasing	805
Black-throated Sparrow	Downward/Static	Stable	Not selected for this project

MIS Species	Forest Habitat Trend	Forest Population Trend	Acres of Habitat in Project Area
Brown (Canyon) Towhee	Downward/Static	Decreasing	Not selected for this project
Bald Eagle	NC	Stable	70
Bell's Vireo	NC	Decreasing	70
Summer Tanager	NC	Decreasing	Not selected for this project
Hooded Oriole	NC	Stable	Not selected for this project
Hairy Woodpecker	NC	Stable	Not selected for this project
Arizona Gray Squirrel	NC	Stable	Not selected for this project
Warbling Vireo	NC	Stable	Not selected for this project
Western Wood Pewee	NC	Decreasing	Not selected for this project
Common black-hawk	NC	Decreasing	70
Macro-invertebrates	N/A	N/A	N/A

### Rationale for Omission of MIS from Analysis

The following species are omitted from the Sleeping Beauty Complex MIS analysis (Table 2). Although they may occur at some point in the species life cycle, the proposed action or alternatives are not expected to alter their habitat type.

**Table 7: MIS dropped from analysis for the Sleeping Beauty Complex (23).**

Species	Grazing Response
Elk	Grazing will not alter general forest conditions
Turkey	Grazing will not alter vertical diversity or forest mix
Goshawk	Grazing will not alter vertical diversity
Gray Vireo	Grazing will not alter tree density
Townsend Solitaire	Grazing proposal will not affect mature juniper component

Species	Grazing Response
Plain (juniper) titmouse	Grazing proposal will not affect old growth juniper and snag component
Common (northern) flicker	Grazing proposal will not affect snag availability or ant populations
Rufous-sided (spotted) towhee	Grazing proposal will not affect shrub density, overstory composition, or crown density
Pygmy nuthatch	Grazing proposal will not affect old growth characteristics of saw timber
Violet-green swallow	Grazing proposal will not affect old growth, water volume or snags
Western bluebird	Grazing proposal will not affect conifer type or increase openings in conifer type
Hairy woodpecker	Grazing proposal will not affect snag densities
Abert's squirrel	Grazing proposal will not affect pole size in ponderosa type
Rufous-sided towhee	Grazing proposal will not affect shrub density, overstory composition, or crown density
Black-chinned sparrow	Grazing proposal will not affect overstory composition and crown density
Summer tanager	Grazing proposal will not affect overstory
Hooded oriole	Grazing proposal will not affect overstory
Hairy woodpecker	Grazing proposal will not affect snag component
Gray Squirrel	Grazing proposal will not affect alder component
Warbling Vireo	Grazing proposal will not affect overstory
Western wood pewee	Grazing proposal will not affect tree mid-story
Black-throated sparrow	Desert scrub component lacking
Canyon towhee	Desert scrub component lacking

**Breeding Birds:** Continental and local declines in many bird populations have led to concern for the future of migratory and resident birds. The Arizona Working Group of Partners in Flight developed a Bird Conservation Plan (Latta, Beardmore and Corman 1999) as part of a national effort to address the concern for the future of migratory and resident birds. The Conservation Plan lists priority bird species by habitat type. Table 3 lists the most common general habitat types represented in the Sleeping Beauty Complex Analysis Area and the priority bird species for each type.

Habitat types identified by the Arizona Partners in Flight Plan (1999) suggest that seven vegetation types are represented on the allotments. Not all species in Table 3 are expected to occur in the analysis area, but elements of their habitat may occur.

**Table 8: Partners in Flight (1999) Vegetation type and species association**

Habitat Type	Species	Habitat/Disturbance Effects
Pine Habitat	Northern goshawk, Olive Sided flycatcher, Cordilleran flycatcher, Purple	Utilization rates should minimize deleterious impacts to herbaceous

	martin	component. Cattle use expected to be low due to steep slopes.
Pinyon-Juniper	Gray flycatcher, Pinyon jay, Gray vireo, Black throated gray warbler, Juniper titmouse	Utilization rates should minimize deleterious impacts to herbaceous component. Cattle use expected to be low on steeper slopes. Utilization standards should reduce adverse impacts on gentler terrain.
Madrean Pine-Oak	Buff breasted flycatcher, Mexican spotted owl, Eastern bluebird, Mearn's quail, Band-tailed pigeon, Thick billed parrot	Utilization rates should minimize deleterious impacts to herbaceous component. Cattle use expected to be low on steeper slopes. Utilization standards should reduce adverse impacts on gentler terrain.
Chaparral	Black chinned sparrow, Virginia's warbler	Little herbaceous component in many areas due to fire suppression. Enforcement of utilization rates should negate adverse impacts.
Desert Grassland	Aplomado falcon, Botteris sparrow, Cassins sparrow, Rufus winged sparrow, Bairds sparrow, grasshopper sparrow (winter and breeding)	Past overgrazing has negatively affected this vegetation type. Efforts to balance cattle stocking rates with capacity may help associated species habitat requirements.
Low elevation Riparian	Common black hawk, western yellow billed cuckoo, Southwestern willow flycatcher, Lucy's warbler	Yearlong overgrazing grazing has contributed to declines in diversity and composition. Where potential still exists, enforcement of standards and guidelines may improve some parameters.
High Elevation Riparian	Common black hawk, Elegant trogan, Southwestern willow flycatcher, MacGillivrays warbler, Red faced warbler	Yearlong overgrazing grazing has contributed to declines in diversity and composition. Where potential still exists, enforcement of standards and guidelines may improve some parameters.

**Threatened and Endangered species:** The Sleeping Beauty Complex analysis area provides suitable and/or potential habitat for eight species of threatened or endangered plants and animals. A list of species that may occur in the project area is identified in Table 7.

Because the analysis area supports numerous wildlife species that occupy more than one habitat type, wildlife is grouped into guilds that represent all or a portion of the species life history requirements. This procedure developed by Short (1983) reflects the layers of habitat in which the species depends for feeding and those in which it depends for breeding (breeding is used here to include other vital, non-feeding activities such as hiding from predators). This approach enables us to focus on specific habitat types that may be affected by each alternative of the

proposed action. The following table displays the guilds that have been developed for this analysis.

**Table 9: Federally Threatened Endangered or Proposed species**

Common Name	Species	Status	Analysis Area Occurrence or Habitat Present
<b>Federally Listed (6)</b>			
Mexican Spotted Owl	<i>Strix occidentalis lucida</i>	T	Adjacent PAC (2)
Arizona Hedgehog Cactus	<i>Echinocereus triglochidiatus var. arizonicus</i>	E	Yes
Spikedace	<i>Meda fulgida</i>	T	Habitat
Gila Topminnow	<i>Poeciliopsis occidentalis occidentalis</i>	E	Habitat
Desert Pupfish	<i>Cyprinodon macularius macularius</i>	E	Habitat
Chiricahua Leopard Frog	<i>Rana chiricahuensis</i>	T	Possible Habitat
<b>Sensitive Birds (7)</b>			
Peregrine Falcon	<i>Falco peregrinus anatum</i>	S	Habitat
Common Black Hawk	<i>Buteogallus anthracinus</i>	S, MIS	Habitat
Northern Goshawk	<i>Accipiter gentilis</i>	S, MIS	Habitat
Northern Gray Hawk	<i>Asturina nitida maxima</i>	S	Habitat
Eared Trogon	<i>Euptilotis neoxenus</i>	S	Habitat
Arizona Bell's Vireo	<i>Vireo bellii</i>	S, MIS	Habitat
Western Yellow-billed Cuckoo	<i>Coccyzus americanus occidentalis</i>	S	Habitat
<b>Sensitive Amphibians (2)</b>			
Lowland Leopard Frog	<i>Rana yavapaiensis</i>	S	Yes
Arizona Southwestern Toad	<i>Bufo microscaphus microscaphus</i>	S	Habitat
<b>Sensitive Reptiles (3)</b>			
Arizona Night Lizard	<i>Xantusia vigilis arizonae</i>	S	Habitat
Mexican Garter Snake	<i>Thamnophis eques megalops</i>	S	Habitat
Narrow-Headed Garter Snake	<i>Thamnophis rufipunctatus</i>	S	Habitat
<b>Sensitive Fish (3)</b>			
Longfin Dace	<i>Agosia chryso-gaster</i>	S	Yes
Gila Chub	<i>Gila intermedia</i>	S	Habitat
Desert Sucker	<i>Catostomus clarki</i>	S	Yes
<b>Sensitive Plants (4)</b>			
Tonto Basin Agave	<i>Agave delamateri</i>	S	Adjacent
Arizona Giant Sedge	<i>Carex ultra</i>	S	Habitat
Arizona Alum Root	<i>Heuchera glomerulata</i>	S	Habitat
Arizona Phlox	<i>Plox amabilis</i>	S	Habitat
<b>Sensitive Invertebrates (6)</b>			
Obsolete Viceroy Butterfly	<i>Limenitis archippus obsoleta</i>	S	Habitat
Arizona Snaketail	<i>Ophiogomphus arizonicus</i>	S	Habitat
Hoary Skimmer	<i>Libelula nodisticta</i>	S	Habitat
Maricopa Tiger Beetle	<i>Cicindela oregona maricopa</i>	S	Habitat
Cow Path Tiger Beetle	<i>Cicindela praetextata pallidofemora</i>	S	Habitat
Hairy-Necked Tiger Beetle	<i>Cicindela hirticollis corpuscula</i>	S	Habitat

