

Four Forest Restoration Initiative, Rim Country EIS

DRAFT Range Report

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for:
4FRI Rim Country EIS

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Introduction/Project Information

The Rangeland resources are not directly related to the Purpose and Need of this project. The effects of the treatments to the understory vegetation will be analyzed; there were no issues relating to the understory vegetation.

Livestock grazing is authorized through Term Grazing Permits. Allotment Management Plans are developed through the NEPA process. This is the process used to analyze stocking rates, season of use, and management for Allotments. The Purpose and Need for this project is not related to the Term Grazing Permit/Allotment Management Plans, and there were no issues were identified in scoping. Although no permanent changes to the stocking, season of use, or management will occur with this decision, annual changes could occur, if deemed necessary. These changes may include rest or deferment of pasture, and would be discussed as needed, such as during the Annual Operating Instruction meetings.

Relevant Law, Regulation, and Policy

Range Management Relevant Laws, Regulations and Policy

Congress

Congressional intent to allow grazing on National Forest System lands comes from the following acts: Multiple Use-Sustained Yield Act of 1960, Forest and Rangeland Renewable Resources

Planning Act of 1974, Federal Land Policy and Management Act of 1976, National Forest Management Act of 1976.

Forest Service Manuals

The Forest Service Manual (FSM) contains legal authorities, objectives, policies, responsibilities, instructions, and guidance needed on a continuing basis by Forest Service line officers and primary staff in more than one unit to plan and execute assigned programs and activities.

Forest Service Manual 2200 – Range Management

Forest Service Handbooks

Forest Service Handbooks (FSH) are the principal source of specialized guidance and instruction for carrying out the direction issued in the FSM. Specialists and technicians are the primary audience of Handbook direction. Handbooks may also incorporate external directives with related USDA and Forest Service directive supplements.

Forest Service Handbook 2209.13 – Grazing Permit Administration Handbook
Service Wide Issuance

2209.13 - Grazing Permit Administration Handbook (Region 3)

Regulations for Range Management are found at 36 CFR Part 222, Subpart A - Grazing and Livestock Use on the National Forest System, Subpart B – Management of Wild Free-Roaming Horses and Burros, and Subpart C – Grazing Fees. Regulations at 36 CFR 222.2 (c) state that National Forest System lands would be allocated for cattle grazing and allotment management plans (AMP) would be prepared consistent with land management plans.

Forest Plan Direction

The Land Management Plan for the Apache-Sitgreaves National Forest provides management direction for range resource as follows:

- Desired conditions for Livestock Grazing:
 - 1) Livestock grazing contributes to the social, economic, and cultural diversity and stability of rural communities. (p. 96)
 - 2) Livestock grazing and associated activities occur such that healthy, diverse plant communities, satisfactory conditions soils, and wildlife habitat are maintained or improved. (p. 96)
 - 3) Livestock grazing is in balance with available forage (i.e., grazing and browsing by authorized livestock, wild horses, and wildlife do not exceed available forage production within established use levels). (p.97)
- Guidelines for Livestock Grazing:
 - 1) As areas are mechanically treated or burned, or after large disturbances, timing of livestock grazing should be modified as needed, in order to move toward desired conditions and to accomplish the objectives for the treatment or disturbed area. (p. 97)

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- 2) Forage, browse, and cover needs of wildlife, authorized livestock, and wild horses should be managed in balance with available forage so that plants providing for these needs remain at or move toward a healthy, persistent state. (p. 97)

- Desired Conditions for all PNVTs:

- 1) Herbivory is in balance with available forage (i.e., grazing and browsing by authorized livestock, wild horses, and wildlife do not exceed available forage production within established use levels). (p. 29)

The Land Management Plan for the Coconino National Forest provides management direction for range resource as follows:

- Desired Conditions for Livestock Grazing

- 1) There are opportunities to engage in ranching activities and graze livestock on NFS lands. These activities contribute to the stability and social, economic, and cultural aspects of the communities in central and northern Arizona. (p. 82)
- 2) Permitted livestock grazing is consistent with the desired conditions of other resources. However, conditions immediately adjacent to livestock concentration areas, such as earthen stock ponds, developed springs, and other features that concentrate livestock, may be inconsistent with general desired conditions for vegetation and soil such as lower levels of vegetation and higher levels of soil compaction. (p. 86)
- 3) Grasses and forbs provide forage for permitted livestock. (p. 86)

- Standards for Livestock Grazing

- 1) Troughs and uncovered storage tanks shall incorporate animal escape devices. (p. 86)

- Guidelines for Livestock Grazing

- 1) Grazing and browsing use by authorized livestock and wildlife should be in balance with available forage production. (p. 86)
- 2) Livestock grazing should be managed to meet, or move toward, the desired conditions for forest resources such as soil, water, vegetation, and species. (p. 86)z
- 3) Burned or mechanically treated areas should be given sufficient rest from livestock grazing, especially during the growing season, to ensure plant recovery and vigor and to ensure that perennial plants would not be permanently damaged by grazing. Grazing should not be authorized in burned or mechanically treated areas until Forest Service specialists determine plant recovery and vigor in the burned or treated area by considering characteristics such as seed heads or flowers, multiple leaves or branches, and/or a root system that does not allow them to be easily pulled from the ground. These characteristics provide evidence of plant recovery, vigor, and reproductive ability. (p. 86)
- 4) Structural range improvements (such as fences, troughs, earthen stock ponds, pipelines) should be located, constructed, reconstructed, maintained, and used in a manner consistent with the desired conditions for riparian areas, wet meadows, aspen, formally identified archaeological sites, known locations of Southwestern Region sensitive species, and other

sensitive resources. Range improvements should be modified, relocated, or removed when found incompatible. (p. 86)

- 5) Salt, minerals, and/or other supplements should be located and used so that sensitive resources are protected from excessive trampling, compaction, salinization, and other impacts. For example, these supplements should be located at least a quarter of a mile from riparian areas, formally identified archaeological sites, known locations of Southwestern Region sensitive species, and other sensitive resources. (p. 86)
- 6) Gates in waterlot fencing should be left open to wildlife except when controlling livestock distribution. (p. 86)
- 7) Where permitted livestock have access to riparian areas, the use of riparian species should provide for maintenance of those species, allow for regeneration of new individuals, protect bank and soil stability, and reduce the effects of flooding. Maintenance of woody riparian species should lead to diverse age classes of woody riparian species where potential for native woody vegetation exists. This guideline would not apply to fine-scale activities and facilities such as intermittent livestock crossing locations, water gaps, or other infrastructure used to minimize impacts to riparian areas at a larger scale. (pp. 86-87)

Affected Environment

Pre-settlement Rangeland Conditions

More than a century ago, Lt. Edward Beale wrote of northern Arizona: "It is the most beautiful region I ever remember to have seen in any part of the world. A vast forest of gigantic pines, intersected frequently with open glades, sprinkled all over with mountains, meadows, and wide savannahs, and covered with the richest grasses, was traversed by our party for many days." (quoted by Bell, 1870).

- The country was beautifully undulating, and although we usually associate the idea of barrenness with the pine regions, it was not so in this instance; every foot being covered with the finest grass, and beautiful broad grassy vales extending in every direction. The forest was perfectly open and unencumbered with brush wood, so that the travelling was excellent." (Beale, 1858).
- C. Hart Merriam (1890) based his life zone concept largely on a study of vertical zonation of vegetation on the San Francisco Mountains. In describing his study area he said, "The lava plateau above about 2130 meters (7000 feet) is covered throughout with a beautiful forest of stately pines (*Pinus ponderosa*) which average at least 33 meters (100 feet) in height. There is no undergrowth to obstruct the view, and after the rainy season the grass beneath the trees is knee-deep in places, but the growth is sparse on account of the rocky nature of the surface."

Existing Conditions

The affected environment for this range analysis is the Rim Country project area. Only allotments within the project area have been considered. Of the 1,238,658 acres of this project area (specific to grazing), 1,129,486 are within grazing allotments and 109,172 acres that are not within a grazing allotment. The majority of the understory vegetation within the grazing area is dominated by Arizona fescue, mountain muhly, pine dropseed, blue grama and squirreltail.

Within the project area there are 70 livestock grazing allotments, with 69 active allotments and one vacant. Of these 70 allotments, 68 permit cattle grazing and two permit sheep grazing (one being a

sheep driveway). The amount of each allotment lying within the project area varies from less than 1% to 100%.

Within the 70 livestock grazing allotments there are 379 main pastures. Main pastures are generally pastures that are large enough to hold the allotment's livestock for more than an average of 20 days/year, or is a key pasture for livestock management in a rotation (such as a short duration rotation). There are 217 main pastures within these allotments that are not within the project area. These pasture acres do not include private lands associated with these allotments.

Of the range allotments in this project area, 37 have been through a rigorous evaluation and NEPA process since 1992 (FSM r3-2209.13-90). Of the 1,129,486 acres of this project that are part of grazing allotments, 71% of these acres have been through NEPA process. A rest or deferred rotation grazing system is used in these allotments.

The allotments, their total acres, their acres within the project area, the current numbers of permitted livestock, and their seasons of use are listed in Table 1. The effects analysis in this report is geared toward the effects on these allotments within the project area.

Table 1

Forest	Allotment	Total Acres	Acres within the Project	On/Off dates	Livestock # and kind
A-S	Arab	4,602	4,147	6/1 to 10/31	27 c/c
A-S	Black Canyon	17,030	17,030	6/1 to 10/31	60 c/c
A-S	Blue Ridge	11,629	11,627	6/1 to 10/31	131 c/c
A-S	Brown Creek	9,937	9,779	6/1 to 10/31	50 c/c and 9 yrsl
A-S	Buck Springs	8,507	8,507	6/1 to 10/31	70 c/c
A-S	Chevelon Canyon	43,089	34,699	6/15 to 10/15	109 c/c
A-S	Clay Springs	23,737	11,332	11/1 to 2/28 11/1 to 5/31 6/1 to 10/31	208 c/c 22 c/c 38 c/c
A-S	Clear Creek	17,399	757	8/16 to 10/31	125 c/c
A-S	Ellsworth	1,996	1,989	5/16 to 10/31	33 c/c
A-S	Heber	156,548	84,195	5/1 to 10/31	905 c/c
A-S	Johnson	740	739	6/1 to 10/31	14 c/c
A-S	Lake Mountain	26,328	26,321	6/1 to 10/31	144 c/c
A-S	Limestone	49,247	49,247	6/15 to 9/15	133 c/c
A-S	Long Tom	74,855	64,371	6/1 to 9/15	3900 sheep
A-S	Ortega	12,724	26	5/1 to 9/30	300 c/c
A-S	Park-Day	25,635	1,528	3/1 to 2/28	120 c/c
A-S	Pinyon	1,823	441	6/1 to 10/31	90 yrsl
A-S	Railroad	89,077	45,880	3/1 to 2/28	512 c/c
A-S	Show Low	33,509	8,257	3/1 to 2/28	288 c/c
A-S	Sponsellor	11,542	7,512	6/1 to 10/31	259 c/c
A-S	Town Tank	3,053	3,053	7/15 to 9/14	9 c/c
A-S	Wallace	42,053	26,721	6/1 to 10/15	425 yrsl
A-S	Wildcat	21,389	20,861	6/1 to 10/31	121 c/c
A-S	Willow Wash	52,713	27,862	5/1 to 11/30	210 c/c
Coconino	13-Mile Rock	37,029	10,530	3/1 to 2/28	550 c/c and 6 hd horses

Coconino	Apache Maid	147,526	53,453	3/1 to 2/28	1,445 c/c and 10 horses
Coconino	Baker Lake/Calf Pen	18,205	16,957	5/1 to 11/1	640 c/c and 10 hd horses
Coconino	Bar T Bar	186,310	97,022	5/20 to 11/1	3,470 c/c and 30 hd horses
Coconino	Beaver Creek	71,195	44,490	3/1 to 2/28	1,150 c/c and 5 horses
Coconino	Buck Springs	45,122	45,122	vacant	
Coconino	Buckhorn	34,942	15,114	3/1 to 2/28	275 c/c
Coconino	Fossil Creek	42,159	2	1/1 to 12/31	294 c/c and 6 hd horses
Coconino	Hackberry/Pivot Rock	78,519	53,989	1/1 to 12/31	640 c/c and 10 hd horses
Coconino	Walker Basin	70,970	21,422	3/1 to 2/28	540 c/c and 10 hd horses
Coconino	Willow Valley	4,776	4,776	5/20 to 10/20	140 c/c and 3 hd horses
Coconino	Windmill	90,329	34	1/1 to 12/31 6/1 to 10/31 11/1 to 5/31	250 c/c 250 c/c 100 c/c
Tonto	13 Ranch	15,473	15,473	5/1 to 10/31	63 c/c
Tonto	A-Cross	26,494	10,168	01/01 to 12/31	160 c/c
Tonto	Armer Mountain	30,320	5,930	01/01 to 12/31 01/01 to 05/31	167 c/c 101 yearlings
Tonto	Bar X	14,460	10,965	1/1-12/31	130 c/c
Tonto	Bryant Mountain	2,684	12	1/1 to 12/31	59 c/c
Tonto	Buzzard Roost	47,253	38,239	1/1 to 12/31	416 c/c
Tonto	Cedar Bench	32,616	2,816	11/1 to 5/31	250 c/c
Tonto	Center Mountain	9,753	1,368	1/1 – 4/30 5/1 – 9/30 10/1 – 12/31 1/1 – 4/30	39 c/c 24 c/c 39 c/c 15 yearlings
Tonto	Cherry Creek	30,434	4,062	3/1 – 2/28	392 c/c
Tonto	Christopher Mountain	9,742	6,812	3/1 to 2/28	200 c/c
Tonto	Colcord Canyon	4,539	4,539	Same as Bar x	
Tonto	Cross V	35,277	17,446	3/1 to 2/28	250 c/c
Tonto	Crouch Mesa	7,391	522	3/1 – 2/28 1/1 – 10/31	51 C/c 21 yearling
Tonto	Dagger	58,088	1,840	01/01 to 12/31 11/1 to 4/30	125 c/c 10 horses
Tonto	Deadman Mesa	16,901	797	Vacant	
Tonto	Del Shay	13,119	0	01/01 to 12/31 01/01 to 05/31	127 c/c 126 yearlings
Tonto	Ellinwood	18,547	15,280	Same as Christopher Mountain	
Tonto	Flying V	57,162	1,943	3/1 – 2/28 3/1 – 7/31	650 C/c 200 yearling
Tonto	Frio Canyon	10,389	2,288	1/1 – 10/31	100 yearlings
Tonto	Gentry Mountain	9,309	5,666	1/1 to 12/31 1/1 to 10/31	125 c/c 35 yrsls

Tonto	Green Valley	48,000	29,187	Same as Indian Gardens	
Tonto	Greenback	21,455	0	01/01 to 12/31 01/01 to 05/31	285 c/c 157 yearlings
Tonto	Haigler Creek	8,744	8,582	Same as Bar X	
Tonto	Hardscrabble	20,538	5,328	3/1 to 2/28	140 c/c
Tonto	Heber-Reno Sheep Driveway	28,558	10,613	5/1 to 5/31 and 9/16 to 10/20 4/20 to 5/14 and 9/8 to 10/8 4/21 to 5/15 and 9/9 to 10/9	3900 sheep and 14 burros 3055 sheep, 1 horse and 7 burros 2000 sheep, 1 horse and 7 burros
Tonto	Indian Gardens	16,445	16,445	3/1to 2/28 1/1 to 10/31	225 c/c 30 yrsls
Tonto	O.W.	4,432	4,419	6/1 to 10/15	150 yearlings
Tonto	Payson	39,262	20,558	Same as Cross V	
Tonto	Pine	33,265	18,612	5/1 to 10/31	185 c/c
Tonto	Pleasant Valley	5,430	70	3/1 - 2/28 1/1 - 10/15	40 C/c 28 yearling
Tonto	Red Lake	19,769	19,708	Same as Gentry Mtn	
Tonto	Seventy Six	23,325	2	01/01 to 12/31 01/01 to 05/31	305 c/c 213 yearlings
Tonto	Tonto Basin	118,548	17,823	01/01 to 12/31 01/01 to 05/31 01/01 to 12/31 01/01 to 05/31	342 c/c 262 yearlings 266 c/c 193 yearlings
Tonto	Young	4,972	2,181	Same as Bar X	

General Overview of Potential and Existing Livestock Grazing Effects on Fire, Understory Species, Riparian, Aspen, Soils, and Hydrologic Function

Livestock grazing can affect vegetation by reducing plant height, plant canopy cover, and ground cover, and can compact soils. Current grazing management systems on allotments within the project area are designed to mitigate these effects by rotating grazing so individual forage plants are not grazed at the same time each year. They are also designed so forage species can reach maturity and seed most years. Current allotment management plans generally have utilization guidelines of 25-40% by ungulates, which leaves 60-75% for ground cover, soils, fire spread, hiding cover, and forage for other animals and insects. Adaptive management for all allotment grazing management systems in the project area is also mitigation to grazing. It is primarily used to match livestock numbers with annual available forage. In some areas managed livestock grazing can affect the spread of natural fire by the removal of fine herbaceous fuel until the plants regrow. Historic unregulated livestock management from the 1860's to the 1920's removed a significant the amount of forage plants and did not allow for much regrowth. As range management practices were improved through the years, more forage plants became available to carry a fire. A likely factor in the increase in the amount of forest acres burned in recent history is a result of this improvement in range management practices.