**Table 10: Habitat Guilds**

Habitat Component	Species Dependent Upon Component For Feeding, Breeding, Hiding And Roosting Cover
<b>P. Pine or Mixed Conifer</b>	MSO, northern goshawk northern flicker,pygmy nuthatch, violet green swallow, western bluebird, hair woodpecker, abert's squirrel, Townsend solitary
<b>Midstory P/J or Chaparral</b>	Ash throated flycatcher, Gray Vireo, Townsends solitary, juniper titmouse, northern flicker, Rufous-sided towhee, mule deer, coues deer, mountain lion, black bear, javalina, furbearerers
<b>Desert Scrub</b>	Agave spp, Arizona hedgehog, cactus ferruginous pygmy owl, black-shinned sparrow, black-throated sparrow, canyon towhee, Bell's vireo, mule deer, mountain lion, black bear, javalina, Gambel's quail, desert tortoise, furbearers, misc. reptiles, misc. bats, rabbits, Hohokam agave, Tonto Basin agave, northern gray hawk, AZ night lizard
<b>Herbaceous</b>	desert tortoise, savannah sparrow, horned lark, mule deer, western yellow-billed cuckoo, Coues deer, Doves, agave spp., Gamble's quail, furbearers, misc. reptiles, Gila monster, misc. microtines, rabbits
<b>Riparian</b>	Cactus ferruginous pygmy owl, lowland leopard frog, Chirichuahua leopard frog, AZ. SW toad, Mexican garter snake, bald eagle, summer tanager, hooded oriole, western yellow-billed cuckoo, gray squirrel, mule deer, Coues deer, black bear, Gambel's quail, doves, misc. microtines, misc. bats. Peregrine falcon, common black hawk, eared trogon, AZ Bell's vireo, narrow headed garter snake, AZ giant sedge, AZ alum root, AZ piox, misc. tiger beetles, butterflies, dragonflies
<b>Water Column</b>	Lowland leopard frog, longfin dace, Gila topminnow, gila chub, desert sucker, Mexican garter snake, narrow-headed garter snake, macroinvertebrates, misc. amphibians

## Environmental Consequences for Wildlife

Habitat Guild	Alternative 1 (No Action)	Alternative 2 (Proposed Action)	Alternative 3 (Flex Option)	Alternative 4 (No Grazing)
<b>Ponderosa Pine</b>	Indirect and direct affects from grazing to this guild are expected to be insignificant.	Indirect and direct affects from grazing to this guild are expected to be insignificant.	Indirect and direct affects from grazing to this guild are expected to be insignificant.	Indirect and direct affects from grazing to this guild are expected to be insignificant.
<b>Mid-Story (Chaparral/P/J)</b>	If herbaceous layer is over-grazed, cattle will be forced to browse layer. Juniper berry production that supports numerous bird species would remain stable. Chaparral would mostly remain static. Some special displacement between livestock and wildlife may continue.	Pinyon and juniper components would remain similar. Interspecific competition between cattle and some wildlife species may occur depending on timing of grazing. Browse species favored by wildlife could benefit depending on pasture. Other chaparral species would mostly remain static.	Wildlife habitat would likely remain similar to existing conditions. Reduced stocking rates and animal months would have little inertia on this guild. Yearlong grazing may affect some wildlife species distribution depending on time of year and level of utilization.	Pinyon and juniper components would remain similar. Inter-specific competition from cattle would be eliminated and browse species could become more abundant.
<b>Desert Scrub</b>	Current stocking and yearlong grazing could be affecting community structure. Historic overstocking may have had a deleterious affect on keystone plant species and species diversity. Some sensitive agaves may be subject to grazing during the bolting season. Numerous wildlife species that rely on the herbaceous component for grazing, foraging, hunting and nesting may be affected. Prey base for predatory birds and mammals may be affected due to decreased hiding and escape cover.	Desert scrub components may change little due to the slow growth of this guild. Historic overgrazing may continue to play a role in guild trajectory. Modest improvement may be expected for the life of the proposed action/permit (10 years).	Desert scrub components may change little due to the slow growth of this guild. Historic overgrazing may continue to play a role in guild trajectory. Cattle will have access to Arizona Hedgehog habitat. Only modest changes/improvement may be expected for the life of the proposed action/permit (10 years).	Desert scrub components may change little due to the slow growth of this guild. Over longer periods of time, recruitment of keystone species (plant and animal) may return to levels desired in the Forest plan.
<b>Herbaceous</b>		Overall primary diversity and productivity could improve. This increased herbaceous cover may help support more trophic levels over time and improve habitat conditions for general wildlife, MIS and some migratory bird species. Impacts may vary depending on whether a specific pasture is designated a browse or herbaceous pasture, as relates to utilization levels.	Under this alternative, with proper monitoring, site herbaceous productivity and those wildlife species associated with this guild may improve. Some wildlife species may experience disturbance during their reproductive periods ie ground nesting birds. Deferred pastures may help alleviate some of these negative impacts. Due to lack of set season dates, some wildlife species may avoid grazed pastures for extended periods or until cattle reach desired utilization levels and are moved.	Overall primary diversity and productivity would likely increase. This increased herbaceous cover would support increased trophic levels over time. Habitat selection by native wildlife would improve with normal precipitation patterns. Fawning, hiding, and thermal cover would improve with improved survival rates for big game, upland game, MIS and TES species.
<b>Riparian</b>	Many of the riparian obligate wildlife species may continue to decline or remain static without improvements in management. Some TES species may continue to be affected by current management. Improvement of habitat for wildlife, as outlined in the TNF Plan, will not be achieved on a regular basis.	Enforcement of TNF riparian standards and guidelines may indirectly improve habitat for many wildlife species. Some TES species may continue to be affected by this proposal.	Enforcement of TNF riparian standards and guidelines may indirectly improve habitat for many wildlife species. Some TES, migratory birds, or MIS species may compete with cattle for limited riparian resources.	Degraded riparian areas with water or high water tables will improve over time. Others will recover slowly or remain static. This alternative would most likely support increased species richness over time. General community structure, edge effect, nutrient cycling and corridor maintenance would be improved. Many TES, MIS and general wildlife species would benefit.
<b>Water Column</b>	Where conditions are perennial, habitat parameters for aquatic species may not be maintained or improved to alleviate potential adverse impacts. TNF Plan standards and guidelines may not be achieved.	Habitat conditions for aquatic species may improve in some areas.	Conditions for aquatic wildlife species may improve with proper monitoring. Most impacts to the aquatic resource are outside the scope of this analysis and are more related to mining activity.	Terrestrial impacts to the water resource and to aquatic species would likely be minimized. Some habitat parameters may improve.

**Table 11: Wildlife Environmental Consequences**

## Vegetation

### Affected Environment

A discussion regarding riparian vegetation can be found in the Hydrology, Riparian and Water section in this Chapter.