Current grazing management systems effects on fire within the project area is short lived and limited in area. The effect is normally limited to one pasture in an allotment, until that pasture can regrow, for

typically between two to six weeks depending on climate conditions. It is also limited in scope because of conservative 25-40% utilization levels used in these grazing management systems in the project area, leaving 60-75% of the plants available for fire spread or mulch. The exceptions are generally always corrected the following year by resting the pasture, deferring use, reducing grazed periods, and/or reducing livestock numbers. Many fuels reduction and restoration projects have occurred within the project area and have been successful with livestock grazing.

Grazing effects appear less important than abiotic and biotic factors in explaining the observed spatial variation in vegetation (Laughlin and Abella 2007). The model results imply that ungulate (cattle, sheep, deer, and elk) grazing might directly influence plant community composition. Heavy grazing can shift the community toward greater abundance of unpalatable species (Westoby et al., 1989; O'Connor, 1991). A few unpalatable species, including broom snakeweed (*Gutierrezia sarothrae* (Pursh, Britt. & Rusby) and spreading fleabane (*Erigeron divergens* Torr. & Gray), were most abundant in the heavily grazed plots (Abella and Covington, 2006). It is likely that the unregulated grazing in the 1860s to 1920s in the project area likely led to temporary changes in vegetation. As heavy grazing was eliminated over time the plant composition responded.

Livestock grazing can affect riparian and aspen areas similarly to upland areas. However, livestock can be more attracted to riparian and aspen areas because of the increased water and/or forage. Riparian plants and aspen can be reduced by grazing these species. Special livestock management techniques have been employed within the project area to reduce the effects including livestock exclosures, deferred grazing, herding, and alternative water sources with adjustments in Allotment Management Plans over the years. These practices have limited the amount of livestock grazing on riparian vegetation and aspen. Additional adjustments in management may be necessary to reduce effects on these areas, especially if riparian and aspen regeneration areas would be expanded with new management practices.

Domestic cattle grazing has the potential to affect soil and hydrologic functions that are important in the maintenance of long-term productivity and favorable conditions of water flow. Specifically, changes in the soil's surface structure and its ability to accept, hold, and release water may be affected by compaction caused by trampling. The nutrient cycling function of the soil may be interrupted by removal of vegetation that affects above ground nutrient inputs into the system. Finally, the soil's resistance to erosion is affected by changes in plant density, composition, and protective vegetative ground cover that are part of the organic components in the soil.

The effects of livestock grazing on soil and hydrologic function is limited within the project area because of the current management in place that limits utilization, maintains forage plants, and limits compaction with deferred and rest rotational grazing systems.

Historic and Past Factors Affecting Current Understory Vegetation

Since European settlement within the project area heavy tree harvest, fire exclusion, overgrazing, and climate change have altered the trajectory of stand development, ecosystem function, and the spatial pattern of ponderosa pine stands in northern Arizona (Moore et al 2004). Many others have documented this as well (Pearson 1910, Arnold 1950, Rummel 1951, Cooper 1960, Manday and West 1983, Stein 1988, Savage and Swetnam 1990, Savage 1991, Covington and Moore 1994, Swetnam and Baisan 1996, Heinlein 1996, Allen et al 2002).

Grazing Effects from the 1860s to Present

There is a long livestock grazing history within the project area. The first pioneers settled in this area in the 1860s with their livestock. As more settlers moved in, they brought with them more and more livestock. Initially, livestock numbers were low but they increased quickly throughout the entire

project area. The major factor contributing to the increase in cattle was when the Atlantic and Pacific Railroad connected Flagstaff to Albuquerque and the eastern U.S. markets in 1882.

The capacity of the land was quickly reached. In 1888 a quote from the Arizona Champion states: “many portions of the Territory are now overstocked to an alarming extent...all available ranges where a natural supply of water can be had are now located and settled upon and those seeking ranges are compelled to buy or intrude on other parties property.”

Cattle production in the project area peaked in 1891. After a two-year drought from 1891 to July of 1893, the financial panic of 1893, and the winter of 1892-93, cattle numbers were greatly reduced.

The project area was designated national forest land in 1908. There were no legal hindrances to grazing on the public domain, but permits were required. Grazing management was minimal, consisting of issuing permits and collecting fees. Uncontrolled public domain grazing inevitably produced conflict and exploitation in which the range deteriorated and most stockmen suffered. To help resolve some of these problems, the first fences were built in 1915.

In 1916, the Homestead Act allowed settlers to claim up to 640 acres and graze 50 head of cattle on these 640 acres. The act provided vast opportunities for settlement in the West and resulted in overgrazing of many areas including the project area.

Livestock numbers on the A-S, Coconino, and Tonto National Forests have generally declined since the 1890’s. One exception to this general trend was during WWII when numbers were temporary increased. In the early years, livestock reductions were generally made when allotments changed hands. Some of the reductions were made for range protection without a permit changing hands. A complete record of the early grazing history of individual allotments does not exist. However, an estimated summary of numbers from 1910 to 2010 for the Coconino National Forest is presented in Tables 2 and 3. Both tables display the permitted number and head months of livestock, and the actual numbers of livestock that grazed the forest during these different time periods. As new data is found and compiled these numbers may change slightly.

Table 2. Number of Cattle and Horses on the Coconino National Forest, 1910-2000

Year	Permitted Number	Permitted Head Months	Actual Head Months
1910	33,200	247,000	239,000
1920	49,106	427,000	400,000
1930	19,088	149,000	142,000
1940	19,500	144,992	139,835
Late 1940’s-50	19,000	137,589	132,639
1960	18,000	138,906	131,018
1970	19,000	138,688	123,611
1980	17,350	134,589	112,713
1990	17,540	136,160	96,118
2000	16,271	126,684	88,801
2010	16,318	112,947	75,715

Table 3. Number of Sheep and Goats on the Coconino National Forest, 1910-2000

Year	Permitted Number	Permitted Head Months	Actual Head Months
1910	89,550	360,000	300,000
1920	95,090	420,000	350,000
1930	63,080	240,000	200,000
1940	50,000	188,237	153,966
Late 1940's-50	24,000	112,827	94,594
1960	17,000	73,554	66,512
1970	15,000	57,742	53,993
1980	10,000	41,565	13,666
1990	2,670	14,747	12,002
2000	2,670	14,747	10,227
2010	2,670	12,038	12,038

On the A-S National Forests, livestock numbers have declined for more than 20 years, as the forests have balanced permitted numbers with the capacity of the land. In the 1980s, about 236,000 AUMs were permitted on an annual basis, compared to 130,000 AUMs permitted in 2011.

Livestock grazing began on the area now known as the Tonto NF in the late 1800s. Heavy grazing was occurring in the 1880s and livestock numbers reached their peak in about 1900, with an estimated 1.5 to two million head grazing the area now known as the Tonto NF. Mostly cattle grazed on the Tonto, although some sheep, goats, and hogs have utilized the rangelands as well as native ungulates. A harsh drought in 1904, followed by new supervision by the Forest Service in 1905, reduced the number of cattle by 80 to 90 percent to 150,000 to 200,000 head. Cattle numbers have continued to be reduced; approximately 25,000 cattle were permitted in 2013.

From the 1920s until the early 1930s, individual allotments were fenced. After the allotments were fenced, the pastures started to be divided and water sources developed. By 1940, most dual use between cattle and sheep ended in this region as most of the permittees switched to cattle. All of these changes improved grazing management and reduced the effects from grazing on understory vegetation within the project area.

Overgrazing by livestock and the changes to understory vegetation in the late 1880s and early 1890s is well documented. In 1889, Farish wrote of the San Francisco Mountains: "In this mountain range are found fine valleys, formerly covered with a growth of wild rye and pea vine, which has been replaced by other grasses." Replacement of the better forage plants had taken no more than a dozen years after the introduction of livestock. In 1892, a severe drought combined with range depletion to cause heavy stock losses, which became even worse in 1893. The Governor of Arizona stated in his annual report (Hughes 1893): "In nearly all districts, owing to overstocking, many weeds have taken the place of the best grasses. In other places where ten years ago the end of the wet season would find a rich growth of grass, now it is of inferior quality, or less quantity, or does not exist at all."

Arnold (1955) described the following effect from early livestock grazing. "Under heavy grazing the original tall bunchgrasses have been largely replaced by plants more resistant to grazing, except where dense tree cover discourages livestock use. In addition, grass cover decreases as pine reproduction becomes established; the greater the density of pine saplings, the less the total herbaceous cover. Decline in total forage production as a result of competition from young pine stands is accompanied by no great botanical change in the herbaceous vegetation, but heavy grazing

induces a major change in species composition. In openings within the forest, ranges in good to excellent condition near Flagstaff support a high proportion of midgrasses, dominated by Arizona fescue, mountain muhly, muttongrass, and June grass. Under heavy grazing pressure, the midgrasses are replaced by a shortgrass cover composed largely of blue grama and squirreltail. Under still more severe use, even these resistant grasses are largely replaced by less desirable perennial and annual forbs.”

Cooper (1960) follows up with a summary of the effects of livestock management through history. “The large reduction in numbers of livestock permitted on national forests, plus the extensive conversion of sheep operations to cattle, have greatly alleviated the browsing problem. Localized damage continues due to livestock concentration, but is relatively minor. The results of past browsing damage, however, are clearly apparent in large areas that lack reproduction due to past sheep use. Grazing has been important in reducing the spread of fire. Large amounts of flammable grass, which used to remain on the ground, are now removed by grazing animals. Many of the early arguments against reduction of grazing on the national forests were based on the premise that heavy grazing made forest fires much less frequent. It has been widely held that removal of herbaceous cover and plant litter by grazing animals, and the exposure of mineral seedbeds by livestock trampling, have been important factors in the establishment of dense pine stands. Pine seeds germinate well under proper weather conditions on almost any type of ground cover, but they soon die from desiccation unless they become rooted in mineral soil. In addition, direct root competition for soil water from the established grass cover is considered to inhibit seedling growth.”

“In a normal year, most if not all pine seedlings in a virgin forest would die regardless of competition. In the rare year in which a wave of seedlings establishes itself, there may be so much moisture that no degree of herbaceous competition is really inhibitory. Reduction of competition may be a means of encouraging better reproduction in managed stands, but under virgin conditions it appears that seedlings could have developed even in a heavy grass cover. The reduction of grass competition and the preparation of a mineral seedbed by grazing animals probably helped to bring about the dense thickets, but do not seem to have been the controlling factor. There are many severely grazed openings which remain nearly denuded of vegetation and in which pine seedlings have not become established” (Cooper 1960).

The Hill Plots livestock grazing exclosures were established in 1911 near the project area. The exclosures were reevaluated in 2004 (Baker and Moore 2007). In 1941, canopy cover of tree regeneration was significantly higher inside exclosures. In 2004, total tree canopy cover was twice as high, density was three times higher, trees were smaller, and total basal area was 40% higher inside exclosures. Understory species density, herbaceous plant density, and herbaceous cover were negatively correlated with overstory vegetation in both years. Most understory variables were lower inside exclosures in 2004. Differences between grazing treatments disappeared once overstory effects were accounted for, indicating that they were due to the differential overstory response to historical livestock grazing practices. These variables did not differ between grazing treatments or years once overstory effects were accounted for, indicating that the declines were driven by the increased dominance of the overstory during this period. In addition, the understory vegetation was more strongly controlled by the ponderosa pine overstory than by recent livestock grazing or by temporal dynamics, indicating that overstory effects must be accounted for when examining understory responses in this ecosystem. Bakker et. al. (2010), conclude that the habitat has a stronger effect than livestock grazing on the herbaceous understory vegetation of this Southwestern Ponderosa pine bunchgrass ecosystem, particularly at small grain sizes.

In summary, historic livestock effects on understory vegetation follow the history of livestock management within the project area. Range trends within the project area follow this grazing history. Unregulated grazing from the 1860s to the 1920s led to declines in grass, forb, and shrubs and an

increase in trees. Since then, grazing management practices have evolved through time to limit overgrazing by livestock and to match conservative livestock utilization with forage production. With the improvement in grazing management, trends in understory vegetation have generally improved in areas where tree density does not limit recovery. Tree density limits the amount of understory vegetation since as tree densities increase, the understory vegetation declines. The direct relationship between tree basal area and understory production has been widely studied (Moore et al 2004, Arnold 1950, Cooper 1960, Pearson and Jameson 1967). In these studies, the direct relationship between tree density and understory vegetation was observed regardless of whether the study area was grazed by livestock, or whether the study area was excluded from livestock grazing.

Tree Density Effects – Pre-settlement to the Present

Tree stand structure has changed dramatically from pre-settlement conditions to present day. Stands of trees are dominantly even-aged, where they used to be more uneven-aged. Trees are primarily mid-size with little large or small trees, where they used to be of various sizes. Trees are spaced throughout the forest, where they used to be more groupy or clumpy with more forest openings. An increase in tree density has increased the probability for an increase in tree mortality from insects, disease, drought, and fire. An increase in trees has reduced understory vegetation amount, species, and composition.

A century ago the pine forests were dominated by widely-spaced large trees with a more open, herbaceous forest floor (Cooper 1960). Typical historic tree group/patch size ranged from 0.1 to 0.75 acres in size, (two to >40 trees) (White 1985). This historic range of variability condition for trees per acre on the Fort Valley Experimental Forest, near Flagstaff, Arizona, is estimated to average 23 to 56 trees per acre (Covington and Moore 1992). This increase in trees primarily came from the 1919 pine seedlings established in this high moisture year. Because of this increase in trees, understory vegetation and forage has declined over time within the project area.

This relationship between trees and herbaceous understory has been well documented (Moore et al 2004, Arnold 1950, Cooper 1960). The 1960s Wild Bill Range study by the Rocky Mountain Research Station (near the project area) showed a solid relationship between tree basal area (BA) and herbage production. As tree basal area increased from 0 to 50 BA sq. ft. per acre, there was a sharp drop in forage from over 650 to 100 pounds per acre. Tree BAs above 50 had herbage production between 100 and 45 pounds per acre (Pearson and Jameson 1967). One reason for the decrease in allowable livestock numbers through history within the project area has been this increase in trees and decrease in forage. This is evident in the allotments within the project area.

Arnold (1950) showed the relationship between canopy cover and herbaceous densities and grass yields was highly significant uniform linear regression. Grasses and forbs decreased at about the same rate as canopy cover increased. There was about a five-fold decrease in herbaceous cover from 10 to 100 percent canopy cover. Under complete canopy cover, trees make full use of the site regardless of site conditions. Under an even-aged forest, each 1% in density of ground cover was equal to an air-dry grass yield of 150 lbs. In uneven-aged forests, the relationship between canopy and herbaceous density was still linear, but with more variability. Perennial herbs made up a small but constant part of the understory. Annuals were rare except in years of abundant moisture.

Several studies have shown high ponderosa pine abundance to depress understory plant production (Ffolliott 1983; Tapia et al. 1990; Moore & Deiter 1992, Laughlin et al 2011), since pine trees create deep shade, intercept precipitation, and compete for soil resources (McLaughlin 1978; Riegel et al. 1995; Naumburg and DeWald 1999). Pine abundance was also related to variation in species composition, suggesting that differences in forest structure could cause changes in floristic assemblages (Laughlin et al 2005).

Laughlin et al 2011 wrote “A century of increasing ponderosa pine density was associated with shifts in herbaceous plant strategies and reduced functional diversity. Shade- and stress-tolerant herbaceous

plants that use a more conservative strategy for acquiring and maintaining resources have increased in relative abundance over time likely because light, water, and nutrients have become more limiting beneath the dense overstory.”

Baker and Moore (2007) reexamined the Hill Plot livestock exclosures built in 1910's. The Hill Plots are located near the project area and have similar vegetation types. They determined that, in 1941, the canopy cover of tree regeneration was significantly higher inside exclosures. In 2004, total tree canopy cover was twice as high, density was three times higher, trees were smaller, and total basal area was 40% higher inside exclosures. Understory species density, herbaceous plant density, and herbaceous cover were negatively correlated with overstory vegetation in both years. Most understory variables were lower inside exclosures in 2004. Differences between grazing treatments disappeared once overstory effects were accounted for, indicating that they were due to the differential overstory response to historical livestock grazing practices. Between 1941 and 2004, species density declined by 34%; herbaceous plant density by 37%, shrub cover by 69%, total herbaceous cover by 59%, graminoid cover by 39%, and forb cover by 82%. However, these variables did not differ between grazing treatments or years once overstory effects were accounted for, indicating that the declines were driven by the increased dominance of the overstory during this period. In addition, the understory vegetation was more strongly controlled by the ponderosa pine overstory than by recent livestock grazing or by temporal dynamics, indicating that overstory effects must be accounted for when examining understory responses in this ecosystem. Smith (1967) noted that bunchgrass cover decreased at all levels of grazing within the open and dense timber types, noting that the increase in the canopy cover of trees appears to be responsible.