### Vegetative Communities

**Catclaw Mimosa/Sideoats Grama Semi-desert Grasslands** - This vegetation type occurs as a semi-desert grassland with a somewhat shrubby overstory, normally on steep or rocky slopes. Soils are normally medium to coarse textured and shallow to moderately deep. Elevations range from 3000 feet to 4800 feet mostly on south aspects often on shallow or rocky soils. Mean annual precipitation ranges from 14 to 20 inches.

The key indicator species are velvet mesquite catclaw mimosa, sideoats grama. Other common species include golden-flowered agave, indigobush, pointleaf manzanita, false mesquite, birchleaf mountain mahogany, sotol, hedgehog, Wright buckwheat, beargrass, prickly pear cactus, cane cholla, turbinella oak, gray horsebrush, broom snakeweed, and banana yucca.

The following graminoids are also typically found: poverty three-awn and hairy grama. Other graminoids may occur but normally on steep or rocky slopes only. These include bush muhly, tanglehead, cane beardgrass, tridens desert stipa, green sprangletop. Curlymesquite is only occasionally found within this type.

Forage production in this vegetation type, as rated by Cedar Creek, is 82 pounds per acre. Investigations by Tonto N.F. personnel found that forage production varied from about 75 to 200 pounds per acre.

**Sideoats Grama/Redberry Juniper Semi-desert Grasslands** - This vegetation type occurs as a semi-desert grassland on nearly level to steep slopes, normally with a south aspect. Soils are normally medium to fine textured and moderately deep to deep. Elevations range from 3400 feet to 4800 feet. Mean annual precipitation ranges from 14 to 20 inches.

The key indicator species are scattered redberry juniper, with canopy coverage ranging from 1 to 10%, and sideoats grama. Other common species include false mesquite, Wright buckwheat, catclaw mimosa, prickly pear cactus, gray horsebrush, broom snakeweed, and banana yucca.

The following graminoids are also typically found: poverty three-awn and hairy grama. Other graminoids may occur but normally on lightly grazed areas only. These include bush muhly, tanglehead, cane beardgrass, tridens species, desert stipa, green sprangletop, plains lovegrass, and Arizona cottontop. Curlymesquite is only occasionally found within this type.

In many places, Wright buckwheat forms a significant portion of the herbaceous forage. Forage production ranges typically ranges from less than 50 pounds per acres to 150 pounds per acre in most areas, however a few areas may produce 300 pounds per acre or more.

Forage production in this vegetation type, as rated by Cedar Creek, is 130 pounds per acre. Tonto N.F. personnel found that forage production varied from about 100 to greater than 200 pounds per acre.

**Mesquite/Threeawn Semi-desert Grasslands** - This vegetation type occurs as a semi-desert grassland, normally on mesas and rolling hills. The dominant slopes are less than 30%. Soils are medium to fine textured and moderately deep to deep. Elevations range from 3000 to 4000 feet. Mean annual precipitation ranges from 14 to 18 inches.

The key indicator species are velvet mesquite and various species of threeawn. Other common species include pricklypear cactus, desert ceanothus, Wright buckwheat, false mesquite, jojoba and crucifixion thorn. Occasional littleleaf paloverde and saguaro can be found on the hotter/drier parts of this type. Redberry juniper and turbinella oak may occur on cooler/moister sites.

Throughout most of this type, the herbaceous understory is sparse. Various threeawn species are by far the dominant perennial grass. Other grasses such as sideoats grama, and black grama are normally found only on steep or rocky slopes. Nearly all of this vegetation type has been heavily impacted by domestic livestock. Most of the slopes less than 10% produce less than 50 pounds per acre of forage. Steeper slopes may produce around 100 pounds per acres.

**Turbinella Oak/Manzanita Chaparral** – This vegetation type occurs as dense stands of shrubs on moderately steep to very steep hills and mountains. Soils are medium textured and range from shallow to deep. Elevations range from 3500 to 6000 feet on north aspects. Mean annual precipitation ranges from 16 to 22 inches.

The key indicator species are turbinella oak, pointleaf manzanita, pringle manzanita, Arizona white oak, Emory oak, desert ceanothus, birchleaf mountain mahogany, skunkbush sumac, sugar sumac, Wright buckwheat, sotol, burrowbush, catclaw mimosa, beargrass, snakeweed, and banana yucca. Scattered Arizona pinyon occurs in the overstory. The total canopy coverage of shrubs normally exceeds 50%.

The herbaceous understory is normally sparse. Forage production, as rated by Cedar Creek, is 48 pounds per acre. Most of this vegetation type contains only small amounts of desirable forage plants.

**Turbinella Oak/Manzanita Chaparral – Rock Outcrop** – This vegetation type is similar to Turbinella Oak/Manzanita Chaparral, except it includes significant presence of rock outcrop and boulder fields. It occurs on nearly level to steep plains, hills and mountains on soils derived from granite. Soils are medium textured and are shallow to moderately deep. Elevations range from about 4000 to 6000 feet. The understory is more open and vegetation occurs in clumps rather than a continuous dense stand. Herbaceous forage is normally greater and includes significant amounts of sideoats grama and other perennial grasses. Some areas have a fair amount of grass cover, however large amounts of brush and boulders limit the ability of cattle to use these areas. Most accessible areas have only a sparse grass cover. The cover of palatable shrubs is highly variable, portions have a good cover of mountain mahogany while in other areas the cover is sparse. Cedar Creek rated forage production at 270 pounds per acre. Tonto N.F. personnel found that forage production varied greatly. A few areas were producing close to 100 pounds per acre of herbaceous forage while other areas produced almost no herbaceous forage. The composition of the browse also varied with some areas containing a fair amount of mountain mahogany and ceanothus while other areas contained very little desirable browse. Overall, most places produce much less than 270 pounds per acre.

**Rock Outcrop - Turbinella Oak/Emory Oak** – This type contains large areas of rock outcrop and boulder fields, dense stands of low growing and mid level shrubs mixed with open areas containing a fair herbaceous understory. It occurs on nearly level to steep plains, hills and mountains on soils derived from dacite. Soils are medium textured and are very shallow to shallow. Elevations range from about 4200 to 5700 feet. Mean annual precipitation ranges from 16 to 22 inches.

The key indicator species are turbinella oak and Emory oak. Common shrubs and trees include, Arizona white oak, mountain mahogany, agave, beargrass, catclaw mimosa, and prickly pear. Scattered Arizona pinyon and redberry juniper also occur.

The understory is dominated by plains lovegrass, hairy grama, little bluestem, sideoats grama, bull muhley, cane beardgrass, green sprangletop, and Wright buckwheat. Herbaceous forage production is normally less than pounds 100 per acre. A few places have a fair amount of grass production, however the large amount of brush and surface boulders limit the ability of cattle to fully utilize forage. Areas free of boulders and brush tend to be heavily used while bushy/rocky areas are lightly used.

**Pinyon/Juniper/Oak Woodland** – This vegetation type occurs on moderately steep to steep hills and mountains. Soils are medium to fine texture and moderately deep to deep. Elevations range from 4000 to 4900 ft. Mean annual precipitation ranges from 18 to 22 inches.

The key indicator species are Arizona pinyon pine, redberry juniper, Arizona white oak, Emory Oak, turbinella oak, mountain mahogany, sugar sumac, skunkbush sumac, and desert ceanothus.

The understory contains sideoats grama, hairy grama, curlymesquite, bottlebrush squirreltail, junegrass, threeawn, and Wright buckwheat. Herbaceous forage is normally limited because of a dense overstory. Browse production in this type is also limited, however, in some places, a fair amount of browse occurs, especially on steeper slopes.

**Pinyon/Redberry Juniper/Sideoats Grama** – This vegetation type occurs as a fairly open woodland on moderately steep hills on soils derived from dacite. Soils are medium textured and are very shallow to shallow.

The key indicator species are Arizona pinyon pine, redberry juniper, and sideoats grama. Other common tree and shrub species include turbinella oak, mountain mahogany, catclaw mimosa sugar sumac, skunkbush sumac, turpentine bush and desert ceanothus.

The understory is dominated by plains lovegrass, hairy grama, little bluestem, sideoats grama, bull muhley, cane beardgrass, green sprangletop, threeawn, Arizona cottontop, and Wright buckwheat. Common understory forbs include Louisiana sagewort, Wright's cliffbrake, and Arizona spikemoss. Forage production is about 300 pounds per acre, however, this vegetation type is sparingly used by livestock because steep slopes limit access from the rest of the allotment.