Fire Effects

Fire suppression has been the norm in the project area since European settlement until recent years. Pre-settlement natural wildfires burned on an average of 3-7 years in the project areas ponderosa pine forest. These fires reduced the number of pine trees, provided abundant nutrient cycling, and reduced pine litter build-up on the forest floor. The reduction in fire frequency reduced these processes.

One study (Laughlin et al 2005) showed that length of time since a fire may also be important for preserving landscape-scale heterogeneity with respect to plant community structure. The variability in plant cover and annual forb richness is much greater on sites that have burned recently and frequently than on sites that have not burned for over 60 years. However, variability in total species richness and in perennial forb richness was not noticeably greater in recently burned forests than in fire-excluded forests. Apparently, plant cover and annual species are more sensitive than total species richness and perennial forb richness to variations in conditions created by fire.

Gundale (etal. 2005) wrote that native grass species that reportedly dominated the understory of historical ponderosa pine forests likely relied on rapid nitrogen cycling that was promoted by periodic fire. Differences in short-term N cycling rates among restoration treatments may lead to substantial differences in site productivity and plant community composition. In addition to differences among restoration treatments, N cycling appears to have a positive linear relationship with fire severity within the severity range experienced in this study.

With the reduction in fire, resulting in more trees and pine needle ground cover, less understory forage was available for livestock grazing over time in the project area. This is another reason that livestock numbers have declined over time (Table 2 and 3). Where fires have occurred within the project area such as the Rodeo-Chediski fire of 2002, forage production has increased and the timing of recovery was related to fire severity.

Climate Change Effects

Precipitation and temperature influence what plants can grow and where. Variations of climate through time have greatly influenced plant conditions in the project area. For example, a high moisture period along with a high pine seed crop and low understory competition from heavy livestock grazing produced the dense 1919 pine tree crop in much of the project area. Lesser tree seed crops were also established in 1910, 1914, and 1929.

The climate in the Southwest United States is characterized by an erratic precipitation pattern. The amount, timing, and location of precipitation are extremely variable and difficult to predict. The months of March, April, and May generally define the cool season growing period and July, August, and September for the warm season plants.

Climate influences on vegetation in the project area has been shown to be the dominant factor in several rangeland studies comparing grazing management and restoration practices (Loeser et al 2007, Abella 2004, Laughlin and Moore 2009, Laughlin et al 2006, Breshears et al. 2005, Moore et al 2006).

Shifts in precipitation and temperature (up or down, plus intensity and duration) could change through time. If these changes occur forest plants could shift with these longer duration trends. Livestock numbers and season of use within the project area over the last 20 years or so (and likely longer) have gone up and down to match the changes in climate from season to season and year to year through adaptive management. The goal for livestock management in this area is to match forage utilization with available forage production. The more or less forage produced in a given season or year, the more or less that is available for livestock to utilize.

Assumptions and Methodology

Annual planning occurs prior to the livestock grazing season. During this planning the livestock numbers and the grazing season are developed based on several factors including the previous year's management plans and outcomes, current year's predictions, and current resource conditions. During the grazing season, changes may be needed to the rotation or numbers, due to unexpected changes in conditions, such as those caused by drought or fire. This is a piece of the adaptive management cycle. Annual monitoring typically includes an assessment of current conditions, a measure of livestock usage and actual use. Long-term monitoring usually consists of condition and trend monitoring every five to 15 years measuring plant canopy cover, plant frequency, species composition, and/or ground cover.

Issues/Indicators/Analysis Topics

Significant issues from comments on the proposed action are not related to range management.

Measures/indicators

- 1) Acres receiving the greatest amount of forage increase (measured by the treatment acres with the greatest amount of forage increase plus the treatment acres with the moderate forage increase minus the treatment acres with a decrease in forage production)
- 2) The percent of pastures with greater than 500 acres within the project area and that treatments are proposed on 20% or more of the pasture.

Summary of Alternatives and Resource Protection Measures (Design Features, Best Management Practices, Mitigation and Conservation Measures)

DESCRIPTION

PRIMARY PURPOSE

<p>Prescribed fire will be implemented in such a way that, whenever possible, damage to fencing and other infrastructure used for managing livestock will be minimized. Any damage incurred to fences or other infrastructure associated with grazing management resulting from prescribed fire will be the responsibility of fire to fix as soon as possible following the burn, or on a timeline agreed on with range managers that would not affect planned grazing management.</p>	<p>To minimize damage to grazing infrastructure. Fire can easily damage grazing infrastructure, particularly fences, gates, and their supporting structure. Fencing can be costly, and is critical to the effective implementation of grazing management strategies.</p>
<p>Historic range monitoring sites including witness trees/posts, 1 inch angle iron stakes, and any other site location markers would be protected. These sites would not be excluded from treatment but care needs to be taken to avoid loss of these site markers and damage to the areas. These sites would not be used as locations for temporary access roads, skid trails, landing areas, or large slash piles. District range and timber personnel will coordinate on these locations during presale packaging and prior to implementation.</p>	<p>Avoid monitoring site damage.</p>
<p>The sale administrator would work closely with the district range staff to determine pasture use during thinning activities.</p>	<p>Avoid infrastructure damage, and retain allotment and pasture fences within a thinning treatment area. Provides for coordination of different activities within the same areas</p>

<p>All fences in the cutting area would be protected from thinning activities. Skid trail layout would attempt to keep equipment on one side of the fence to avoid having to cut fences. If fences need to be cut, a gate or temporary cattleguard may need to be constructed/installed with appropriate bracing; these areas shall be coordinated with district range personnel prior to cutting. If the fence is cut or damaged it shall be repaired to conditions equal to or better than existed (to Forest Service Standards). Temporary cattle guards would be installed on all haul roads where gates exist within active grazed pastures. All cattle guards on haul roads would be maintained throughout hauling activities and cleaned, if necessary upon completion of a sale. Damage to other range improvements, such as tanks, drainage into tanks, spillways, drinkers, pipelines, corrals, etc., shall be repaired or cleaned to a condition that was as good or better than existed. Skid trails, roads, landings, etc. should not be placed next to these range improvements.</p>	<p>Protect infrastructure.</p>
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<p>Rest or deferment of a pasture by livestock may occur after the completion of ground disturbing activities, such as burning and mechanical thinning. Range management personnel will evaluate conditions to determine when adjustment to livestock management, such as rest or deferment of a pasture is needed. Several factors may be used to assist in these determinations, such as plant recovery, plant vigor, and size of the disturbed area in relation to the pasture size. Plants that are well rooted, have multiple leaves or branches, and/or are producing seed head or flowers provide evidence of plant recovery, vigor, and reproductive ability.</p>	<p>Post ground-disturbing treatment assessment.</p>
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<p>The removal or exclusion of livestock water would be mitigated with alternative water sources, providing lanes to the water, or piping water to a livestock drinker.</p>	<p>Provide alternate water sources.</p>
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<p>Prior to the construction of any enclosure fences or barriers, which exclude forage and/or water, or the removal of a water source, such as earthen tanks or trough, there needs to be a review by the District Ranger, Range Management personnel and other specialist to evaluate the extent and amounts that may be excluded on an allotment/pasture.</p> <p>If a pasture/allotment has a considerable amount or extent of fencing or water exclusion, which could change livestock management such as numbers, season of use, distribution, etc., then these proposals should be analyzed during the Allotment Management Planning process. During this process, livestock management on the allotment can be evaluated along with the resource concern that would have initiated the fence and other possible solutions may arise. This will also allow a review of water rights, if applicable.</p>	<p>This will ensure that changes to an allotment/ pastures will not hinder permittees operations without coordination with local specialist expertise.</p>
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<p>Range and fire managers will coordinate burning and grazing schedules to minimize disruption of grazing while maximizing the implementation of prescribed fires. Each allotment will have specific management needs to be considered as management actions are planned and implemented. Past and future burns, projected rest/deferment are examples of things that should be considered when burn plans are being written and prior to implementation of prescribed fire. Grazing options, such as swing pastures, may be utilized to increase flexibility for range and fire managers.</p>	<p>The process of planning and implementing prescribed fire is long and complex. The effects are beneficial to most resources, though there are a myriad of restrictions on where and when prescribed fire can be implemented. The USFS issues Term Grazing Permits, Allotment Management Plans, and/or Annual Operating Instructions describing numbers, season of use, pasture rotations, etc. that permittees follow. Coordination will help maintain good working relationships and will minimize hardships to the permittees, while managing for ecosystem health. Coordinating the management of these programs for minimal disruption to both is desirable.</p>
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Detailed Mechanical and Fire Treatments by Alternative

Proposed Treatment	Acres Alt 2 (MPA)	Acres Alt 3 (FA)
Intermediate Thin	150,780	112,090
IT 10% - 25%	30,210	24,260
IT 25% - 40%	53,620	34,530
IT 40% - 55%	49,980	39,260
IT 55% - 70%	16,970	14,040
Single Tree Selection	12,510	5,630
Stand Improvement	71,270	37,300
SI 10% - 25%	13,660	7,480
SI 25% - 40%	34,590	17,120
SI 40% - 55%	14,460	7,690
SI 55% - 70%	8,560	5,010
Uneven Age	280,370	156,790
UEA 10% - 25%	77,820	48,500
UEA 25% - 40%	106,210	53,740
UEA 40% - 55%	39,490	11,110
UEA 55% - 70%	56,850	43,440
Prescribed Fire Only	54,070	40,630
Aspen Restoration	1,230	1,010
Aspen Restoration	1,200	980
PAC - Aspen Restoration	30	30
Facilitative Operations Mechanical	131,840	51,580
Facilitative Operations Mechanical	123,400	47,580
PAC - Facilitative Operations Mechanical	300	300
Facilitative Operations Prescribed Fire Only	1,260	630
PAC - Facilitative Operations Prescribed Fire Only	6,880	3,070
MSO Recovery - Replacement Nest/Roost	25,290	19,590
PAC - Mechanical	17,460	15,750
PAC - Prescribed Fire Only	50,830	37,960
Savanna Restoration	18,570	2,470
Severe Disturbance Area Treatment	132,240	31,760
PAC - Severe Disturbance Area Treatment	3,610	1,420
Severe Disturbance Area Treatment	128,630	30,340
Grassland Restoration	36,320	36,320
Wet Meadow Restoration	6,720	6,720

Riparian Restoration	14,560	14,560
Total	1,004,060	570,160

Environmental Consequences

Alternative 1 – No Action

Direct and Indirect effects

In Alternative 1, there would be no management activities occurring within the project area as a result of the Rim Country Project. Because no activities would occur, tree densities and canopy cover would remain high and understory plant cover would stay the same. Over time, tree densities and canopy cover would continue to increase, under which understory vegetative cover and production would decline. Understory species would also be reduced because of the buildup of pine needles and the lack of nutrient cycling.

The reduction in understory vegetation over time would reduce the amount of forage available to livestock. Over time, livestock numbers may need to be reduced. This reduction in forage and decrease in livestock numbers has been recorded throughout the project area. There is no reason to believe that this trend would not continue under Alternative 1.

Under Alternative 1, additional prescribed fire would not occur in the project area. Without these acres of prescribed burning, no pasture rest periods would be necessary after burning.

Since no treatments are planned in Alternative 1, grazing management would continue as has generally been planned and actually carried out in the past. However, this alternative would not adequately reduce the increased risk of uncharacteristic wildfire and this is only projected to increase in the future.

Uncharacteristic wildfires can burn with high severity and burn through multiple pastures, burning fences and other structural range improvements. Uncharacteristic wildfire would have an adverse effect on livestock grazing management and forage until the area recovers and structural improvements are replaced. See the Fire Ecology and Air Quality Report for additional information (Haas 2018).

Effects Common to All Action Alternatives (Alternatives 2 & 3)

Tree thinning and prescribed burning would increase understory vegetation. Understory species and composition would change primarily by increasing shade-intolerant understory species and decreasing shade-tolerant species. Understory species would also be increased because of the reduction of pine needles and the increase in nutrient cycling provided by burning. All these factors would improve forage production for livestock within the areas treated.

Alternatives 2 and 3 would directly decrease tree density by mechanical tree thinning and prescribed burning. Overall stand tree basal areas may not measurably change all treatment areas but an increase in the groupy/clumpy arrangement would substantially increase herbaceous species production by creating openings between these groups. The indirect effect of cutting trees in a groupy/clumpy arrangement would increase herbaceous vegetation because of the overall

increase in sunlight reaching the soil. The increase in forage would have short-term (within three years) and long-term 10-year beneficial effects on livestock grazing. In research near the project area, herbaceous production dropped from greater than 650 pounds per acre to 100 pounds per acre when basal area increased above 50 square feet/acre (Pearson and Jameson 1967). In another study, grasses increased by more than 470 percent cover in high-intensity harvest units compared to a 53 percent increase in pre-treatment control units (Stoddard et al. 2011). Griffis et al. (2001) also found that the abundance of native grasses increased significantly along with treatment intensity throughout thinned and burned stands.

The increase in forage within treatment areas would improve allotment conditions and allow for more flexibility in grazing management systems. Livestock distribution would improve because forage is more available in uplands than in more typical grazing areas like meadows. The increase in forage would either drop utilization rates within a pasture or increase pasture graze periods. An increase in pasture graze periods would allow for additional pasture rest or deferment in other pastures within an individual allotment. (ROBIN DELETE THIS AND ALSO IN THE MAIN DOCUMENT.

Prescribed burning would have an adverse effect on livestock grazing by removing forage available to livestock. This effect would be short term until the forage plants regrow, typically within one year. This effect would be offset by the long-term increase in forage after burning. The prescribed burning would be phased throughout the project area to minimize effects on individual allotments. Pastures could be rested prior to prescribed burning, in coordination with the range specialist, but it would not be a requirement to reach burning objectives. The allotments in the project area have the ability to rest a main pasture for one year after a burn with little effect on overall allotment grazing management. However, livestock numbers or season of use might have to be reduced in some allotments because of the combined effects from prescribed burns and other factors like wildfire and drought. If the burned areas do not recover within a year, then livestock would likely continue to run in the same pastures, reducing the amount of rotational grazing on an allotment. This might also lead to a temporary reduction in livestock numbers or a reduction in length of grazing season to maintain the health of the grazed pastures until the treatment area recovers and rotational grazing is restored. Adaptive management would continue to be used to adjust livestock numbers to meet annual forage production, with or without the burns.

Restrictions in grazing of livestock after prescribed fires are a mitigation to reduce effects on forage species. These mitigations have been shown to maintain static understory conditions in grazed areas. An estimate of this restriction is not available because each pasture's response to ground-disturbing treatments (including mechanical thinning and prescribed fire) is unique. Climatic conditions, soils, vegetation, the severity of fire effects, burn amount, intensity of vegetation treatments, and pasture management may vary greatly from year to year or from pasture to pasture. Implementation of design feature RM007 will ensure coordination among range and fire managers to determine appropriate changes or restrictions to grazing following prescribed fires.

The removal of trees during mechanical thinning operations would have little effect on livestock grazing. Mitigations would be implemented to maintain structural range improvements and keep livestock within designated pastures during these operations. Pastures may be deferred during operations to minimize equipment and livestock conflicts, but it is not mandatory. Mechanical thinning has been conducted throughout the project area for many years with few effects on

livestock grazing operations, although post-treatment inspections may result in changes to annual pasture rotations (such as deferment).

Intermediate Thin, Stand Improvement, and the Uneven-aged treatments

With the Intermediate Thin, Stand Improvement, and Uneven-aged treatments, mechanical and fire treatments would occur leaving tree groups with differing sizes of interspaces between the tree groups. Treatments in the 40 to 55 percent and the 55 to 70 percent interspace ranges would result in an increase in herbaceous cover and production, and the treatments in 10 to 25 percent, 10 to 40 percent, and 25 to 40 percent interspace ranges would still result in an increase in herbaceous cover and production, but less of an increase than the higher interspace treatments..

Single tree selection

Mechanical and fire treatments that leave fewer tree groups and more randomly spaced trees. Designed to increase or maintain age class diversity and reduce understory brush and shrub response, creating small openings less than or equal to $\frac{1}{4}$ acre in size where seedlings and saplings are underrepresented and brush cover is greater than 40%. Maintains higher basal area where brush competition is expected to be strong to suppress woody understory response. Accompanied by prescribed fire. This type of treatment generally would result in an increase in herbaceous cover and production in the openings created.

Aspen Restoration

These treatment areas may include the removal of conifers within aspen clones. Removal of aspen, disturbing the ground and/or applying fire may also be used to stimulate aspen suckering. This type of treatment generally would result in an increase in herbaceous cover and production.

Facilitative Operations Mechanical

The inclusion of FO in burn units would be designed to improve safety, improve treatment effectiveness, expand burn windows, and minimize disturbance. FO treatments may include mastication/chipping; lop and scatter; thinning/limbing; and moving, rearranging, or removal of jackpots or excessive surface fuels. This type of treatment generally would result in an increase in herbaceous cover and production.

Facilitative Operations Prescribed Fire Only in PACs

This includes broadcast burning, jackpotting, pile burning, and blacklining. This type of treatment generally would result in a slight increase in herbaceous cover and production.

MSO Recovery-Replacement Nest/Roost

Mechanical and fire treatments designed to develop uneven-aged structure, irregular tree spacing, and a mosaic of interspace and tree groups of varying size. This type of treatment generally would result in a slight increase in herbaceous cover and production.

MSO PAC – Mechanical

Mechanical treatment outside core areas that thins to improve structure, maintain and develop large trees, and reduce risk of high-severity fire in PACs. Accompanied by prescribed fire. This type of treatment generally would result in a slight increase in herbaceous cover and production.

MSO PAC – Prescribed Fire Only

Prescribed burning to improve structure, maintain and develop large trees, and reduce risk of high-severity fire in PACs. This type of treatment generally would result in a slight increase in herbaceous cover and production.

Savanna

Savanna restoration includes a mechanical and fire treatment that restores pre-settlement tree density and pattern, and manages for a range of 70 to 90% interspace between groups or individual trees. Areas with this treatment type would generally result in an increase herbaceous cover and production.

Severe Disturbance Area Treatment

A combination of burning, thinning out undesirable species, and reforestation are all options within these areas. Burning where the tree cover is low would generally slightly improve herbaceous cover and production, by removing needle cast and heavy fuel loading. Thinning out undesirable species such as Alligator juniper and Gambel oak, would in the short term reduce the canopy cover and promote herbaceous cover and production, but as these species tend to re-sprout quickly after treatment (usually less than a year), they would become re-established and thereby again reducing the herbaceous cover and production. Planting of trees in the short term would have minor effects of forage cover and production, except for small areas around the planting sites. In the long-term (10-20 years) planted trees would start grow increasing in size and canopy closure, and would drop needles, reducing forage production over time. If these areas are planted, burning operations, would not be effective in reducing canopy cover of undesirable species or of the planted species. This treatment would reduce herbaceous cover and production slowly over time.

Grassland and Meadow Restoration

Mechanical and fire treatments to reduce or eliminate tree encroachment (pine and junipers). Remove tree established since interruption of the historic fire regime. Promote and re-establish the historic meadow edge. . Areas with this treatment type would generally result in an increase herbaceous cover and production.

Spring exclosure areas would not be available for livestock grazing and would have an adverse effect on available forage within a pasture. However, these exclosures would not be large enough and would not amass in any particular pasture to reduce pasture stocking rates. In addition, by the time these exclosures would be completed, it is anticipated the increase in pasture forage by the tree thinning and burning would help to offset the forage lost within the exclosures. Spring projects would not have a measureable impact on the capacity of allotment or grazing management.

Stream and riparian area restoration would have a long-term benefit to livestock grazing management by increasing forage and by improving bank stability.

Aspen exclosure areas would not be available for livestock grazing and would have an adverse impact on available forage within a pasture. However, the majority of these exclosures would not be large enough or amassed in any particular pasture to reduce pasture stocking rates. Aspen projects would not have a measureable impact on the capacity of allotment or grazing management.

Road decommissioning would have a beneficial effect on livestock grazing by growing additional forage in the old road bed. Constructing temporary roads would have a temporary adverse effect to livestock grazing when the forage on the road was disturbed. No road project would have a measureable impact on the capacity of allotments or grazing management.

Effects Unique to Each Action Alternative and Differences Among Them

COMPARISON OF ALTERNATIVES:

Alternative 2 would provide for the biggest increase in forage with 583,490 acres (measured by the treatment acres with the greatest amount of forage increase plus the treatment acres with the moderate forage increase minus the treatment acres with a decrease in forage production) followed by Alternative 3 with 386,710 acres . Alternative 1 would result in an increase in tree density, increased risk of uncharacteristic wildfire and reduced forage production over time.

The effects to livestock grazing management is greater with Alternative 2. Approximately 81% of the pastures with more than 500 acres within the project area and with more than 20% of the pasture acres with proposed treatments occur with Alternative 2, as compared with 54% with Alternative 3. Since Alternative 1 has no proposed treatments, it would have the least amount of pastures affected by treatments.

Alternative 2

The following tables displays the acres of treatment types broken out by amounts of expected forage production categories.

Table XX. Alternative 2 Forage Production Categories by Treatment Type

Treatments with the greatest forage production	Acres
IT, SI and UEA 40-55% & 55-70%	186,310
Savanna Restoration	18,570
Grassland, Riparian and meadow Restoration	57,600
Total	262,480

Treatments with moderate forage production	Acres
IT, SI and UEA 10-25%, 10-40% & 25-40%	316,110
Single tree selection	12,510

Aspen Restoration	1,230
Facilitative Operations	123,400
Total	453,250

Treatments with lower increase in Forage production	Acres
FO Prescribed Fire only in PACs	6,880
MSO Recovery-Replacement Nest/Roost	25,290
MSO Pac Mechanical & FO Mechanical in PACs	17,760
MSO PAC Prescribed fire only	50,830
FO Prescribed Fire only and Prescribed fire only	55,330
Total	156,090

Areas with decrease forage production	Acres
Severe Disturbance Area Treatment	128,630
Severe Disturbance Area Treatment-MSO PACs	3,610
Total	132,240

As displayed above Alternative 2 has more overall acres of treatments, than is proposed in Alternative 3.

Table XX. Alternative 2 Expected Forage Production Categories Broken Out By Allotment/Pastures

Allotment	Pasture	Total Pasture Acres	Acres of Pasture in Project Area	% of Pasture w/ Proposed Treatments	Acres High	Acres Mod	Acres Low	Acres Decrease
Arab	Aniceto	1,946	1,946	100%	996	950	1	0
	Buckwheat	863	863	100%	445	418	0	0
	Butler	1,141	1,135	99%	568	548	0	19
	Jackson	651	203	31%	130	73	0	0
Black Canyon	H.P.#1	202	202	100%	84	117	0	0

	H.P.#2	130	130	100%	78	52	0	0
	King Phillip	4,589	4,589	100%	751	3,528	0	311
	Nelson	1,808	1,808	100%	237	1,571	0	0
	Porter	2,059	2,059	100%	1,461	598	0	0
	Sharp Hollow	4,935	4,935	100%	884	2,676	0	1,375
	Stermer	3,308	3,308	100%	411	1,421	0	1,475
Blue Ridge	Admin Pasture	106	106	82%	88	0	0	0
	Cattle Enclosure	16	16	0%	0	0	0	0
	Chimney	652	650	14%	88	0	0	0
	Chimney 1	391	391	41%	162	0	0	0
	Chimney 2	303	303	68%	204	0	0	0
	Jaques Marsh	220	220	19%	41	0	0	0
	North Blue Ridge	4,021	4,021	0%	0	0	0	0
	Scotts	462	462	0%	2	0	0	0
	South Blue Ridge	4,226	4,226	0%	0	0	0	0
	Twin Knoll	1,020	1,020	0%	2	0	0	0
	Unallocated	212	212	57%	121	0	0	0
Brown Creek	Cattle Enclosure 1	2	2	42%	1	0	0	0
	Cattle Enclosure 2	17	17	0%	0	0	0	0
	Cattle Enclosure 3	104	104	3%	3	0	0	0
	Cattle Enclosure 4	62	62	0%	0	0	0	0
	Elk Enclosure	3	3	97%	3	0	0	0
	Marshall	4,695	4,690	9%	402	0	0	0
	Penrod Holding	258	105	32%	83	0	0	0
	Turkey	4,796	4,796	18%	699	144	0	0
Buck Springs	Brushy	2,777	2,777	25%	289	145	270	0
	Brushy Flat Enclosure	14	14	100%	14	0	0	0
	Brushy Flat Tank	3	3	0%	0	0	0	0
	Brushy Spring Enclosure	1	1	100%	1	0	0	0
	Buck Springs	3,365	3,365	0%	0	0	0	0
	Buck Springs Tank	11	11	0%	0	0	0	0
	Elk Springs	2,089	2,089	0%	0	0	0	0
	Lion Tank	2	2	0%	0	0	0	0
	Tank 1	2	2	0%	0	0	0	0

	Tank 2	3	3	0%	0	0	0	0
	Whitcom Holding 1	134	134	0%	0	0	0	0
	Whitcom Holding 2	98	98	0%	0	0	0	0
	Whitcom Trap	8	8	0%	0	0	0	0
Chevelon Canyon	Alder H.P.	264	264	100%	51	213	0	0
	Breed	8,439	8,439	100%	1,036	6,346	955	102
	Circle Bar	10,887	10,887	100%	1,356	9,198	333	0
	Nagel H.P.	208	208	100%	15	194	0	0
	Sandpoint	8,914	8,914	100%	1,378	6,210	1,326	0
	Vigil-Durfee	11,623	5,987	52%	172	5,815	0	0
Clay Springs	+IL	3,845	115	3%	0	56	0	59
	Summer North	4,530	4,530	100%	333	1,127	0	3,070
	Summer South	6,687	6,687	100%	1,050	1,212	0	4,425
Clear Creek	South	7,855	757	10%	50	532	175	0
Ellsworth	East Ellsworth	1,227	1,222	33%	401	0	0	0
	West Ellsworth	769	767	82%	627	0	0	0
Heber	Bunger	21,893	21,893	100%	2,300	5,796	658	13,140
	Gentry	17,906	17,906	100%	1,808	2,655	4,726	8,709
	H.P.	595	595	100%	43	42	0	510
	Halter Cross	7,410	1,850	25%	124	1,464	0	262
	HP #2	13	13	100%	0	13	0	0
	Mud Tank	13,220	5,740	43%	275	5,465	0	0
	Nelson	11,007	11,007	96%	1,551	8,759	239	0
	Oil Well	13,608	1,390	10%	102	1,288	0	0
	Phoenix Park	23,801	23,801	100%	3,106	9,440	327	10,922
Johnson	Johnson	740	739	64%	475	0	0	0
Lake Mountain	Brown Creek	9	9	100%	8	1	0	0
	Brown Springs	121	121	100%	84	37	0	0
	Cattle Enclosure AZ G&F	6	6	100%	6	0	0	0
	Doyle	3,539	3,539	16%	509	51	0	0
	Enclosure 1	74	74	100%	0	73	0	0
	Enclosure 12	13	13	100%	0	13	0	0
	Enclosure 13	9	9	100%	0	9	0	0
	Enclosure 17	3	3	100%	3	0	0	0
	Enclosure 2	4	4	100%	0	4	0	0
	Enclosure 3	14	14	100%	0	14	0	0
	Enclosure 4	8	8	100%	0	8	0	0
	Enclosure 9	21	21	100%	0	21	0	0

	Firebox	3,091	3,091	100%	1,512	830	749	0
	Holding	148	148	100%	142	6	0	0
	Holding 1	117	117	27%	32	0	0	0
	Holding 2	228	228	60%	137	0	0	0
	Lake Mountain	5,578	5,578	90%	2,464	2,259	315	0
	Los Burros	211	211	100%	99	112	0	0
	Mineral	4,182	4,182	29%	1,200	9	0	0
	Porter Lake	1,028	1,027	100%	130	842	54	0
	Porter Trap	15	15	100%	13	2	0	0
	Quakie	1,426	1,422	100%	478	607	166	171
	Reservation	2,509	2,509	100%	1,361	1,108	40	0
	Section 1 Tank	5	5	100%	3	1	0	0
	Unallocated	80	80	100%	80	0	0	0
		111	111	47%	52	0	0	0
	Wolf Mountain	3,776	3,776	98%	1,354	1,603	748	0
Limestone	Double Cabin	9,368	9,368	100%	1,217	4,375	3,148	598
	Five Mile	8,622	8,622	90%	2,614	4,040	1,074	0
	Hart Canyon H.P.	232	232	100%	157	74	0	0
	Ohaco	11,836	11,836	100%	3,108	6,257	2,406	63
	Pius Farm #1 H.P.	223	223	100%	222	1	0	0
	Pius Farm #2 H.P.	707	707	100%	324	104	279	0
	Tentground	9,164	9,164	100%	493	7,600	1,071	0
	Wilkins	9,059	9,059	100%	18	7,654	1,387	0
Long Tom	Long Tom	74,855	64,371	33%	3,539	18,869	1,424	608
Ortega	Woolhouse	2,835	26	1%	16	0	0	0
Park-Day Wash	Park	4,337	1,528	35%	62	675	0	791
Pinyon	East	845	441	38%	318	0	0	0
Railroad	Bear Canyon	6,658	6,658	100%	581	2,586	0	3,490
	Blue Grass	5,321	1,370	26%	93	1,277	0	0
	Brittenham Holding	162	162	100%	0	161	0	1
	Bull	309	309	100%	19	253	0	37
	Capps	1,674	439	26%	0	139	0	300
	Deer Lick	1,573	1,573	100%	200	937	0	436
	East Bull	731	731	100%	0	131	0	600
	East Cottonwood	4,450	4,450	100%	137	2,323	0	1,990
	Fence Tank	9,247	9,241	83%	1,388	1,621	0	4,683
	Lons	9,209	9,209	100%	1,318	2,204	127	5,560

	McNeil East	2,949	2,949	31%	673	250	0	0
	McNeil West	989	989	0%	0	0	0	0
	Middle	806	430	53%	68	361	0	0
	Mortensen	1,552	2	0%	0	1	0	1
	Mortensen Holding	668	663	99%	86	166	0	410
	Owens	1,287	492	38%	0	417	0	75
	Pinedale	2,177	2,177	100%	257	898	0	1,021
	Rattlesnake	3,914	4	0%	0	4	0	0
	South Juniper Ridge	2,377	2,377	100%	99	539	0	1,739
	Wilson	4,614	4	0%	0	4	0	0
	Winter	1,701	1,652	97%	21	1,626	0	0
Show Low	Porter	8,244	8,243	11%	897	0	0	0
	Second Knoll	3,292	13	0%	8	0	0	0
Sponsellor	East Sponsellor	2,978	197	0%	0	0	0	0
	Holding 1	416	416	1%	2	0	0	0
	Holding 2	162	162	0%	0	0	0	0
	South Sponsellor	5,825	5,825	0%	0	0	0	0
	West Sponsellor	2,160	912	26%	555	0	0	0
Town Tank	East Town Tank	558	558	100%	0	0	0	558
	Holding	83	83	100%	83	0	0	0
	Polson	1,020	1,020	100%	97	152	0	771
	West Town Tank	1,393	1,393	100%	58	20	0	1,314
Wallace	Barney	6,463	6,463	100%	372	6,087	4	0
	FS.H.P.	147	147	100%	27	120	0	0
	Grama	6,931	6,931	100%	99	5,868	963	0
	Tillman	9,928	1,638	16%	61	1,147	429	0
	Wall H.P.	343	343	100%	27	316	0	0
	Waters	11,200	11,200	100%	2,697	7,869	419	215
Wildcat	Buckhorn	5,523	5,523	100%	395	5,128	0	0
	Daze	4,400	4,400	100%	1,227	2,216	362	593
	Ellsworth	4,155	4,155	100%	1,303	2,737	113	0
	H.P.#1	1,295	1,155	89%	31	1,006	0	119
	Hanks	5,416	5,416	84%	272	4,287	3	0
	Research Natural Area	334	211	63%	0	35	3	173
Willow Wash	Aztec	4,130	4,130	100%	934	529	0	2,666
	Bear Springs	4,497	4,497	100%	1,106	971	0	2,418
	Cottonwood	6,203	6,203	100%	1,416	813	0	3,975
	East Sundown	3,745	63	2%	0	57	0	6
	Phelps	4,256	4,256	100%	449	749	0	3,058

	Ranch	2,631	2,556	97%	181	585	0	1,789
	Sackett	3,875	2,762	71%	328	1,264	0	1,170
	West Sundown	4,620	982	21%	0	693	0	289
	Yarrow	2,414	2,414	100%	143	312	0	1,959
13-Mile Rock	Good Enough	755	650	86%	5	535	110	0
	Horse Water Lot	1	1	100%	0	1	0	0
	Jack Pine Water Lot	2	2	100%	0	2	0	0
	Lone Pine Water Lot	8	8	100%	8	0	0	0
	Meadow Canyon North	1,443	673	47%	383	6	283	0
	Meadow Canyon South	1,896	1,084	57%	608	413	63	0
	New Tank Holding	16	16	100%	0	16	0	0
	Section 8 Water Lot	4	4	100%	4	0	0	0
	Toms	3,516	3,353	95%	100	2,137	1,116	0
	Tule	2,487	2,381	96%	1,221	1,085	75	0
	Tule Holding	72	72	100%	26	47	0	0
	Tule Waterlot	3	3	100%	2	2	0	0
	Wilbur	2,558	2,281	89%	227	1,441	613	0
	Wilbur 2 Waterlot	1	1	100%	1	0	0	0
Apache Maid	61 Water Lot	4	4	100%	0	4	0	0
	Bargaman	875	875	100%	213	132	529	0
	Bargaman Flat	146	146	100%	130	10	6	0
	Blind Lake	7,497	7,379	5%	401	0	0	0
	Blind Lake Horse	330	1	0%	0	0	0	0
	Bull	665	301	45%	138	92	71	0
	Cabin	518	490	95%	443	47	0	0
	Campbell Spring	9,348	9,348	3%	314	0	0	0
	Dave's Water Lot	4	2	52%	1	2	0	0
	Foster Spring Exclosure	4	4	65%	2	0	0	0
	Gash Flat East	1,398	8	0%	1	0	0	0
	Gash Flat Middle	668	8	1%	5	0	0	0
	Gash Flat West	918	1	0%	0	0	0	0
	Horse Summer	203	203	31%	63	0	0	0
	Horse Trap Water Lot	2	2	100%	0	2	0	0
	Hutch	7,600	2,293	30%	392	536	1,365	0