**Ponderosa Pine/Pinyon/Arizona White Oak** – This vegetation type occurs at higher elevations on north facing slopes of moderately steep to steep hills and mountains. Elevations range from 4000 to 6400 ft. Mean annual precipitation ranges from 20 to 22 inches.

The key indicator species are Ponderosa Pine, Arizona pinyon pine, alligator juniper, Arizona white oak, Emory Oak, turbinella oak, mountain mahogany, sugar sumac, skunkbush sumac, and desert ceanothus.

The understory is sparse dominated by bottlebrush squirreltail and junegrass. Herbaceous forage is normally limited because of a dense overstory. Browse production in this type is also limited, however, in some places, a fair amount of browse occurs.

**Sonoran Desert (Paloverde)** – This vegetation type is found on the lowest elevations within the allotment and steep south facing slopes at mid elevation. It occurs on moderately steep to steep mountain slopes. Elevations range from 3200 to 4000 feet. Mean annual precipitation ranges from 13 to 18 inches.

The key indicator species are giant saguaro, little-leaf paloverde, triangle bursage, jojoba, pricklypear cactus, white brittlebush, flat top buckwheat, and trace amounts of threeawn, and false mesquite. Other species present include, jumping cholla, catclaw acacia, hedgehog cactus, turpentine bush, red brome, six week fescue and spurge.

The understory forage production is very limited except for areas of steep slopes or very rocky ground. Currently, on slopes less than about 40%, the understory is almost void of perennial grasses and over time, has been replaced by annual bromes and annual forbs including spurge. On some of the steeper slopes, a fair grass cover can be found including

slender grama, threeawn, hairy grama, sideoats grama, bush muhly, tanglehead, cane beardgrass, tridens, desert stipa and a variety of forbs.

Overall, the portions of this vegetation type accessible to cattle produce almost no herbaceous forage. Some parts of this type will produce a limited amount of browse, mostly from jojoba.

**Mesquite/Turpentine Bush/Snakeweed** - This vegetation type occurs as semi-desert scrub on nearly level to moderately steep plains and hills. The dominant slopes are less than 30%. Elevations range from 3200 to 3500 feet. Mean annual precipitation ranges from 15 to 18 inches.

The key indicator species are velvet mesquite, turpentine bush, and broom snakeweed. Catclaw acacia, pricklypear cactus, Wright buckwheat, false mesquite and jojoba also occur. Blue paloverde can be found on the hotter/drier parts of this type. Redberry juniper may occur on cooler/moister sites.

The understory is almost completely devoid of perennial grasses except for an occasional threeawn or curlymesquite. In some places Wright buckwheat provides a small amount of forage.

Most of this vegetation type has been heavily impacted by domestic livestock grazing. The herbaceous forage is less than 50 pounds per acre.

**Manzanita/Sotol/Crucifixion Thorn** - This vegetation type occurs on calcareous soils as semi-desert scrub on moderately steep to steep hills. Elevations range from 3100 to 3500 feet. Mean annual precipitation ranges from 15 to 18 inches.

The key indicator species are manzanita, sotol, and crucifixion thorn. Pricklypear cactus, false mesquite, catclaw acacia, and jojoba may also occur. Blue paloverde can be found on the hotter/drier parts of this type. Redberry juniper may occur on cooler/moister sites.

This vegetation type has been heavily impacted by domestic livestock grazing. The understory is almost completely devoid of perennial grasses except for an occasional threeawn or curlymesquite. Sheet erosion is very evident in the type.

**Catclaw Acacia/Curlymesquite Semi-Desert Grasslands** - This vegetation type occurs as a semi-desert grassland, normally on mesas and rolling hills on medium textured soils. The dominant slopes are less than 30%. Elevations range from 3100 to 3500 feet. Mean annual precipitation ranges from 15 to 19 inches.

The key indicator species are, catclaw acacia and curlymesquite. Other common species include pricklypear cactus, catclaw mimosa, Wright buckwheat, and jojoba. Blue paloverde can be found on the hotter/drier parts of this type. Redberry juniper and turbinella oak may occur on cooler/moister sites. Most of this vegetation type is fairly open except for some heavily used areas where catclaw acacia, catclaw mimosa, or pricklypear may dominate the site.

Throughout most of this type, the understory is heavily dominated by curlymesquite and threeawn. Other grasses such as sideoats grama, black grama, bottlebrush squirreltail, and junegrass, normally occur only beneath the protection of shrubs. Most of this vegetation type has been heavily impacted by domestic livestock. Only slopes greater than 30% or remote areas have a better cover and diversity of grasses.

**Velvet Mesquite/Curlymesquite Semi-Desert Grasslands** - This vegetation type occurs as a semi-desert grassland, normally on mesas and rolling hills. The dominant slopes are less than 30%. Elevations range from 3500 to 4000 feet. Mean annual precipitation ranges from 15 to 19 inches.

The key indicator species are velvet mesquite, catclaw acacia, pricklypear cactus, desert ceanothus, catclaw mimosa, Wright buckwheat, and jojoba. Blue paloverde can be found on the hotter/drier parts of this type. Redberry juniper and turbinella oak may occur on cooler/moister sites. Most of this vegetation type is fairly open except for some heavily used areas where catclaw acacia, catclaw mimosa, or pricklypear may dominate the site.

Throughout most of this type, the understory is heavily dominated by curlymesquite. Other grasses such as sideoats grama, black grama, bottlebrush squirreltail, and junegrass, normally occur only beneath the protection of shrubs. Most of this vegetation type has been heavily impacted by domestic livestock. Only slopes greater than 30% or remote areas have a better cover and diversity of grasses.

**Jojoba/Sideoats Semi-desert Grasslands** - This vegetation type occurs as a semi-desert grassland with a somewhat shrubby overstory, normally on steep or rocky slopes. Elevations range from 3200 feet on south aspects to 4000 feet on north aspects. Mean annual precipitation ranges from 14 to 19 inches.

The key indicator species are velvet mesquite, catclaw acacia, pricklypear cactus, desert ceanothus, catclaw mimosa, Wright buckwheat, and jojoba., Blue paloverde can be found on the hotter/drier parts of this type. Redberry juniper and turbinella oak may occur on cooler/moister sites.

The following graminoids are typically found, producing more than 500 lbs/acre in areas not easily accessible to livestock: blue grama, hairy grama, sideoats grama, bush muhly, tanglehead, cane beardgrass, threeawn, tridens, desert stipa, green sprangletop and a variety a forbs. Where this type occurs on accessible slopes less than about 30%, the site is dominated by curlymesquite with other grasses occurring only in protected areas.

Forage production in this type may exceed 500 pounds per acre on steep or rocky slopes, however on slopes less than 30%, forage production ranges from 50 to 150 pounds per acre.

**Redberry Juniper/Turbinella Oak/Sideoats Grama** - This vegetation type occurs on moderately steep hills and mountains, often associated with rock outcrop. Slopes are commonly steeper than 30%. Elevations range from 3500 feet on north aspects to 4000 feet on south aspects. Mean annual precipitation ranges from 15 to 19 inches.

The key indicator species are redberry juniper, turbinella oak and sideoats grams. Other common species include desert ceanothus and mountain mahogany.

The understory production consists of threeawn, sideoats grama, hairy grama, curlymesquite, junegrass, green sprangletop, and Wright buckwheat. On gentle slopes and in areas with few rocks, curlymesquite is the dominant grass.

**Turbinella Oak/Mountain Mahogany Chaparral** -This vegetation type occurs as dense stands of shrubs on nearly level plains and moderately steep to very steep hills and mountains. Soils are medium textured and range from shallow to deep. Elevations range from 3300 to 3900. Mean annual precipitation ranges from 16 to 19 inches.

The key indicator species are turbinella oak and birchleaf mountain mahogany. Other common species include pointleaf manzanita, pringle manzanita, Arizona white oak, Emory oak, desert cenothus, skunkbush sumac, sugar sumac, Wright buckwheat, sotol, burrowbush, catclaw

mimosa, beargrass, snakeweed, and banana yucca. Scattered Arizona pinyon occurs in the overstory. The total canopy coverage of shrubs normally exceeds 50%. Most of this type, within the allotment, has been heavily impacted by domestic livestock grazing. The availability of high quality browse is low.