	Maid Holding	155	155	97%	151	0	0	0
	Pine Mountain East	7,003	6,898	98%	4,416	2,478	0	4
	Pine Mountain West	6,958	6,958	100%	2,204	3,317	1,425	0
	Pine Ridge Water Lot	3	3	100%	0	3	0	0
	Sawmill	6,727	2,170	32%	781	1,337	52	0
	Shipping Lane East	660	660	100%	264	396	0	0
	Shipping Lane West	460	460	100%	199	87	174	0
	Snake Tanks	6,719	1,006	15%	842	164	0	0
	Stoneman	8,394	3,447	16%	1,307	0	0	0
	Sue's Water Lot	8	8	84%	7	0	0	0
	T-Bar Cabin	29	29	47%	13	0	0	0
	T-Bar Cabin #1	77	73	90%	69	0	0	0
	T-Bar Cabin #2	253	248	76%	193	0	0	0
	T-Bar Tank 2 Enclosure	5	5	81%	4	0	0	0
	Wild Horse	7,550	7,550	100%	2,237	4,117	1,196	0
	Woodland	7,354	2,727	10%	741	0	0	0
Baker Lake/Calf Pen	Baker Lake	2,476	2,476	72%	697	965	108	0
	Brush	3,660	3,410	93%	1,189	1,871	178	172
	Calf Pen 7	283	283	100%	283	0	0	0
	Cinch Hook	1,017	1,017	100%	437	579	0	0
	Five Mile	1,014	1,014	100%	595	303	0	117
	Highway Junction	728	728	93%	316	260	100	0
	Milk Ranch	3,338	3,338	100%	1,684	1,618	35	0
	Pocket	3,031	2,060	68%	843	916	234	68
	Strawberry Point	1,184	1,184	100%	606	578	0	0
	Twentynine Mile Lake	1,474	1,447	98%	469	860	118	0
Bar T Bar	064	164	164	100%	153	11	0	0
	075	42	6	15%	4	3	0	0
	090	21	21	100%	20	1	0	0
	092	39	39	100%	39	0	0	0
	099	87	87	100%	87	0	0	0
	Baucom	1,273	1,273	100%	985	288	0	0
	Boulder Waterlot	11	11	100%	11	0	0	0
	Buckhorn	11,480	11,480	92%	1,972	4,024	2,966	1,560

	Buckhorn Waterlot	2	2	100%	0	0	0	2
	Clinton's Pool	1,367	1,367	100%	853	514	0	0
	Clint's	827	827	7%	59	0	0	0
	Clints Waterlot	10	10	100%	9	1	0	0
	David's	895	895	7%	8	58	0	0
	Duke Waterlot	3	3	100%	3	0	0	0
	East Green Howard	3,984	3,984	100%	3,674	311	0	0
	East Melatone	6,517	2,611	40%	1,210	1,224	177	0
	Fisher	9,683	9,261	93%	3,592	3,662	1,709	0
	Girlscout	13	13	100%	8	5	0	0
	Green Waterlot	6	6	100%	0	6	0	0
	Hay Lake 1	2,173	943	43%	556	387	0	0
	Hay Lake 10	434	434	100%	430	4	0	0
	Hay Lake 2	306	28	9%	12	16	0	0
	Hay Lake 3	341	136	40%	126	10	0	0
	Hay Lake 4	253	253	100%	253	0	0	0
	Hay Lake 5	128	128	100%	128	0	0	0
	Hay Lake 7	41	41	100%	41	0	0	0
	Hay Lake 8	94	94	100%	94	0	0	0
	Hay Lake 9	412	412	100%	298	114	0	0
	Home	304	304	0%	0	0	0	0
	Homestead Waterlot	4	4	100%	4	0	0	0
	Horse	490	490	100%	490	0	0	0
	Horse Trap 1	77	77	100%	77	0	0	0
	Horse Trap 2	24	24	100%	24	0	0	0
	Janice	1,716	1,716	100%	1,436	279	0	0
	Lane	113	113	100%	81	31	0	0
	Lost Eden Horse	181	181	100%	179	2	0	0
	Lost Eden Waterlot	16	16	100%	12	4	0	0
	Mary's	1,124	1,124	97%	356	621	110	0
	Marys Waterlot	4	4	98%	4	0	0	0
	Mesa Waterlot	2	2	100%	2	0	0	0
	Monty's	666	666	100%	549	117	0	0
	Montys Waterlot	52	52	100%	52	0	0	0
	Moqui	39	39	100%	39	0	0	0
	Moqui East	67	67	100%	9	0	0	58
	Moqui West	16,443	16,443	40%	1,868	2,712	1,281	722

	Park	818	818	27%	85	139	0	0
	Prairie Dog	3,178	3,178	100%	2,100	1,077	0	0
	PW Waterlot	4	4	100%	4	0	0	0
	Sarah's	1,131	1,131	81%	109	480	325	0
	Todd	186	186	100%	180	6	0	0
	Trap 1	201	201	100%	180	22	0	0
	Trap 2	312	312	100%	1	293	18	0
	Turkey Mountain	2,005	2,005	100%	1,532	473	0	0
	Turkey Mountain Waterlot	10	10	100%	10	0	0	0
	Two Eleven	138	138	100%	33	105	0	0
	Victorine Waterlot	2	2	100%	0	2	0	0
	West Green Howard	5,106	5,106	97%	4,739	205	0	0
	West Melatone	3,821	611	16%	589	22	0	0
	Wilkins	15,129	12,650	72%	1,884	7,519	0	1,556
	Wochner	1,550	1,550	100%	1,208	342	0	0
	Woods Water Lot	9	9	100%	9	0	0	0
	Y7 Waterlot	14	14	100%	12	2	0	0
	Yellowjacket	13,244	13,244	98%	4,594	7,203	1,208	0
Beaver Creek	072	32	32	100%	7	25	0	0
	Antelope	529	202	26%	139	0	0	0
	Antelope Water Lot	14	5	24%	3	0	0	0
	Banfield	448	448	0%	2	0	0	0
	Bar D	2,153	2,153	39%	411	433	0	0
	Bar-D Water Lot	2	2	100%	2	0	0	0
	Brady North	2,139	1,994	48%	985	36	0	0
	Brady South	2,226	2,226	74%	973	624	0	42
	Brady Water Lot	6	6	100%	4	2	0	0
	Buck Mountain	4,308	4,308	38%	718	876	26	0
	Crossing	503	503	100%	34	469	0	0
	Divide Water Lot	4	4	100%	0	4	0	0
	Fred's Water Lot	2	2	0%	0	0	0	0
	Goswick	1,522	1,522	2%	26	0	0	0
	Goswick Holding	84	84	0%	0	0	0	0
	Happy Jack	4,336	4,336	11%	145	328	0	0
	Hollingshead East	257	257	3%	7	0	0	0

	Hollingshead West	2,110	2,110	1%	26	0	0	0
	Horse Knoll	1,392	522	38%	372	151	0	0
	Jose Water Lot	2	2	0%	0	0	0	0
	Landmark North	4,683	4,683	100%	2,259	2,367	57	0
	Landmark Shipping	861	861	90%	628	149	0	0
	Landmark South	4,245	4,245	100%	1,417	2,143	620	66
	Lower Jacks	2,540	2,540	0%	3	0	0	0
	May's Water Lot	2	2	0%	0	0	0	0
	Pine Ridge	1,214	82	7%	82	0	0	0
	Schroeder Water Lot	2	2	100%	2	0	0	0
	Sheep Water Lot	2	2	100%	1	1	0	0
	Shipping #1	751	751	100%	83	661	6	0
	Shipping #2	966	966	100%	891	75	0	0
	Shipping #3	660	660	100%	119	540	0	0
	Triangle	3,546	3,546	100%	1,081	2,466	0	0
	Upper Jacks	3,483	3,483	0%	1	0	0	0
	Waldroup	1,202	1,202	100%	556	646	0	0
	Woodland	2,025	743	4%	89	0	0	0
Buck Springs	Burn	639	639	0%	0	0	0	0
	Dines	1,103	1,103	100%	175	824	104	0
	Double North	2,129	2,129	1%	12	0	0	0
	Forest Service	412	412	100%	129	216	67	0
	Genes	69	69	100%	62	7	0	0
	Holding/Horse	158	158	0%	0	0	0	0
	Jumbo	1,527	1,527	0%	2	0	0	0
	Knolls	1,171	1,171	100%	725	446	0	0
	Lane	82	82	100%	22	60	0	0
	Limestone	172	172	100%	90	82	0	0
	McCarty	2,536	2,536	2%	39	0	0	0
	Moonshine	1,287	1,287	100%	570	593	124	0
	North	9,459	9,459	96%	1,948	4,783	2,303	51
	North Battleground	5,445	5,445	3%	143	0	0	0
	North Holding	78	78	100%	39	39	0	0
	North McClintock	2,052	2,052	98%	453	953	607	0
	North Pinchot	5,883	5,883	38%	441	1,227	548	0
	Schneider	101	101	100%	23	78	0	0
	South Battleground	7,595	7,595	7%	202	169	27	107

	South Pinchot	2,980	2,980	63%	212	599	1,060	0
	Steer	243	243	100%	178	65	0	0
Buckhorn	Brushy	520	520	100%	387	72	55	4
	Brushy Holding	15	15	100%	0	0	8	7
	Buckhorn	2,623	63	2%	56	7	0	0
	Buckhorn Horse	277	277	100%	118	159	0	0
	Clover	2,753	2,753	0%	0	6	0	0
	Dirty Name	728	728	100%	595	132	0	0
	Dukey	2,375	2,375	100%	589	1,452	204	130
	Experimental	1,260	1,260	0%	0	0	0	0
	Maxwell Holding	12	12	100%	12	0	0	0
	Maxwell North	1,524	1,524	100%	1,029	495	0	0
	Maxwell Waterlot	4	4	100%	2	3	0	0
	Oak Grove Water Lot	5	5	100%	5	0	0	0
	Oak North	2,125	2,125	100%	1,351	774	0	0
	Pecks Point Water Lot	3	3	0%	0	0	0	0
	Snake Water Lot	2	2	100%	0	2	0	0
	Walker Water Lot	2	2	100%	1	1	0	0
	Willow	3,448	3,448	57%	483	1,334	30	115
Fossil Creek	Manzanita	1,049	0	0%	0	0	0	0
	Salmon Lake	804	2	0%	1	0	0	0
Hackberry/Pivot Rock	009	74	74	7%	5	0	0	0
	011	59	59	2%	1	0	0	0
	012	9	9	0%	0	0	0	0
	013	31	31	0%	0	0	0	0
	142A Water Lot	1	1	100%	0	1	0	0
	Baker	1,791	1,791	0%	3	0	0	0
	Bald 4	3,874	3,874	19%	279	354	0	86
	Bed Bug East	983	983	3%	29	0	0	0
	Bed Bug West	2,263	2,263	2%	35	0	0	0
	Calloway	4,525	4,525	92%	449	3,497	229	0
	Calloway Gathering	20	20	100%	6	15	0	0
	Clear Creek	1,490	1,490	4%	62	0	0	0
	Corral	633	629	99%	23	594	12	0
	Dry Lake	1,930	1,930	2%	35	0	0	0
	Fuller Water Lot	1	1	0%	0	0	0	0

	Good Enough Water Lot	1	1	100%	0	1	0	0
	Horse	473	473	1%	3	0	0	0
	Huffer	2,453	2,453	2%	52	0	0	0
	Kehl	7,586	7,710	16%	489	504	5	195
	Lee Johnson Water Lot	0	0	100%	0	0	0	0
	Long Valley	323	323	0%	0	0	0	0
	Long Valley Water Lot	5	5	0%	0	0	0	0
	Miller	4,622	4,501	2%	101	0	0	0
	Neck 1	826	826	0%	1	0	0	0
	Neck 2	1,417	1,417	88%	463	658	0	132
	Neck 3	242	242	100%	118	124	0	0
	Potato North	1,556	1,556	1%	13	0	0	0
	Potato South	1,679	1,679	10%	131	40	0	0
	Sandrock	1,047	1,044	100%	442	603	0	0
	Sandrock Draw Water Lot	4	4	100%	0	4	0	0
	Shipping	639	639	2%	12	0	0	0
	Toms Creek	10,325	10,304	94%	911	6,001	2,815	0
	Twentyseven Mile	2,733	2,532	93%	358	1,311	863	0
	Vickers Water Lot	1	1	100%	0	1	0	0
	Water Lot	0	0	0%	0	0	0	0
		0	0	0%	0	0	0	0
		1	1	0%	0	0	0	0
		1	1	0%	0	0	0	0
		2	2	0%	0	0	0	0
	Wingfield	594	594	1%	8	0	0	0
Walker Basin	020	3	3	100%	3	0	0	0
	Aztec Water Lot	3	3	100%	0	3	0	0
	Banfield	3,833	3,833	57%	766	1,433	0	0
	Banfield Water Lot	3	3	0%	0	0	0	0
	Cherry Tree Water Lot	6	6	100%	6	0	0	0
	East Snake Ridge	1,765	1,765	100%	980	779	0	0
	Harris Meadow Water Lot	3	3	100%	3	0	0	0
	Harris Water Lot	27	27	100%	23	4	0	0
	Horse Knoll	6,273	3,818	49%	2,296	804	0	0

	Kitty Pan Water Lot	3	3	0%	0	0	0	0
	Lucky Water Lot	8	8	100%	4	4	0	0
	Mahan Horse	258	258	100%	241	2	0	15
	Mahan Park	160	160	73%	109	8	0	0
	Mesa Water Lot	3	3	0%	0	0	0	0
	Middle Snake Ridge	2,024	2,024	87%	1,606	150	0	0
	Peewee Water Lot	3	3	100%	3	0	0	0
	Pine	3,206	3,206	100%	1,402	1,803	0	0
	Sams Butte Water Lot	2	2	100%	2	0	0	0
	Snake Ridge Water Lot	1	1	100%	1	0	0	0
	Steer	2,860	2,860	100%	1,463	1,039	30	329
	Summer Heifer	1,369	1,369	100%	989	380	0	0
	Toilet Paper Water Lot	3	3	100%	2	1	0	0
	Turkey Draw Water Lot	8	8	0%	0	0	0	0
	Underpass	510	510	100%	7	503	0	0
	West Snake Ridge	1,882	1,540	82%	999	516	25	0
Willow Valley	Antelope	1,191	1,191	100%	130	1,060	1	0
	Bushy Knoll Waterlot	3	3	100%	0	3	0	0
	D7	791	791	100%	93	696	2	0
	Deer	725	725	89%	207	435	0	0
	Gathering Pasture	71	71	54%	38	0	0	0
	Mud Lake	1,373	1,373	42%	98	447	0	35
	North Riparian	236	236	100%	153	84	0	0
	Randall	260	260	100%	152	108	0	0
	South Riparian	126	126	99%	117	8	0	0
Windmill	Luke Mountain	10,202	34	0%	0	0	0	0
13 Ranch	Gordon Pasture	112	112	100%	42	70	0	0
		2,186	2,186	96%	873	254	967	0
	Highway 260 Pasture	1,377	1,377	58%	564	189	40	0
	Horse Pasture	257	257	28%	32	39	0	0
	Hunter Pasture	3,201	3,201	89%	1,756	476	631	0
	North Pasture	3,309	3,309	100%	980	736	1,592	0

	Snowshoe Pasture	4,471	4,471	100%	3,052	1,417	3	0
A - Cross	Rose Creek Pasture	1,872	0	0%	0	0	0	0
Armer Mountain	Hopkins Pasture	7,978	4,836	59%	870	3,499	58	285
	Salome Pasture	6,276	0	0%	0	0	0	0
Bar X	Bar X Pasture	687	687	98%	171	502	0	0
	Cross Y II Pasture	1,411	1,411	100%	896	515	0	0
	Haigler Pasture	1,179	1,163	98%	851	310	0	0
	Lower Dry Creek	1,464	703	48%	683	20	0	0
	Upper Dry Creek	1,412	1,132	80%	899	233	0	0
	Westhole Pasture	1,182	477	40%	85	392	0	0
Bryant Mountain	Bryant Pasture	2,684	12	0%	0	12	0	0
Buzzard Roost	Buzzard Roost Pasture	3,549	681	19%	14	666	0	0
	Cataract Tank Holding Pasture	53	53	100%	0	43	10	0
	Copper Mountain Pasture	10,649	8,080	76%	814	6,134	728	399
	Dinner Creek Pasture	549	549	100%	0	549	0	0
	Headquarters Pasture	746	746	100%	0	737	0	9
	Holding Pasture	151	151	100%	17	130	3	0
	Indian Camp Reservoir	4	4	100%	0	4	0	0
	Jerky Butte Pasture	2,069	1,771	85%	25	1,734	0	0
	Juniper Flat Holding Pasture	1,096	88	8%	22	65	0	0
	Juniper Flat Pasture	941	533	57%	149	384	0	0
	Lacy Holding Pasture	251	251	100%	0	236	14	0
	Middle Pasture	9,061	9,061	100%	423	7,364	438	836
	North Shipping Pasture	741	325	44%	7	318	0	0
	Pine Mountain Pasture	9,723	9,512	98%	2,273	5,411	1,662	166
	Redman Mesa Pasture	4,458	4,458	100%	251	4,199	7	0