The herbaceous understory is normally sparse, especially on flatter areas. On steeper slopes common species include threeawn and sideoats grama. On flatter portions of this type sheet erosion is prominent. Severe sheet erosion is occurring in the area burned (98 acres) in the 1994 Dagger Fire.

**Table 12. Summary of Associations of Vegetation Types**

Vegetation Type	Acres
Burn	98
Catclaw Mimosa/Sideoats Grama Semi-Desert Grassland (LSM, 3)	1,343
Mesquite/Threeawn Semi-Desert Grassland (LSM, 3)	1,036
Sideoats Grama/Redberry Juniper Semi-Desert Grassland (LSM, 3)	1,823
Sideoats Grama/Redberry Juniper Semi-Desert Grassland (LSM, 3)-Catclaw Mimosa/Sideoats Grama Semi-Desert Grassland	119
Active Mine	581
Pinyon/Juniper/Oak (LSM, 4, 0)	609
Pinyon/Redberry Juniper/Sideoats Grama (LSM, 4, 0)	152
Ponderosa Pine/Pinyon/Arizona White Oak (LSM, 5, -1)	269
Private/Patented	8,670
Rock Outcrop - Turbinella Oak/Emory Oak (LSM, 4, +1)	2,824
Streamside Vegetation	70
Turbinella Oak/Manzanita Chaparral (LSM, 4)	8,092
Turbinella Oak/Manzanita Chaparral (LSM, 4) - Rock Outcrop	6,847
Catclaw Acacia/Curly Mesquite Semi-Desert Grassland (LSM, 3)	269
Manzanita/Sotol/Crucifixion Thorn Semi-Desert Scrub (LSM, 3)	22
Redberry Juniper/Turbinella Oak/Sideoats Grama (LSM, 4, -1)-Velvet Mesquite/Curlymesquite Semi-Desert Grassland (LSM, 3)	167
Sonoran Desert Paloverde (LSM, 2)-Jojoba/Sideoats Grama Semi-Desert Grassland (LSM, 3)	544
Velvet Mesquite/Turpentine Bush/Snakeweed Semi-Desert Scrub (LSM, 3, -1)	88
Velvet Mesquite/Curlymesquite Semi-Desert Grassland (LSM, 3)	123
Turbinella Oak/Mountain Mahogany Chaparral (LSM, 4)	229
Turbinella Oak/Mountain Mahogany Chaparral (LSM, 4) (Burned)	98
Turbinella Oak/Mountain Mahogany Chaparral (LSM, 4)-Jojoba/Sideoats Grama Semi-Desert Grassland (LSM, 3)	86
Streamside Vegetation	203
Total	34,180

## Environmental Consequences

### Effects Similar to All Allotments

Areas where livestock tend to congregate tend to be in poorer range condition with downward trends. All of the alternatives except for Alternative 1 should result in improved range conditions with upward trends in these areas. Conditions would improve to the greatest extent and at the fastest rate under Alternative 4. The effects from Alternatives 2 and 3 should be similar; however, improvement would not occur to the extent nor as fast as realized under Alternative 2.

The anticipated effects displayed here are based upon the amount of use domestic livestock will be allowed on key plants in key areas. This is why the effects of Alternatives 2 and 3 are similar. The main difference between these alternatives is the amount of time the livestock are anticipated to be on the allotment. Management prescriptions proposed in the alternatives have livestock being removed from the allotment once use limits are met. Due to the higher level of permitted use under Alternative 2, it is expected that livestock would not remain on the allotment for a full 12 months. With the ability to use adaptive management under Alternative 3, the Forest and permittee can employ a stock and monitor program to help determine the most appropriate stocking level as it relates to both allotment management objectives and available forage on a yearly basis. This approach would probably result in livestock being able to remain on the allotment for a longer period of time than that achieved under Alternative 2.

Most of the project area consists of shrub-dominated vegetation types. Research in the southwest has shown that these areas are probably in a state where a change in livestock management alone will probably not appreciably change the current condition. Pieper explains, "Removing livestock from rangelands is unlikely to return these ecosystems [in the Southwest] to their pristine conditions. Many other changes including climatic shifts, increases in woody plant species, reduction in fire frequency and intensity, introduction of alien plant species, and other human activities have occurred, resulting in undetermined impacts on the native vegetation. Livestock grazing has played a role in reducing the amount of fuel for wildfires, altering nutrient distribution, acting to create patchiness at landscape levels in the environment for many animal species, and disrupting cryptogamic crusts. Nevertheless, domestic livestock grazing at conservative levels appears to be sustainable, even on sensitive western rangelands" (Pieper, 1994).

## Soils

Soil condition was evaluated by using a combination of field inspections, Digital Elevation Models (DEM's), aerial photo interpretation, and topographic maps. The soil condition represents an approximation. It was not possible to visit all areas. Interpretations were based on historical livestock use patterns and slope characteristics. In some places, it was not possible to map small areas where the soil condition differed from the surrounding areas because of the small size of the polygons. It was observed in the field that 0 to 10% slopes had high impacts. Ten to 30% slopes had mostly moderate to high impacts except in rocky areas or areas of thick chaparral where impacts were low. Most slopes steeper than 30% had low impacts. Areas with less than satisfactory soil condition are a result of past and current management practices.

**Table 13. Soil Condition Acres**

Category	Acres	Relative Percent
Satisfactory	20,820	81
Impaired	3,290	13
Unsatisfactory	988	4
Mine (Disturbed)	581	2
	25,679	100

Areas of disturbed mining lands were not rated for soil condition and are excluded from grazing.

The satisfactory soil condition class covers about 20,820 acres (81%). These soils are generally found under thick chaparral vegetation, areas that have large amounts of boulders or rock outcrop, and steep slopes. Generally, these soils have not been heavily impacted and have high effective vegetative ground cover. Plant species' density and diversity are high. Some areas rated satisfactory have small inclusions of impaired or unsatisfactory soils, mostly in areas of chaparral relatively free of rock fragments where livestock have impacted small open areas. These areas have impaired or unsatisfactory soil condition but represent only a small percentage of the particular vegetation type.

Thirteen percent of the soils (3,290 acres) are predominantly in impaired soil condition. Most of these soils occur in grasslands on slopes ranging from 10 to 45% or in chaparral areas easily accessible to livestock. Specifically, these have slight to moderate soil compaction and have lost part of the original "A" horizon through moderate sheet and rill erosion. These soils have not been compacted as much as the heavily used soils in unsatisfactory condition. Nutrient cycling is limited as well. Vegetation diversity and species composition is relatively low.

The unsatisfactory soil condition class by itself makes up 581 acres (4%) of the allotments. These soils occur on flats and low hills with slopes ranging from 0 to 15% on some grasslands and a few drainages. In addition, two burned areas from wildfire in the mid 1990's have not fully recovered and lack herbaceous vegetation and litter. One of the burns, the 100 acre Dagger fire on the

Gerald Hills allotment is experiencing severe sheet erosion. These soils have high amounts of surface compaction and poor soil porosity and root distribution resulting in moderate to high amounts of sheet, rill, and gully erosion, very poor diversity, density, and composition of perennial grasses with little litter cover. The lack of perennial grasses and litter cover is limiting the ability of these soils to rebuild their supply of organic matter. For these soils to recover, the compact layers must be allowed to achieve normal compaction (i.e. a bulk density within 15% of normal) by limiting hoof impact, especially when soils are wet. Also critical for recovery is a buildup of organic matter from both surface litter and a dense network of plant roots, primarily perennial grasses. Much of the unsatisfactory soil condition appears to have been caused by historical grazing impacts, however, current management practices may be slowing or preventing recovery.

## **Environmental Consequences**

### **Effects Common to All Alternatives**

Cattle treading on soils has the potential to effect soil bulk density (compaction), increase erosion, and create animal trails. Compaction of soils reduces the infiltration and percolation of rain, increasing runoff and thereby increasing erosion. Erosion and subsequent sedimentation increases may also be experienced from the removal of vegetation due heavy grazing. Research has shown that the stocking rate seems to be the most important influence on the bulk density of soils (Valentine 1990).

The unsatisfactory soil condition, two percent, and the impaired soil condition, 13 percent occur on the flattest parts of the allotments. These conditions were most likely caused from grazing practices over the last century. Even with alternative 4, no grazing, it is very unlikely that any measurable change would occur over the next ten year period. However alternative 4 would most likely improve vegetative cover and thereby reduce erosion.

Alternative 3, and alternative 2 with improved and monitored management most likely would prevent soil conditions from declining further. Alternative 4 would be the most likely to show improvement in soil condition.

## **Hydrology, Riparian and Water Quality**

The Sleeping Beauty Allotment and the eastern portion of each the Bohme and Bellevue allotments fall within the Pinal Creek fifth code watershed. Major tributaries to Pinal Creek within the allotments include Gerald Wash, Tinhorn Wash, Eastwater Spring and Bloody Tanks Wash. The western portion of each the Bohme and Bellevue Allotments fall within the Pinto Creek fifth code watershed and Pinto Creek flows through both allotments. Major tributaries to Pinto Creek within the allotments include a small reach of Haunted Canyon and Powers Gulch. A small portion in the southwest of the Bellevue Allotment falls within the Mineral Creek fifth code watershed. There are no major tributaries to Mineral Creek within the allotment.

Pinto Creek flows out of the Pinal Mountains in a northwesterly direction through the Bellevue and Bohme Allotments before it turns north into the Pinto Creek allotment. Its elevation at the upper end of the Bellevue Allotment is about 4200 feet. It flows through about 3 miles of the Bellevue Allotment in a narrow canyon and approximately 4 miles through the Bohme Allotment. About 1.5 miles of Pinto Creek in the Bohme Allotment is located on patented land.

Although all of Pinto Creek in both allotments flows through a steep canyon, valley bottom width varies. Almost all of Pinto Creek in the Bellevue Allotment is in valley bottoms less than 100 feet wide. Valley bottoms widen, with more potential for riparian vegetation development, in the upper half of the Bohme Allotment, especially on the patented lands. In the lower half of the Bohme Allotment, the Pinto Creek valley bottom becomes very narrow until its confluence with Haunted Canyon, where the valley widens out.

## Pinto Creek

Pinto Creek is a perennial stream with reaches of intermittent flow. Data was collected on the creek on the Bohme Allotment downstream from the 1997 tailings spill. It was classified as a "B" type stream with mainly sand and cobble size sediment. There is little other data for Pinto Creek on these allotments. Cattle and mining activities have impacted the creek for over 100 years. Direct impacts by cattle include removal of riparian vegetation and hoof impacts to banks. Direct impacts by mining include tailings spills, placer mining, and mining roads. Cattle grazing, in the uplands has removed vegetation and compacted soils. These changes in watershed condition have likely indirectly affected stream channels and riparian areas. Indirect impacts by mining include the withdrawal of groundwater, which may have affected streamflow, and the conversion of parts of the watershed to mine pits and tailings and waste piles. The results of these indirect impacts (both mining and grazing) are higher peak flows, lower base flows, more sediment in the stream, and more erosion of the banks and floodplains. The historic condition of Pinto Creek's stream channel cannot be known. Currently, the channel is armored with bedrock, boulders and cobble. Finer sediments and the vegetation to hold them are generally lacking. Poor channel conditions lower the resiliency of the stream to withstand damaged caused by floods.

**Vegetation.** The riparian vegetation of Pinto Creek is a mixed broadleaf community with low density and sparse canopy. It is characterized by uneven and irregularly distributed patches and belts of riparian vegetation with differing species composition, ages and densities. Cedar Creek Associates (1992, revised 1993 and 1994) describe four riparian community types along Pinto Creek in the Bohme Allotment. Each of the community types is dominated by Arizona sycamore, and associated with Emory oak, tamarisk or Fremont cottonwood. Velvet ash is found in each of these community types. Tamarisk is most common on the upper reaches of Pinto Creek in the Bohme Allotment, where disturbance was greatest from historic mining activities. Overall woody plant species density is 175 plants/acre. Cat-claw, wait-a-minute, Baccharis species, burro-brush, Turbinella oak and buttonbush, are the dominant shrubs. Understory ground cover averages 15%. Bare ground and rock cover is 80%. Litter cover averages about 5%. The herbaceous layer has very low cover. Total non-tree annual production was estimated to be 900 pounds (dry weight) per acre, with about 5% of this usable forage. Average carrying capacity in the riparian area is estimated at 0.021 AUM's/acre.

In an evaluation of condition and trend, Cedar Creek Associates (1992, revised 1993 and 1994) rated the riparian vegetation of Pinto Creek as poor and declining, with an ecological rating of early to mid-seral. Rationale for ratings was based on lack of regeneration of cottonwood, willow, and herbaceous species, and relatively high cover values of early successional, weedy and non-native species such as Bermuda grass and tamarisk. They attributed this ecological state to heavy grazing over several decades, recurrent flood events (the 1993 flood removed much of the vegetation from the channel in many reaches), physical disturbances related to mining activities and the invasion of non-native species.

Since the Cedar Creek Associates study, a mine tailings spill and cleanup in 1997 altered the vegetation (see above). From the entry point, tailings extended upstream about 800 feet and downstream 2700 feet. Tailings were removed from this 3500 feet. Stream morphology reparation and re-vegetation occurred on about 1000 feet. A native mix of grasses, forbs and shrubs was seeded; containerized deergrass, and willow and cottonwood pole cuttings, potted sycamores and velvet ash starters were planted. Cattle grazing was restricted in the area. Photographic, qualitative assessments and quantitative transect monitoring were initiated following re-vegetation. From the photo log, vegetative recovery appears to be occurring, although ground cover and vertical diversity remain low. Riparian vegetation below the area of stream restoration was relatively unaffected by the tailings spill or cleanup efforts (Loomis, personal communication).

There is no inventory, trend or condition assessment data for Pinto Creek on the Bellevue Allotment. From field observations, it is probably similar to Pinto Creek in the lower end of the Bohme allotment, in the narrow canyon sections. From observation, it appears to have greater cover and diversity in the herbaceous layer. It is likely that this narrow reach of Pinto Creek received lower levels of use historically.

### **Haunted Canyon**

Haunted Canyon is a perennial stream that flows through the Bohme Allotment near the boundary with the Pinto Creek Allotment for approximately  $\frac{3}{4}$  mile to its confluence with Pinto Creek. A stream survey was completed on this reach of the creek. It is a "B" type channel with gravel as the predominant sediment. "B" type streams are moderately entrenched, containing narrow floodplains, and have a moderate gradient (2-4%). It was rated as impaired due to erosion occurring on the upper banks.

Cedar Creek Associates, Inc. (1992, revised 1993 and 1994) sampled and described the vegetation in Haunted Canyon as an Arizona alder community with velvet ash, Arizona sycamore, Arizona black walnut, one-seed Juniper and Arizona cypress. Understory species include burrobrush, desert broom, shrub live oak, broom snakeweed and wait-a-minute bush. Photopoints show an increase in understory diversity, cover and density since 1996.

### **Powers Gulch**

Powers Gulch is an ephemeral stream that flows from south to north across the Bellevue Allotment for approximately three miles, then the Bohme Allotment for approximately  $\frac{1}{4}$  mile to its confluence with Haunted Canyon. No stream surveys were done, but most of the stream is a "B" type with some reaches of "F" type where it flows through a narrow canyon (Loomis, personal communication). "F" type streams are highly entrenched (downcut), with little or no floodplain to dissipate flood flows or support riparian vegetation. Most "F" type streams evolve from a more stable stream type due to some natural or management caused disturbance.

Above the confluence of Powers Gulch and its West Fork, there is very little riparian vegetation other than an occasional Arizona sycamore (fewer than 15 trees per 1.5 miles). Riparian vegetation exists below the West Fork and the confluence of Powers Gulch with Haunted Canyon. Vegetation is dominated by Arizona sycamore with emory oak and velvet ash (Cedar Creek Associates, Inc., 1992, revised 1993 and 1994). Photopoints show an increase in riparian vegetation density and cover between 1996 and 2001.