	Redman Mesa Tank Holding Pasture	16	16	100%	0	16	0	0
	Shipping Pasture	83	72	88%	0	72	0	0
	Thoroughbred Pasture	2,975	1,750	59%	197	1,552	0	0
	Trap	2	2	100%	0	2	0	0
		3	3	100%	0	3	0	0
		3	3	100%	0	3	0	0
		4	4	100%	0	4	0	0
		7	7	100%	0	7	0	0
		9	9	100%	4	5	0	0
Cedar Bench	FU Pasture	318	318	100%	31	286	0	0
	Open Pasture	3,311	1,161	35%	101	1,060	0	0
	Ranch Pasture	691	691	100%	120	565	5	0
	YH Pasture	374	374	100%	0	374	0	0
Center Mountain	North Pasture	4,430	1,204	27%	19	32	385	768
	South Pasture	5,323	164	3%	4	21	78	61
Cherry Creek	Cherry Holding Pasture	931	100	11%	31	68	0	0
	Dinner Pasture	7,208	3,825	53%	463	3,318	0	44
	Olligar Pasture	6,062	117	2%	58	59	0	0
	South Cherry Pasture	10,070	16	0%	13	0	0	3
	Squaw Holding Pasture	393	5	1%	5	0	0	0
Christopher Mountain	Highway 260 West Pasture	3,012	3,012	100%	1,153	1,253	607	0
	Holding Pasture	239	239	100%	200	30	9	0
		626	626	100%	185	434	7	0
	Mescal Ridge Pasture	5,218	2,759	51%	1,231	1,333	115	0
Cross V	Bean Patch Pasture	3,641	13	0%	0	13	0	0
	Beaver Valley	2,714	142	5%	0	139	3	0
	Brody Pasture	2,164	2,164	100%	289	1,047	2	824
	Diamond Pasture	4,219	4,099	95%	479	3,200	319	0
	Dry Dude Pasture	1,825	1,825	100%	73	0	0	1,752
	East Verde Pasture	9,517	9,187	91%	2,580	3,260	213	2,612

	Star Valley Pasture	5,844	14	0%	0	14	0	0
	Trap	2	2	100%	0	2	0	0
Crouch Mesa	Brewer Pasture	1,304	0	0%	0	0	0	0
	Deadman Pasture	1,034	417	40%	13	404	0	0
	Mesa Pasture	2,682	104	4%	67	37	0	0
Dagger	Oak Creek Mesa Pasture	17,985	1,840	10%	367	655	293	484
Deadman Mesa	Nash Point Pasture	394	388	98%	315	71	0	0
	Upper Fossil Creek Pasture	3,241	62	2%	61	0	0	0
	Upper Mesa Pasture	2,061	347	17%	47	297	0	0
Del Shay	Del Shay Pasture	3,703	0	0%	0	0	0	0
Ellinwood	Cottonwood Pasture	8,644	6,119	69%	111	5,859	0	0
	Highway 260 East Pasture	4,639	4,639	95%	1,813	639	1,890	59
	Horse Mountain Pasture	3,961	3,219	81%	1,372	1,503	343	0
	Hunter Creek Pasture	931	931	90%	375	447	19	0
Flying V	Gentry Pasture	3,036	1,943	64%	219	1,163	561	0
Frio Canyon	Deadman Pasture	4,232	1,539	36%	457	743	339	0
	Dump Pasture	3,674	706	19%	196	506	4	0
	North Turkey Pasture	909	42	5%	42	1	0	0
	South Turkey Pasture	1,239	1	0%	0	1	0	0
Gentry Mountain	Gentry Pasture	4,356	1,172	23%	976	0	44	0
	Sheep Pasture	4,953	4,494	90%	2,520	1,872	61	0
Green Valley	Bonita Pasture	3,201	3,201	100%	110	606	0	2,484
	Diamond Pasture	10,843	10,098	70%	2,671	3,864	872	167
	Ellison Pasture	2,090	2,090	96%	98	100	0	1,807
	Holding Pasture	68	68	51%	35	0	0	0
		280	115	41%	107	8	0	0
		360	348	96%	337	10	0	0
	Kings Ridge Pasture	5,516	3,005	54%	1,225	1,762	16	0
	Moore Pasture	4,189	4,189	95%	206	158	35	3,567

	Myrtle-Pyeatt Pasture	3,885	3,885	79%	1,372	1,558	16	111
	Ponderosa Pasture	1,497	1,497	87%	702	605	0	0
	Trap	3	3	100%	0	3	0	0
	Upper Neal Pasture	1,940	93	5%	2	90	0	0
	Winter Division Pasture	10,057	188	2%	83	105	0	0
Greenback	Basin Pasture	15,008	0	0%	0	0	0	0
Haigler Creek	Cross Y Pasture	1,045	1,045	93%	660	298	13	0
	Oxbow Pasture	3,099	2,937	94%	664	2,237	27	0
Hardscrabble	Button Flat Pasture	1,846	1,254	68%	326	928	0	0
	Hardscrabble Pasture	98	98	100%	0	98	0	0
	Natural Bridge Pasture	2,274	45	2%	0	45	0	0
	Pine Pasture	5,527	3,659	66%	1,241	2,373	42	0
	Rock Creek Pasture	3,169	39	1%	0	39	0	0
	Trap	1	1	100%	0	1	0	0
		2	1	98%	0	1	0	0
		5	5	94%	0	5	0	0
	UA Pasture	225	225	100%	0	225	0	0
Heber-Reno Sheep Driveway	Sheep Driveway	4,233	4,233	99%	614	278	208	3,110
		11,463	6,380	49%	3,145	1,187	1,246	0
Indian Gardens	Dead Horse Pasture	2,155	2,155	98%	985	980	151	0
	Dick Williams Pasture	6,633	6,633	98%	2,053	1,103	1,489	1,831
	Roberts Mesa North Pasture	270	270	100%	0	0	0	270
		3,644	3,644	100%	583	372	20	2,667
	Roberts Mesa South Pasture	3,435	3,435	99%	1,542	1,748	108	0
O.W.	East Canyon Creek Pasture	1,026	1,015	99%	172	184	0	659
	Headquarters North Pasture	88	88	100%	88	0	0	0
	Headquarters South Pasture	86	86	100%	31	0	34	21
	Mule Creek Pasture	1,079	1,076	100%	215	52	434	374

	West Canyon Creek Pasture	2,080	2,080	100%	186	31	1,192	671
Payson	Boy Scout Pasture	9,571	9,324	96%	2,164	2,841	3,004	1,156
	Girl Scout Pasture	10,079	10,072	99%	2,807	4,506	1,782	913
	Hells Half Acre Pasture	7,298	1,156	16%	326	830	0	0
	Holding Trap	6	6	100%	0	6	0	0
Pine	Buckhead Holding Pasture	269	269	100%	0	269	0	0
	Cedar Mesa North Pasture	6,481	6,456	99%	2,736	3,589	65	0
	Cedar Mesa South Pasture	2,660	83	3%	0	83	0	0
	Red Hills Pasture	2,451	740	30%	326	413	0	0
	Strawberry Mountain Pasture	2,164	2,164	97%	1,177	347	579	0
	Strawberry Point Pasture	2,227	2,227	96%	1,318	739	36	35
Pleasant Valley	Haught Pasture	537	13	2%	1	12	0	0
	Northeast Pasture	2,251	47	2%	9	38	0	0
Red Lake	Frog Pasture	3,725	3,725	100%	2,844	595	272	0
	Ramer Tank	2	2	100%	2	0	0	0
	Red Lake Pasture	9,699	9,699	100%	6,377	1,799	992	532
	Second Pasture	5,806	5,806	100%	4,151	1,523	78	54
Seventy Six	Coffeepot Pasture	5,921	2	0%	0	2	0	0
Tonto Basin	Clover/Bearhead Pasture	36,364	17,176	47%	279	9,088	870	6,933
	Holding Pasture	98	98	100%	0	13	0	85
		229	229	38%	0	0	0	87
		319	319	84%	1	267	0	0
Young	Round Mountain Pasture	2,466	2,181	88%	373	1,673	135	0

Allotments such as the Black Canyon, Clay Springs, Heber, Railroad, Town Tank and the Willow Wash on the Apache-Sitgreaves NF and the Cross V, Green Valley, Sheep Driveway, Indian Gardens OW, Payson, and the Tonto Basin Allotments on the Tonto would receive the largest

portions of the acres severe disturbance treatments. These areas are generally within previously burned areas, such as the Rodeo-Chediski fire.

Alternative 3

The following tables displays the acres of treatment types broken out by amounts of expected forage production categories.

Table XX. Alternative 3 Forage Production Categories By Treatment Type

Treatments with the greatest forage production	Acres
IT, SI and UEA 40-55% & 55-70%	120,550
Savanna Restoration	2,470
Grassland, Riparian and Meadow Restoration	57,600
Total	180,620

Treatments with moderate forage production	Acres
IT, SI and UEA 10-25%, 10-40% & 25-40%	185,630
Single tree selection	5,630
Aspen Restoration	1,010
Facilitative Operations	47,580
Total	239,850

Treatments with lower increase in Forage production	Acres
FO Prescribed Fire only in PACs	3,070
MSO Recovery-Replacement Nest/Roost	19,590
MSO Pac Mechanical & FO Mechanical in PACs	16,050
MSO PAC Prescribed fire only	37,960

FO Prescribed Fire only and Prescribed fire only	41,260
Total	117,930

Areas with decrease forage production	Acres
Severe Disturbance Area Treatment	30,340
Severe Disturbance Area Treatment-MSO PACs	1,420
Total	31,760

Table XX. Alternative 3 Expected Forage Production Categories Broken Out By Allotment/Pastures

Allotment	Pasture	Total Pasture Acres	Acres of Pasture in Project Area	% of Pasture w/ Proposed Treatments	Acres High	Acres Mod	Acres Low	Acres Decrease
Arab	Aniceto	1,946	1,946	91%	985	782	1	0
	Buckwheat	863	863	79%	414	269	0	0
	Butler	1,141	1,135	84%	552	407	0	0
	Jackson	651	203	31%	130	73	0	0
Black Canyon	H.P.#1	202	202	55%	55	55	0	0
	H.P.#2	130	130	77%	50	50	0	0
	King Phillip	4,589	4,589	68%	688	2,447	0	0
	Nelson	1,808	1,808	85%	237	1,309	0	0
	Porter	2,059	2,059	69%	1,102	313	0	0
	Sharp Hollow	4,935	4,935	10%	384	85	0	0
	Stermer	3,308	3,308	17%	209	179	0	166
	Unallocated	0	0	0%	0	0	0	0
Blue Ridge	Admin Pasture	106	106	82%	88	0	0	0
	Cattle Exclosure	16	16	0%	0	0	0	0
	Chimney	652	650	14%	88	0	0	0
	Chimney 1	391	391	41%	162	0	0	0
	Chimney 2	303	303	68%	204	0	0	0
	Jaques Marsh	220	220	19%	41	0	0	0
	North Blue Ridge	4,021	4,021	0%	0	0	0	0
	Scotts	462	462	0%	2	0	0	0
	South Blue Ridge	4,226	4,226	0%	0	0	0	0
	Twin Knoll	1,020	1,020	0%	2	0	0	0
Unallocated	212	212	57%	121	0	0	0	

Brown Creek	Cattle Enclosure 1	2	2	42%	1	0	0	0
	Cattle Enclosure 2	17	17	0%	0	0	0	0
	Cattle Enclosure 3	104	104	3%	3	0	0	0
	Cattle Enclosure 4	62	62	0%	0	0	0	0
	Elk Enclosure	3	3	97%	3	0	0	0
	Marshall	4,695	4,690	6%	299	0	0	0
	Penrod Holding	258	105	32%	83	0	0	0
	Turkey	4,796	4,796	0%	4	0	0	0
Buck Springs	Brushy	2,777	2,777	1%	16	0	0	0
	Brushy Flat Enclosure	14	14	100%	14	0	0	0
	Brushy Flat Tank	3	3	0%	0	0	0	0
	Brushy Spring Enclosure	1	1	67%	1	0	0	0
	Buck Springs	3,365	3,365	0%	0	0	0	0
	Buck Springs Tank	11	11	0%	0	0	0	0
	Elk Springs	2,089	2,089	0%	0	0	0	0
	Lion Tank	2	2	0%	0	0	0	0
	Tank 1	2	2	0%	0	0	0	0
	Tank 2	3	3	0%	0	0	0	0
	Whitcom Holding 1	134	134	0%	0	0	0	0
	Whitcom Holding 2	98	98	0%	0	0	0	0
	Whitcom Trap	8	8	0%	0	0	0	0
Chevelon Canyon	Alder H.P.	264	264	0%	0	0	0	0
	Breed	8,439	8,439	89%	756	5,714	955	102
	Circle Bar	10,887	10,887	100%	1,356	9,198	333	0
	Nagel H.P.	208	208	100%	15	194	0	0
	Sandpoint	8,914	8,914	31%	453	1,961	305	0
	Vigil-Durfee	11,623	5,987	0%	0	0	0	0
Clay Springs	+IL	3,845	115	0%	0	0	0	0
	Summer North	4,530	4,530	1%	42	0	0	0
	Summer South	6,687	6,687	1%	48	0	0	1
Clear Creek	South	7,855	757	1%	43	0	0	0
Ellsworth	East Ellsworth	1,227	1,222	33%	401	0	0	0
	West Ellsworth	769	767	82%	627	0	0	0
Heber	Bunger	21,893	21,893	20%	759	2,109	0	1,423

	Gentry	17,906	17,906	3%	360	70	0	49
	H.P.	595	595	1%	5	0	0	0
	Halter Cross	7,410	1,850	1%	42	0	0	0
	HP #2	13	13	100%	0	13	0	0
	Mud Tank	13,220	5,740	25%	213	3,140	0	0
	Nelson	11,007	11,007	96%	1,551	8,759	239	0
	Oil Well	13,608	1,390	10%	102	1,288	0	0
	Phoenix Park	23,801	23,801	0%	39	0	0	0
Johnson	Johnson	740	739	64%	475	0	0	0
Lake Mountain	Brown Creek	9	9	91%	8	0	0	0
	Brown Springs	121	121	2%	2	0	0	0
	Cattle Enclosure AZ G&F	6	6	100%	6	0	0	0
	Doyle	3,539	3,539	11%	384	0	0	0
	Enclosure 1	74	74	0%	0	0	0	0
	Enclosure 12	13	13	0%	0	0	0	0
	Enclosure 13	9	9	0%	0	0	0	0
	Enclosure 17	3	3	82%	3	0	0	0
	Enclosure 2	4	4	0%	0	0	0	0
	Enclosure 3	14	14	0%	0	0	0	0
	Enclosure 4	8	8	5%	0	0	0	0
	Enclosure 9	21	21	0%	0	0	0	0
	Firebox	3,091	3,091	54%	737	317	620	0
	Holding	148	148	100%	142	6	0	0
	Holding 1	117	117	27%	32	0	0	0
	Holding 2	228	228	60%	137	0	0	0
	Lake Mountain	5,578	5,578	22%	1,092	125	5	0
	Los Burros	211	211	24%	51	0	0	0
	Mineral	4,182	4,182	29%	1,200	0	0	0
	Porter Lake	1,028	1,027	8%	83	0	0	0
	Porter Trap	15	15	87%	13	0	0	0
	Quakie	1,426	1,422	5%	51	22	0	0
	Reservation	2,509	2,509	16%	185	188	40	0
	Section 1 Tank	5	5	73%	3	0	0	0
	Unallocated	80	80	100%	80	0	0	0
		111	111	47%	52	0	0	0
	Wolf Mountain	3,776	3,776	50%	640	519	741	0
Limestone	Double Cabin	9,368	9,368	100%	1,217	4,375	3,148	598
	Five Mile	8,622	8,622	90%	2,614	4,040	1,074	0
	Hart Canyon H.P.	232	232	100%	157	74	0	0
	Ohaco	11,836	11,836	100%	3,108	6,257	2,406	63
	Pius Farm #1 H.P.	223	223	100%	222	1	0	0