### **Copper Springs Canyon**

No change could be observed from photopoints between 1996 and 1999. From the photopoints, the channel appears to be an "F" type channel. The channel is ephemeral/intermittent. Vegetation is dominated by oaks and chaparral species. There are occasional riparian obligate species. Sycamore is the most common tree species. Understory riparian species are poorly represented. A spring supports several older Fremont cottonwood and Goodding willow. Bermuda grass is present.

### **Eastwater Springs and Canyon**

Eastwater Spring originates in a narrow canyon north of the Pinto Valley open pit mine. The water flows north and east through Eastwater Canyon in to a tailings pond. Surface water is present for about  $\frac{1}{2}$  mile. Riparian vegetation extends for about one mile. The elevational range is from about 4400 to 4000 feet. The channel is steep, and dominated by bedrock and boulder. Vegetation is dominated by an overstory of mature white oak and Arizona sycamore. There are a mature few velvet ash, Fremont cottonwood and Arizona walnut. Other age classes (seedling to pole size) are infrequent. The understory is open, and shrub, forb and herbaceous cover and diversity is moderately low.

Although the channel is moderately steep, cattle access most of the one mile reach. The inaccessible sections support deergrass. Deergrass use in one narrow section below the spring averaged 23%.

According to BHP employees, a trail that traverses the length of the riparian areas is a remnant of an old road used to move livestock from the higher elevations down to Pinto Creek. Cattle still make extensive use of this route.

### Water Quality

Water quality standards for streams within the allotments are intended to protect the designated uses identified in the table below. Water quality in the non-ephemeral tributaries is protected by the standards that have been established for the nearest downstream water.

**Table 14. Water Quality**

Stream Name	Designated Uses	Use Support
Pinto Creek, headwaters - Ripper Spring Canyon	A&Ww, FC, FBC, AgI, AgL	Non-support
Bloody Tanks Wash, Schultze Ranch – Miami Wash	A&We, PBC	Non-support

A&Wc - aquatic and wildlife – warm water fisheries

A&We - aquatic and wildlife – ephemeral

FC - fish consumption

FBC - full body contact recreation

PBC - partial body contact recreation

AgI - agricultural irrigation

AgL - agricultural livestock watering

The Arizona Department of Environmental Quality (ADEQ) evaluates the water quality status of waters within the state in a Nonpoint Source Assessment Report (305b) every other year. The 2000 report indicates that Pinto Creek and Bloody Tanks Wash (in the reaches referenced above) are both in non-support of A&W due to an exceedance of the standard for dissolved copper. Pinto Creek is also in partial support of A&W and FBC for low pH. The potential sources for the exceedances are listed as resource extraction and natural.

Both Pinto Creek and Bloody Tanks Wash, on the above reaches, are listed on ADEQ's 303d list of water quality impaired waters (ADEQ 1998). Because these are listed stream reaches, any management activities may not further reduce water quality of the constituents exceeded.

### Environmental Consequences

Alternative 1, current management, riparian condition trend would be expected to remain constant. Most of the reaches of Pinto creek are off of the allotment and are inaccessible to cattle from these allotments. The Haunted Canyon area and Pinto creek have not been accessible to cattle since 1997 when the Pinto creek areas were fenced after a mine tailings spill which entered Pinto Creek. On the Bellevue allotment, The Powers Gulch area and Copper Springs Canyon have not been grazed since 2000. Riparian monitoring in the recent past has shown that utilization is within current guidelines.

Alternatives 2 and 3 would require livestock to use these areas more equally and with reduced stocking from the currently permitted. Under alternative 2 and 3 key riparian areas would be monitored for percent use. The trend, on the Bellevue Allotment would be slightly better under alternative 2 because of more stringent use standards. Riparian condition trend would most likely

remain stable under both alternative 2 and 3. Riparian condition trend would be most likely to improve with alternative 4 although the rate and extent of recovery would largely be determined by the existing conditions.

## **Air Quality**

Air quality within this project area is not expected to be measurably affected by any alternative. Very little dust and other pollutants will be produced by any actions in any of the alternatives. Some of the action alternatives require livestock to be rotated or moved at closer intervals compared to current management. However, these large herd movements will be short lived, and will occur once every 3-6 months.

## **Heritage Resources**

### **Affected Environment.**

The Sleeping Beauty, Gerald Hills, Bohme, and Bellevue Allotments probably contains hundreds of prehistoric archaeological sites representing the occupation and agricultural modification and use of this area by people related to the Hohokam and Salado archaeological traditions over a period of 8,000 to 10,000 years. It also contains hundreds of historic sites reflecting its use and occupation by Apache hunters, gatherers, and farmers, Anglo and Hispanic ranchers, stockmen, miners and prospectors, the Civilian Conservation Corps, and the U.S. Forest Service.

Few areas within the Sleeping Beauty, Gerald Hills, Bohme, and Bellevue Allotments, with the exception of a strip following the course of State Highway 88, have been intensively surveyed to produce an inventory of heritage resources. The limited previous archaeological surveys have revealed a large number of prehistoric and historic sites. Known heritage properties include a wide range of features, ranging from historic cabin sites to simple artifact scatters to large prehistoric village sites. The great majority of these features, however, are prehistoric and consist of collapsed stone masonry structures, various water control devices such as check dams, and terraces, and roasting pits for the processing of agave. There are also a large number of features associated with a long history of cattle ranching and small-scale mining and ore processing. Many other prehistoric and historic archaeological sites are represented by nothing more than a scatter of artifacts on the ground surface.

Specific efforts to identify and inventory traditional cultural properties have only been made in one small area within the allotments. Only one eligible Traditional Cultural Property is currently known to be located within the allotment. However, several areas identified as tribal sacred sites with ongoing traditional and cultural value have also been identified within the allotment boundaries. These sites include native plant gathering areas still used by the Apache and areas associated with the origin of certain clans.

From the 1870s to the early 1920s grazing of what would become the Sleeping Beauty, Gerald Hills, Bohme, and Bellevue Allotments was heavy and unregulated. This resulted in an initial reduction of vegetative cover, which may have affected heritage resources by soil loss, erosion, and trampling. This was exacerbated by vegetation loss caused by sulphurous emissions from the copper smelter in Miami. Since the establishment of the allotment and implementation of grazing management and the enactment of emission control regulations for the smelters, vegetative cover has returned and the known heritage resources inventoried there have stabilized and in many cases improved in condition.

### **Effects Common To All Alternatives**

Based on a history of observation and consultation with the State Historic Preservation Officer (SHPO), managed grazing is not considered in and of itself to constitute an effect on heritage resources when the grazing strategy is designed to match herd size with capacity and distribute

livestock as evenly as possible across the allotment in order to avoid localized concentrations of animals and the resultant impacts to soils and vegetation associated with intense trampling. Changes in grazing strategy are likewise not considered to have an effect provided that whatever new strategy is implemented does not alter these conditions. Adverse effects can be foreseen if a proposed grazing strategy were to introduce livestock into an area not known to have been grazed historically. They may also be expected when a grazing strategy proposes shifting to a more intensive system where higher permitted numbers or high intensity/short duration schedules would concentrate livestock into confined areas where either the absolute or relative stock density would cause a significant increase in surface disturbances due to trampling that would be above previous or existing levels. This could result in either direct or indirect adverse effects depending on the degree of trampling resulting from localized concentration and on the presence or absence of heritage resources in the concentration area, the nature of the resource and its resistance to such impacts, and the distance to other heritage sites. For the most part, these conditions tend to be associated with the construction of range improvements designed to provide water or to concentrate and hold stock for roundup or shipping. Thus, the greatest potential for direct adverse effects to heritage resources is associated with the construction of range improvements and the access roads needed to build and maintain them

### **Environmental Consequences**

Impacts to heritage resources, especially archaeological sites, can be generally defined as anything that results in the removal of, displacement of, or damage to artifacts, features, and/or stratigraphic deposits of cultural material. In the case of heritage resources, which are considered eligible for inclusion in the National Register of Historic Places, this can also include alterations of a property's setting or context. In the case of traditional cultural properties and sacred places, additional considerations may include alterations in the presence or availability of particular plant species. Heritage resources, depending on their nature and composition, are subject to several different types of impact from activities associated with grazing. Direct impacts from grazing are generally considered to be those resulting from concentrated livestock trampling or construction. Indirect impacts can include erosion and changes in vegetative composition and density that alter the setting and geographic context of sites.

Since site condition assessments for heritage resources are not available for any time prior to the introduction of European livestock species to the Southwest, some level of effect is assumed to have contributed to the current condition of all sites on the allotment. Given the non-renewable nature of heritage resources -- particularly archaeological and historic sites -- any portion of them that has been damaged or removed diminishes their cultural and scientific value permanently. All effects to heritage resources are considered cumulative.

### **Mitigation and Monitoring**

Mitigation of impacts to heritage resources for all alternatives is best accomplished by avoidance of these properties by the placement and construction of all range improvements. It can also be achieved by minimizing opportunities for the localized concentration of animals, improving distribution across the allotment and across each pasture, and by reducing the intensity of grazing for the allotment as a whole. Other, more specific mitigation requirements may be identified as each of these improvements is developed and a heritage inventory is made of their areas of potential effect. Archeological clearance must be approved and all necessary consultation with SHPO and the potentially interested Tribes prior to issuing any decision regarding the construction, modification, or removal of all improvements. This approach, based on long-term consultation with SHPO and on Region 3 policy as embodied in the *Heritage Consideration Checklist* issued 11 February, 1998, is considered to be the "standard operating procedure" for treating potential grazing impacts to heritage resources on the Tonto National Forest.

**Monitoring.** No specific monitoring of heritage resources will be required unless it is determined to implement an alternative that would have an adverse effect.

## **Cumulative Effects**

### **Mining**

Pinto Creek flows through a mineral rich area. Mining began in this area in the mid 1870s. The miners include individuals and large companies. The types of mining that have occurred here include placer, open pit, and underground. There have been several large tailings spills into Pinto Creek. The most recent occurred in 1997 on the Bohme Allotment. On Oct. 22, 1997 a slope failure on a tailings pile at the BHP Copper, Pinto Valley Mine caused more than 350,000 cubic yards of material to discharge into Pinto Creek, impacting 1.5 miles of stream. A 53 foot dam was constructed upstream of the spill to keep flow in the stream from reaching the tailings and carrying them downstream. Gabions were constructed downstream of the site to catch any material moving downstream. In November, the mine began cleaning the tailings out 1000 feet of the channel with heavy equipment and then by hand. In April and May 1998 the dam was removed and the 1000 foot reach was reconstructed to a stable configuration and vegetation was planted on the stream banks and terraces.

At the present time two open pit copper mines are operating within or adjacent to the project area. The Pinto Valley Mine, operated by BHP, is located adjacent to the Bohme Allotment. It is currently operating with residual leaching of ore.

Phelps Dodge Miami Corporation operates the Blue Bird Mine, which is just south of the Sleeping Beauty allotment. This operation has leach dumps and overburden dumps which are within the Bohme Allotment. In addition there is ongoing reclamation involving the cattle and the progeny of the cattle, which are permitted to this project.

Since 1989 effective re-vegetation of tailings and the prevention of erosion has been accomplished through the use of cattle from the Sleeping Beauty, Bellevue and Bohme allotments. The cattle are put on the tailings along with straw and hay and effectively trample and mulch the tailings. This is one of the essential stages in the re-vegetation process (Jones 1995).

Effects from the tailing spill have caused Pinto Creek to exceed standards for water quality because of dissolved copper and other minerals. Cattle grazing is not expected to change water quality in this regard.

**Future Projects** – The Carlota Corporation completed its Environmental Impact Statement for a new mine in the Granite pasture of the Bellevue allotment. This mine may start once copper prices remain above \$0.80/ lb. All EIS work is completed from the standpoint of the FS and the National Pollutant Discharge Elimination System (NPDES) permit has been obtained from the EPA. This project will profoundly affect approximately 1428 acres within a project area of 3050 acres. Cattle would not be permitted within the area due to safety concerns. Construction would take about 18 months, with some mining occurring within that time. The mine is expected to last 20 years.

**The Castle Dome Mineral Pit** will be expanded by Gila County from its current five acres to about 15 acres over the next 10 years. It is located on the Bohme Allotment between the Pinto Valley Mine and the Phelps Dodge Miami mine. The pit will comply with the Clean Water act and all Best Management Practices. Reclamation will be started after the first 10 year period. Gila County will obtain a storm water discharge permit from ADEQ prior to the expansion. Water quality is not expected to be cumulatively affected in conjunction with cattle grazing.

## **Recreation**

The Haunted Canyon trailhead is located on the west side of the Bohme allotment. The mines allow public traffic to pass through private land to access the trailhead. Cattle grazing is not expected to affect recreation nor is the combined effect expected to be greater than the effects described in this document.

## **Grazing**

The Bureau of Land Management allows grazing just south of the sleeping beauty allotment for up to 27 cattle. Downstream effects of grazing are to the Blue Bird Mine area and the town of Globe, Arizona.

## **Special Management Areas**

### **Affected Environment and Consequences**

The analysis area does not contain any designated Wilderness areas or any area designated as Roadless, or Inventoried Roadless areas.

The analysis areas does not contain any segments of streams that were considered potential for wild scenic or recreational rivers designated in the *Preliminary Analysis of Eligibility and classification for Wild/Scenic/Recreational River Designation* (USDA, 1993). A segment of Pinto creek is located approximately 4 miles downstream from the boundary of the analysis area. None of the alternatives proposed are expected to affect the characteristic of the free-flowing nature or the outstandingly remarkable values (ORV's) associated with the potential wild, scenic or recreational river segment downstream from the analysis area.

# Chapter 4 – Agencies and Persons Consulted

The Forest Service consulted the following individuals, Federal, state and local agencies, tribes and non-Forest Service persons during the development of this environmental assessment:

## **ID TEAM MEMBERS:**

Earl Christian – Project Leader, Natural Resource Specialist, Tonto Focus Team  
Elwood Burge, Natural Resource Specialist, Tonto Focus Team  
Rhonda O’byrne, Natural Resource Specialist, Tonto Focus Team  
Russell Richards, Wildlife Biologist, Tonto Focus Team  
Norm Ambos; Forest Soil Scientist; Tonto National Forest  
Janet Grove; Forest Riparian Ecologist; Tonto National Forest  
Lynn Mason; Forest Hydrologist, Tonto National Forest  
Steve Germick; Archaeologist, Tonto National Forest

## **Consultation with Others**

The Forest attempted to contact 71 separate parties believed to be interested or affected by the proposed action when it initiated scoping on the proposed action (November 2002). Of these, 3 were federal agencies, 4 were state agencies, 3 were local governments, 15 were tribes. The remainder were individuals and organizations. From this effort, five parties commented or otherwise expressed an interest in the proposal and will receive a copy of this Environmental Assessment.

## **FEDERAL, STATE, AND LOCAL AGENCIES:**

Bureau of Land Management  
U.S. Army Corps of Engineers  
US Fish and Wildlife Service  
Dana Bayer, Arizona Game and Fish Department  
Dennis Sundie, Department of Water Resources  
Susan Ward, AZ Dept. of Environmental Quality  
Chris Jones, Gila County Extension Service  
Honorable John McCain, US Congress  
Honorable Rick Renzi, US Congress  
Honorable Jon Kyl, US Congress

## **TRIBES:**

Fort McDowell Indian Community  
Hopi Tribe  
Salt River Pima-Maricopa Indian Community  
San Carlos Apache Tribe  
Tonto Apache Tribe  
White Mountain Apache Tribe  
Yavapai-Apache Nation  
Yavapai-Prescott Tribe  
Pueblo of Zuni

## **OTHERS:**

Laurie Fulkerson, Forest Guardians  
Martin Taylor, Center for Biological Diversity  
Jeff Burgess  
Tom Hale, Gila County Cattle Growers  
Frank Welch  
Jeff Williamson  
Don Steuter, Sierra Club  
Gary Jones, Phelps Dodge, Miami Inc  
David Cook, D.C. Cattle Co.  
Jay Spehar, Phelps Dodge, Miami Inc.  
Mr. Robert Mounce  
Mr. Chuck Marlow  
Ms. Kathy Williams

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