	Pius Farm #2 H.P.	707	707	100%	324	104	279	0
	Tentground	9,164	9,164	100%	493	7,600	1,071	0
	Wilkins	9,059	9,059	38%	0	2,959	468	0
Long Tom	Long Tom	74,855	64,371	7%	2,319	2,294	464	44
Ortega	Woolhouse	2,835	26	1%	16	0	0	0
Park-Day Wash	Park	4,337	1,528	1%	62	0	0	0
Pinyon	East	845	441	38%	318	0	0	0
Railroad	Bear Canyon	6,658	6,658	0%	3	0	0	0
	Blue Grass	5,321	1,370	0%	14	0	0	0
	Brittenham Holding	162	162	0%	0	0	0	0
	Bull	309	309	0%	0	0	0	0
	Capps	1,674	439	0%	0	0	0	0
	Deer Lick	1,573	1,573	99%	189	933	0	428
	East Bull	731	731	0%	0	0	0	0
	East Cottonwood	4,450	4,450	0%	4	6	0	6
	Fence Tank	9,247	9,241	24%	622	481	0	1,091
	Lons	9,209	9,209	48%	1,000	1,374	127	1,912
	McNeil East	2,949	2,949	31%	673	250	0	0
	McNeil West	989	989	0%	0	0	0	0
	Middle	806	430	0%	0	0	0	0
	Mortensen	1,552	2	0%	0	0	0	0
	Mortensen Holding	668	663	11%	76	0	0	0
	Owens	1,287	492	0%	0	0	0	0
	Pinedale	2,177	2,177	15%	51	219	0	54
	Rattlesnake	3,914	4	0%	0	0	0	0
	South Juniper Ridge	2,377	2,377	21%	23	210	0	278
	Wilson	4,614	4	0%	0	0	0	0
	Winter	1,701	1,652	0%	0	0	0	0
Show Low	Porter	8,244	8,243	11%	897	0	0	0
	Second Knoll	3,292	13	0%	8	0	0	0
Sponsellor	East Sponsellor	2,978	197	0%	0	0	0	0
	Holding 1	416	416	1%	2	0	0	0
	Holding 2	162	162	0%	0	0	0	0
	South Sponsellor	5,825	5,825	0%	0	0	0	0
	West Sponsellor	2,160	912	26%	555	0	0	0
Town Tank	East Town Tank	558	558	0%	0	0	0	0
	Holding	83	83	96%	79	0	0	0
	Polson	1,020	1,020	95%	96	140	0	735
	West Town Tank	1,393	1,393	19%	3	0	0	268

Wallace	Barney	6,463	6,463	0%	8	0	0	0
	FS.H.P.	147	147	0%	0	0	0	0
	Gramma	6,931	6,931	70%	98	3,891	875	0
	Tillman	9,928	1,638	0%	41	0	0	0
	Wall H.P.	343	343	0%	0	0	0	0
	Waters	11,200	11,200	98%	2,697	7,680	419	215
Wildcat	Buckhorn	5,523	5,523	20%	278	838	0	0
	Daze	4,400	4,400	1%	62	0	0	0
	Ellsworth	4,155	4,155	17%	216	399	83	0
	H.P.#1	1,295	1,155	2%	25	0	0	0
	Hanks	5,416	5,416	53%	173	2,682	3	0
	Research Natural Area	334	211	0%	0	0	0	0
Willow Wash	Aztec	4,130	4,130	21%	237	61	0	559
	Bear Springs	4,497	4,497	27%	584	301	0	340
	Cottonwood	6,203	6,203	53%	1,001	559	0	1,752
	East Sundown	3,745	63	0%	0	0	0	0
	Phelps	4,256	4,256	25%	135	117	0	805
	Ranch	2,631	2,556	0%	9	0	0	0
	Sackett	3,875	2,762	4%	168	0	0	0
	West Sundown	4,620	982	0%	0	0	0	0
	Yarrow	2,414	2,414	0%	0	0	0	0
13-Mile Rock	Good Enough	755	650	86%	5	535	110	0
	Horse Water Lot	1	1	100%	0	1	0	0
	Jack Pine Water Lot	2	2	0%	0	0	0	0
	Lone Pine Water Lot	8	8	100%	8	0	0	0
	Meadow Canyon North	1,443	673	25%	354	0	0	0
	Meadow Canyon South	1,896	1,084	25%	478	0	0	0
	New Tank Holding	16	16	0%	0	0	0	0
	Section 8 Water Lot	4	4	8%	0	0	0	0
	Toms	3,516	3,353	95%	100	2,137	1,116	0
	Tule	2,487	2,381	36%	902	0	0	0
	Tule Holding	72	72	35%	26	0	0	0
	Tule Waterlot	3	3	0%	0	0	0	0
	Wilbur	2,558	2,281	67%	190	1,049	478	0
	Wilbur 2 Waterlot	1	1	100%	1	0	0	0

Apache Maid	61 Water Lot	4	4	0%	0	0	0	0
	Bargaman	875	875	93%	163	121	529	0
	Bargaman Flat	146	146	95%	124	9	6	0
	Blind Lake	7,497	7,379	5%	401	0	0	0
	Blind Lake Horse	330	1	0%	0	0	0	0
	Bull	665	301	3%	19	0	0	0
	Cabin	518	490	50%	257	0	0	0
	Campbell Spring	9,348	9,348	3%	314	0	0	0
	Dave's Water Lot	4	2	0%	0	0	0	0
	Foster Spring Exclosure	4	4	65%	2	0	0	0
	Gash Flat East	1,398	8	0%	1	0	0	0
	Gash Flat Middle	668	8	1%	5	0	0	0
	Gash Flat West	918	1	0%	0	0	0	0
	Horse Summer	203	203	31%	63	0	0	0
	Horse Trap Water Lot	2	2	0%	0	0	0	0
	Hutch	7,600	2,293	26%	376	533	1,034	0
	Maid Holding	155	155	97%	151	0	0	0
	Pine Mountain East	7,003	6,898	15%	1,061	0	0	0
	Pine Mountain West	6,958	6,958	62%	1,029	2,086	1,221	0
	Pine Ridge Water Lot	3	3	0%	0	0	0	0
	Sawmill	6,727	2,170	3%	179	7	0	0
	Shipping Lane East	660	660	32%	208	0	0	0
	Shipping Lane West	460	460	37%	68	20	83	0
	Snake Tanks	6,719	1,006	9%	612	0	0	0
	Stoneman	8,394	3,447	16%	1,307	0	0	0
	Sue's Water Lot	8	8	84%	7	0	0	0
	T-Bar Cabin	29	29	47%	13	0	0	0
	T-Bar Cabin #1	77	73	90%	69	0	0	0
	T-Bar Cabin #2	253	248	76%	193	0	0	0
	T-Bar Tank 2 Exclosure	5	5	81%	4	0	0	0
	Wild Horse	7,550	7,550	1%	53	0	0	0
	Woodland	7,354	2,727	10%	741	0	0	0
Baker Lake/Calf Pen	Baker Lake	2,476	2,476	72%	697	965	108	0
	Brush	3,660	3,410	6%	216	0	0	0

	Calf Pen 7	283	283	2%	5	0	0	0
	Cinch Hook	1,017	1,017	100%	437	579	0	0
	Five Mile	1,014	1,014	100%	595	303	0	117
	Highway Junction	728	728	93%	316	260	100	0
	Milk Ranch	3,338	3,338	100%	1,684	1,618	35	0
	Pocket	3,031	2,060	0%	0	0	0	0
	Strawberry Point	1,184	1,184	100%	606	578	0	0
	Twentynine Mile Lake	1,474	1,447	0%	0	0	0	0
Bar T Bar	064	164	164	2%	3	0	0	0
	075	42	6	15%	4	3	0	0
	090	21	21	0%	0	0	0	0
	092	39	39	100%	39	0	0	0
	099	87	87	0%	0	0	0	0
	Baucom	1,273	1,273	32%	402	0	0	0
	Boulder Waterlot	11	11	34%	4	0	0	0
	Buckhorn	11,480	11,480	92%	1,972	4,024	2,966	1,560
	Buckhorn Waterlot	2	2	100%	0	0	0	2
	Clinton's Pool	1,367	1,367	54%	734	0	0	0
	Clint's	827	827	2%	19	0	0	0
	Clints Waterlot	10	10	29%	3	0	0	0
	David's	895	895	0%	4	0	0	0
	Duke Waterlot	3	3	100%	3	0	0	0
	East Green Howard	3,984	3,984	62%	2,460	0	0	0
	East Melatone	6,517	2,611	14%	915	0	0	0
	Fisher	9,683	9,261	10%	566	407	0	0
	Girlscout	13	13	0%	0	0	0	0
	Green Waterlot	6	6	0%	0	0	0	0
	Hay Lake 1	2,173	943	13%	292	0	0	0
	Hay Lake 10	434	434	24%	103	0	0	0
	Hay Lake 2	306	28	4%	12	0	0	0
	Hay Lake 3	341	136	29%	100	0	0	0
	Hay Lake 4	253	253	50%	127	0	0	0
	Hay Lake 5	128	128	81%	104	0	0	0
	Hay Lake 7	41	41	100%	41	0	0	0
	Hay Lake 8	94	94	100%	94	0	0	0
	Hay Lake 9	412	412	37%	153	0	0	0
	Home	304	304	0%	0	0	0	0
	Homestead Waterlot	4	4	100%	4	0	0	0

	Horse	490	490	0%	0	0	0	0
	Horse Trap 1	77	77	63%	49	0	0	0
	Horse Trap 2	24	24	80%	19	0	0	0
	Janice	1,716	1,716	32%	544	0	0	0
	Lane	113	113	96%	79	29	0	0
	Lost Eden Horse	181	181	100%	179	2	0	0
	Lost Eden Waterlot	16	16	100%	12	4	0	0
	Mary's	1,124	1,124	97%	356	620	110	0
	Marys Waterlot	4	4	98%	4	0	0	0
	Mesa Waterlot	2	2	100%	2	0	0	0
	Monty's	666	666	17%	113	0	0	0
	Montys Waterlot	52	52	45%	24	0	0	0
	Moqui	39	39	78%	30	0	0	0
	Moqui East	67	67	100%	9	0	0	58
	Moqui West	16,443	16,443	20%	534	961	998	719
	Park	818	818	3%	27	0	0	0
	Prairie Dog	3,178	3,178	21%	678	0	0	0
	PW Waterlot	4	4	100%	4	0	0	0
	Sarah's	1,131	1,131	77%	92	451	325	0
	Todd	186	186	100%	180	6	0	0
	Trap 1	201	201	18%	37	0	0	0
	Trap 2	312	312	100%	1	293	18	0
	Turkey Mountain	2,005	2,005	63%	1,254	0	0	0
	Turkey Mountain Waterlot	10	10	11%	1	0	0	0
	Two Eleven	138	138	0%	0	0	0	0
	Victorine Waterlot	2	2	100%	0	2	0	0
	West Green Howard	5,106	5,106	39%	1,992	0	0	0
	West Melatone	3,821	611	14%	525	0	0	0
	Wilkins	15,129	12,650	66%	1,884	6,513	0	1,556
	Wochner	1,550	1,550	37%	573	0	0	0
	Woods Water Lot	9	9	0%	0	0	0	0
	Y7 Waterlot	14	14	0%	0	0	0	0
	Yellowjacket	13,244	13,244	36%	1,632	1,911	1,208	0
Beaver Creek	072	32	32	100%	7	25	0	0
	Antelope	529	202	26%	139	0	0	0
	Antelope Water Lot	14	5	24%	3	0	0	0
	Banfield	448	448	0%	2	0	0	0

	Bar D	2,153	2,153	1%	12	0	0	0
	Bar-D Water Lot	2	2	97%	2	0	0	0
	Brady North	2,139	1,994	42%	894	0	0	0
	Brady South	2,226	2,226	11%	241	0	0	0
	Brady Water Lot	6	6	45%	3	0	0	0
	Buck Mountain	4,308	4,308	27%	460	675	26	0
	Crossing	503	503	12%	13	47	0	0
	Divide Water Lot	4	4	0%	0	0	0	0
	Fred's Water Lot	2	2	0%	0	0	0	0
	Goswick	1,522	1,522	2%	26	0	0	0
	Goswick Holding	84	84	0%	0	0	0	0
	Happy Jack	4,336	4,336	0%	0	0	0	0
	Hollingshead East	257	257	3%	7	0	0	0
	Hollingshead West	2,110	2,110	1%	26	0	0	0
	Horse Knoll	1,392	522	26%	361	0	0	0
	Jose Water Lot	2	2	0%	0	0	0	0
	Landmark North	4,683	4,683	8%	366	1	0	0
	Landmark Shipping	861	861	60%	435	78	0	0
	Landmark South	4,245	4,245	27%	120	436	575	0
	Lower Jacks	2,540	2,540	0%	3	0	0	0
	May's Water Lot	2	2	0%	0	0	0	0
	Pine Ridge	1,214	82	7%	82	0	0	0
	Schroeder Water Lot	2	2	0%	0	0	0	0
	Sheep Water Lot	2	2	56%	1	0	0	0
	Shipping #1	751	751	0%	0	0	0	0
	Shipping #2	966	966	0%	0	0	0	0
	Shipping #3	660	660	0%	0	0	0	0
	Triangle	3,546	3,546	3%	104	0	0	0
	Upper Jacks	3,483	3,483	0%	1	0	0	0
	Waldroup	1,202	1,202	30%	83	279	0	0
	Woodland	2,025	743	4%	89	0	0	0
Buck Springs	Burn	639	639	0%	0	0	0	0
	Dines	1,103	1,103	100%	175	824	104	0
	Double North	2,129	2,129	1%	12	0	0	0
	Forest Service	412	412	100%	129	216	67	0
	Genes	69	69	100%	62	7	0	0
	Holding/Horse	158	158	0%	0	0	0	0
	Jumbo	1,527	1,527	0%	2	0	0	0

	Knolls	1,171	1,171	100%	725	446	0	0
	Lane	82	82	100%	22	60	0	0
	Limestone	172	172	100%	90	82	0	0
	McCarty	2,536	2,536	2%	39	0	0	0
	Moonshine	1,287	1,287	100%	570	593	124	0
	North	9,459	9,459	96%	1,948	4,783	2,303	51
	North Battleground	5,445	5,445	3%	143	0	0	0
	North Holding	78	78	100%	39	39	0	0
	North McClintock	2,052	2,052	98%	453	953	607	0
	North Pinchot	5,883	5,883	38%	441	1,227	548	0
	Schneider	101	101	100%	23	78	0	0
	South Battleground	7,595	7,595	7%	202	169	27	107
	South Pinchot	2,980	2,980	63%	205	598	1,060	0
	Steer	243	243	100%	178	65	0	0
Buckhorn	Brushy	520	520	3%	15	0	0	0
	Brushy Holding	15	15	0%	0	0	0	0
	Buckhorn	2,623	63	2%	56	0	0	0
	Buckhorn Horse	277	277	43%	118	0	0	0
	Clover	2,753	2,753	0%	0	0	0	0
	Dirty Name	728	728	16%	117	0	0	0
	Dukey	2,375	2,375	1%	34	0	0	0
	Experimental	1,260	1,260	0%	0	0	0	0
	Maxwell Holding	12	12	0%	0	0	0	0
	Maxwell North	1,524	1,524	16%	246	0	0	0
	Maxwell Waterlot	4	4	0%	0	0	0	0
	Oak Grove Water Lot	5	5	100%	5	0	0	0
	Oak North	2,125	2,125	60%	1,282	0	0	0
	Pecks Point Water Lot	3	3	0%	0	0	0	0
	Snake Water Lot	2	2	0%	0	0	0	0
	Walker Water Lot	2	2	0%	0	0	0	0
	Willow	3,448	3,448	2%	70	0	0	0
Fossil Creek	Manzanita	1,049	0	0%	0	0	0	0
	Salmon Lake	804	2	0%	1	0	0	0
Hackberry/Pivot Rock	009	74	74	7%	5	0	0	0
	011	59	59	2%	1	0	0	0
	012	9	9	0%	0	0	0	0

	013	31	31	0%	0	0	0	0
	142A Water Lot	1	1	0%	0	0	0	0
	Baker	1,791	1,791	0%	3	0	0	0
	Bald 4	3,874	3,874	2%	67	0	0	0
	Bed Bug East	983	983	3%	29	0	0	0
	Bed Bug West	2,263	2,263	2%	35	0	0	0
	Calloway	4,525	4,525	79%	430	2,939	196	0
	Calloway Gathering	20	20	100%	6	15	0	0
	Clear Creek	1,490	1,490	4%	62	0	0	0
	Corral	633	629	0%	0	0	0	0
	Dry Lake	1,930	1,930	2%	35	0	0	0
	Fuller Water Lot	1	1	0%	0	0	0	0
	Good Enough Water Lot	1	1	100%	0	1	0	0
	Horse	473	473	1%	3	0	0	0
	Huffer	2,453	2,453	2%	52	0	0	0
	Kehl	7,586	7,710	16%	489	504	5	195
	Lee Johnson Water Lot	0	0	100%	0	0	0	0
	Long Valley	323	323	0%	0	0	0	0
	Long Valley Water Lot	5	5	0%	0	0	0	0
	Miller	4,622	4,501	2%	101	0	0	0
	Neck 1	826	826	0%	1	0	0	0
	Neck 2	1,417	1,417	2%	25	0	0	0
	Neck 3	242	242	17%	41	0	0	0
	Potato North	1,556	1,556	1%	13	0	0	0
	Potato South	1,679	1,679	10%	131	40	0	0
	Sandrock	1,047	1,044	27%	281	0	0	0
	Sandrock Draw Water Lot	4	4	0%	0	0	0	0
	Shipping	639	639	2%	12	0	0	0
	Toms Creek	10,325	10,304	94%	911	6,001	2,815	0
	Twentyseven Mile	2,733	2,532	1%	15	0	0	0
	Vickers Water Lot	1	1	0%	0	0	0	0
	Water Lot	0	0	0%	0	0	0	0
		0	0	0%	0	0	0	0
		1	1	0%	0	0	0	0
		1	1	0%	0	0	0	0
		2	2	0%	0	0	0	0

	Wingfield	594	594	1%	8	0	0	0
Walker Basin	020	3	3	0%	0	0	0	0
	Aztec Water Lot	3	3	100%	0	3	0	0
	Banfield	3,833	3,833	24%	274	659	0	0
	Banfield Water Lot	3	3	0%	0	0	0	0
	Cherry Tree Water Lot	6	6	33%	2	0	0	0
	East Snake Ridge	1,765	1,765	10%	180	0	0	0
	Harris Meadow Water Lot	3	3	72%	2	0	0	0
	Harris Water Lot	27	27	73%	20	0	0	0
	Horse Knoll	6,273	3,818	30%	1,859	0	0	0
	Kitty Pan Water Lot	3	3	0%	0	0	0	0
	Lucky Water Lot	8	8	100%	4	4	0	0
	Mahan Horse	258	258	5%	12	0	0	0
	Mahan Park	160	160	55%	88	0	0	0
	Mesa Water Lot	3	3	0%	0	0	0	0
	Middle Snake Ridge	2,024	2,024	57%	1,148	0	0	0
	Peewee Water Lot	3	3	100%	3	0	0	0
	Pine	3,206	3,206	92%	1,230	1,722	0	0
	Sams Butte Water Lot	2	2	67%	1	0	0	0
	Snake Ridge Water Lot	1	1	100%	1	0	0	0
	Steer	2,860	2,860	9%	193	76	0	0
	Summer Heifer	1,369	1,369	10%	143	0	0	0
	Toilet Paper Water Lot	3	3	0%	0	0	0	0
	Turkey Draw Water Lot	8	8	0%	0	0	0	0
	Underpass	510	510	100%	7	503	0	0
	West Snake Ridge	1,882	1,540	43%	801	0	0	0
Willow Valley	Antelope	1,191	1,191	87%	130	908	1	0
	Bushy Knoll Waterlot	3	3	100%	0	3	0	0
	D7	791	791	100%	93	696	2	0
	Deer	725	725	88%	206	435	0	0
	Gathering Pasture	71	71	54%	38	0	0	0

	Mud Lake	1,373	1,373	30%	32	340	0	35
	North Riparian	236	236	100%	153	84	0	0
	Randall	260	260	100%	152	108	0	0
	South Riparian	126	126	99%	117	8	0	0
Windmill	Luke Mountain	10,202	34	0%	0	0	0	0
13 Ranch	Gordon Pasture	112	112	100%	42	70	0	0
		2,186	2,186	96%	873	254	967	0
	Highway 260 Pasture	1,377	1,377	58%	564	189	40	0
	Horse Pasture	257	257	28%	32	39	0	0
	Hunter Pasture	3,201	3,201	89%	1,756	476	631	0
	North Pasture	3,309	3,309	100%	980	736	1,592	0
	Snowshoe Pasture	4,471	4,471	100%	3,052	1,417	3	0
A - Cross	Rose Creek Pasture	1,872	0	0%	0	0	0	0
Armer Mountain	Hopkins Pasture	7,978	4,836	59%	870	3,499	58	285
	Salome Pasture	6,276	0	0%	0	0	0	0
Bar X	Bar X Pasture	687	687	98%	171	502	0	0
	Cross Y II Pasture	1,411	1,411	99%	896	505	0	0
	Haigler Pasture	1,179	1,163	98%	851	310	0	0
	Lower Dry Creek	1,464	703	48%	683	20	0	0
	Upper Dry Creek	1,412	1,132	64%	721	182	0	0
	Westhole Pasture	1,182	477	40%	85	392	0	0
Bryant Mountain	Bryant Pasture	2,684	12	0%	0	0	0	0
Buzzard Roost	Buzzard Roost Pasture	3,549	681	19%	14	666	0	0
	Cataract Tank Holding Pasture	53	53	24%	0	2	10	0
	Copper Mountain Pasture	10,649	8,080	21%	180	2,001	44	0
	Dinner Creek Pasture	549	549	0%	0	0	0	0
	Headquarters Pasture	746	746	99%	0	733	0	2
	Holding Pasture	151	151	0%	0	0	0	0
	Indian Camp Reservoir	4	4	0%	0	0	0	0
	Jerky Butte Pasture	2,069	1,771	23%	25	446	0	0

	Juniper Flat Holding Pasture	1,096	88	0%	0	0	0	0
	Juniper Flat Pasture	941	533	0%	0	0	0	0
	Lacy Holding Pasture	251	251	100%	0	236	14	0
	Middle Pasture	9,061	9,061	48%	228	3,552	400	201
	North Shipping Pasture	741	325	1%	7	0	0	0
	Pine Mountain Pasture	9,723	9,512	50%	1,063	3,002	770	0
	Redman Mesa Pasture	4,458	4,458	48%	142	1,973	7	0
	Redman Mesa Tank Holding Pasture	16	16	0%	0	0	0	0
	Shipping Pasture	83	72	0%	0	0	0	0
	Thoroughbred Pasture	2,975	1,750	21%	28	604	0	0
	Trap	2	2	0%	0	0	0	0
		3	3	0%	0	0	0	0
		3	3	0%	0	0	0	0
		4	4	0%	0	0	0	0
		7	7	0%	0	0	0	0
		9	9	92%	3	5	0	0
Cedar Bench	FU Pasture	318	318	76%	31	211	0	0
	Open Pasture	3,311	1,161	2%	27	44	0	0
	Ranch Pasture	691	691	82%	117	445	5	0
	YH Pasture	374	374	0%	0	0	0	0
Center Mountain	North Pasture	4,430	1,204	0%	17	0	0	0
	South Pasture	5,323	164	0%	0	0	0	0
Cherry Creek	Cherry Holding Pasture	931	100	3%	31	0	0	0
	Dinner Pasture	7,208	3,825	0%	12	0	0	0
	Olligar Pasture	6,062	117	0%	0	0	0	0
	South Cherry Pasture	10,070	16	0%	0	0	0	0
	Squaw Holding Pasture	393	5	0%	0	0	0	0
Christopher Mountain	Highway 260 West Pasture	3,012	3,012	100%	1,153	1,253	607	0
	Holding Pasture	239	239	100%	200	30	9	0
		626	626	100%	185	434	7	0

	Mescal Ridge Pasture	5,218	2,759	50%	1,229	1,286	115	0
Cross V	Bean Patch Pasture	3,641	13	0%	0	13	0	0
	Beaver Valley	2,714	142	5%	0	139	3	0
	Brody Pasture	2,164	2,164	64%	218	1,004	2	167
	Diamond Pasture	4,219	4,099	95%	479	3,200	319	0
	Dry Dude Pasture	1,825	1,825	41%	0	0	0	742
	East Verde Pasture	9,517	9,187	90%	2,558	3,219	213	2,604
	Star Valley Pasture	5,844	14	0%	0	14	0	0
	Trap	2	2	100%	0	2	0	0
Crouch Mesa	Brewer Pasture	1,304	0	0%	0	0	0	0
	Deadman Pasture	1,034	417	1%	13	0	0	0
	Mesa Pasture	2,682	104	4%	67	37	0	0
Dagger	Oak Creek Mesa Pasture	17,985	1,840	0%	1	0	0	0
Deadman Mesa	Nash Point Pasture	394	388	62%	193	50	0	0
	Upper Fossil Creek Pasture	3,241	62	2%	61	0	0	0
	Upper Mesa Pasture	2,061	347	2%	16	23	0	0
Del Shay	Del Shay Pasture	3,703	0	0%	0	0	0	0
Ellinwood	Cottonwood Pasture	8,644	6,119	14%	68	1,178	0	0
	Highway 260 East Pasture	4,639	4,639	95%	1,813	639	1,890	59
	Horse Mountain Pasture	3,961	3,219	79%	1,366	1,434	343	0
	Hunter Creek Pasture	931	931	90%	375	447	19	0
Flying V	Gentry Pasture	3,036	1,943	64%	219	1,163	561	0
Frio Canyon	Deadman Pasture	4,232	1,539	0%	8	0	0	0
	Dump Pasture	3,674	706	1%	48	0	0	0
	North Turkey Pasture	909	42	0%	0	0	0	0
	South Turkey Pasture	1,239	1	0%	0	0	0	0
Gentry Mountain	Gentry Pasture	4,356	1,172	23%	976	0	44	0
	Sheep Pasture	4,953	4,494	84%	2,508	1,583	61	0

Green Valley	Bonita Pasture	3,201	3,201	47%	104	556	0	844
	Diamond Pasture	10,843	10,098	69%	2,661	3,853	872	129
	Ellison Pasture	2,090	2,090	4%	60	14	0	3
	Holding Pasture	68	68	49%	33	0	0	0
		280	115	41%	107	8	0	0
		360	348	96%	337	10	0	0
	Kings Ridge Pasture	5,516	3,005	21%	685	460	16	0
	Moore Pasture	4,189	4,189	14%	167	0	0	412
	Myrtle-Pyeatt Pasture	3,885	3,885	69%	1,244	1,409	16	0
	Ponderosa Pasture	1,497	1,497	85%	702	571	0	0
	Trap	3	3	100%	0	3	0	0
	Upper Neal Pasture	1,940	93	5%	2	90	0	0
	Winter Division Pasture	10,057	188	2%	77	105	0	0
Greenback	Basin Pasture	15,008	0	0%	0	0	0	0
Haigler Creek	Cross Y Pasture	1,045	1,045	93%	660	298	13	0
	Oxbow Pasture	3,099	2,937	94%	664	2,227	27	0
Hardscrabble	Button Flat Pasture	1,846	1,254	11%	131	67	0	0
	Hardscrabble Pasture	98	98	100%	0	98	0	0
	Natural Bridge Pasture	2,274	45	0%	0	0	0	0
	Pine Pasture	5,527	3,659	58%	1,081	2,081	42	0
	Rock Creek Pasture	3,169	39	0%	0	0	0	0
	Trap	1	1	100%	0	1	0	0
		2	1	0%	0	0	0	0
		5	5	0%	0	0	0	0
	UA Pasture	225	225	0%	0	0	0	0
Heber-Reno Sheep Driveway	Sheep Driveway	4,233	4,233	99%	614	278	208	3,110
		11,463	6,380	43%	2,693	971	1,246	0
Indian Gardens	Dead Horse Pasture	2,155	2,155	98%	985	980	151	0
	Dick Williams Pasture	6,633	6,633	90%	1,953	1,083	1,489	1,440
	Roberts Mesa North Pasture	270	270	0%	0	0	0	0
		3,644	3,644	8%	83	68	0	140

	Roberts Mesa South Pasture	3,435	3,435	99%	1,542	1,748	108	0
O.W.	East Canyon Creek Pasture	1,026	1,015	99%	172	184	0	659
	Headquarters North Pasture	88	88	100%	88	0	0	0
	Headquarters South Pasture	86	86	100%	31	0	34	21
	Mule Creek Pasture	1,079	1,076	100%	215	52	434	374
	West Canyon Creek Pasture	2,080	2,080	100%	186	31	1,192	671
Payson	Boy Scout Pasture	9,571	9,324	96%	2,164	2,841	3,004	1,156
	Girl Scout Pasture	10,079	10,072	99%	2,807	4,506	1,782	913
	Hells Half Acre Pasture	7,298	1,156	16%	326	830	0	0
	Holding Trap	6	6	100%	0	6	0	0
Pine	Buckhead Holding Pasture	269	269	0%	0	0	0	0
	Cedar Mesa North Pasture	6,481	6,456	76%	2,332	2,515	65	0
	Cedar Mesa South Pasture	2,660	83	1%	0	16	0	0
	Red Hills Pasture	2,451	740	0%	0	2	0	0
	Strawberry Mountain Pasture	2,164	2,164	97%	1,177	347	579	0
	Strawberry Point Pasture	2,227	2,227	96%	1,318	739	36	35
Pleasant Valley	Haught Pasture	537	13	0%	1	0	0	0
	Northeast Pasture	2,251	47	2%	9	38	0	0
Red Lake	Frog Pasture	3,725	3,725	100%	2,844	595	272	0
	Ramer Tank	2	2	100%	2	0	0	0
	Red Lake Pasture	9,699	9,699	100%	6,377	1,799	992	532
	Second Pasture	5,806	5,806	74%	3,020	1,187	78	0
Seventy Six	Coffeepot Pasture	5,921	2	0%	0	0	0	0
Tonto Basin	Clover/Bearhead Pasture	36,364	17,176	5%	123	476	0	1,387
	Holding Pasture	98	98	100%	0	13	0	85
		229	229	38%	0	0	0	87
		319	319	84%	1	267	0	0

Young	Round Mountain Pasture	2,466	2,181	66%	310	1,186	135	0
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Allotments such as the Black Canyon, Clay Springs, Heber, Railroad, Town Tank and the Willow Wash on the Apache-Sitgreaves NF and the Cross V, Green Valley, Indian Gardens, and the Tonto Basin Allotments on the Tonto would receive some portions of the acres severe disturbance treatments, but much less than in Alternative 2. The OW, and Payson Allotments and the Sheep Driveway would receive similar amounts.

Effects from Use of In-woods Processing and Storage Sites

The development and use of the proposed processing areas would make any potential forage unavailable to livestock grazing for approximately 20 years from their initial development. These processing sites would reduce the amount of forage available in these areas which could last up to 20 years. This effect would be small compared to the size of the allotment, and would likely have no noticeable effect on livestock management.

Cumulative Effects Analysis

The area considered for cumulative effects analysis includes 100 percent of the acres within allotments that occur within the project area. This is a logical boundary because changes to grazing management in one pasture of an allotment affect the management in the entire allotment.

If growing conditions are favorable, understory plants would generally recover from the effects of the proposed forest management activities within one to three years. If growing conditions are not favorable, plant recovery would occur more slowly (up to two to three years). Vegetation recovery from the other activities and natural events may take this long depending on annual weather conditions particularly annual precipitation.

Continuation of current management, absent the proposed treatments in the Rim Country project area, would result in further reductions in forage production over time with the increase in tree density. Past restoration projects within and close to the project area have increased forage and understory vegetation. Forest Service policy and forest plan direction is to manage for uneven-aged stands and allow fire to return to its nature role in ecosystems. Current grazing management uses adaptive management to meet objectives established in existing allotment management plans. Past vegetation and prescribed fire projects have resulted in the current resource conditions.

The cumulative effects on livestock grazing management and livestock forage from Alternative 1 would be no change in the short term, but would result in a long-term decrease in forage with the increase in tree density. The 4FRI Rim Country project area would not be treated with the additional activities proposed. When other current and reasonably foreseeable projects are considered, 282,290 acres would be treated (168,420 acres of mechanical thinning and 113,880 acres of burning) within the project area, in addition to the current/ongoing acres which includes 302,690 acres of mechanical and 538,180 acres of fuels treatments. The acreages shown under mechanical vegetation management and fuels treatments are not all mutually exclusive. There are many acres on which proposed fuels treatments (mechanical and prescribed fire) overlap with proposed mechanical vegetation management treatments. Livestock grazing management would be affected by these treatments; pastures would be rested and deferred as these

treatments are completed, as determined with inspections. With fewer treatment acres, relative to Alternative 2 and 3, there would be fewer effects on pasture rotations.

The treatments proposed in Alternatives 2 and 3 would occur in addition to the other current and reasonably foreseeable projects in the project area. Prescribed burning from either Alternative 2 or 3, or from other current and reasonably foreseeable projects, would produce a short term effect on forage on allotments within the project area, with a typical duration effects lasting one year after burning. In the long term, forage would increase on the acres treated throughout the cumulative effects analysis area (allotments throughout the project area). In terms of grazing management, even though forage would be reduced for a period of one to three years, design features applied in implementation of all projects would mitigate any effects on grazing management. Coordination among fire, silviculture, and range specialists as part of an implementation interdisciplinary team would result in minor adjustments to grazing management.

Irreversible and Irretrievable Commitments of Resources

Unavoidable Adverse Effects, Irreversible and Irretrievable Commitment of Resources, Compliance with the forest plan(s).

There would be no long term unavoidable adverse effects in any of the Alternatives related to livestock grazing because effects would be short term in nature and would not affect grazing permit capacity.

There are also no irreversible and irretrievable commitments of resources because forage grows back after treatments or after managed grazing.

The alternatives are in compliance with the Apache-Sitgreaves, Coconino, and Tonto Forest Plans' direction for livestock grazing.

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