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Southwestern Region

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FINAL

Environmental Assessment

Hassayampa Grazing Allotment Management

Bradshaw Ranger District, Prescott National Forest
Yavapai County, Arizona

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CHAPTER 1 – PURPOSE OF & NEED FOR ACTION

Introduction

The Prescott National Forest Interdisciplinary Range Analysis Team has conducted an environmental analysis and prepared this Environmental Assessment (EA) documentation in order to describe alternatives considered for management of the Hassayampa Grazing Allotment on the Bradshaw Ranger District and the potential effects associated with each alternative. The document is provided for public review and comment and for review and consideration by the decision maker. The analysis has been conducted in compliance with the National Environmental Policy Act (NEPA) and other relevant Federal and State laws and regulations.

The EA is based upon background information about the allotment including current and past inventory and monitoring data, the desired condition of resources on the allotment derived from direction and guidelines in the Prescott NF Land and Resource Management Plan (1987), as amended (Forest Plan), as well as from resource specialists' knowledge of the allotment. This information forms the basis for the current analysis of alternatives. Chapter 2 provides detailed descriptions of two grazing alternatives and the no action (no grazing) alternative. At the end of Chapter 2 is a summary table of anticipated effects to each resource area by alternative. Chapter 3 provides a more detailed account of the affected environment for each resource, current resource conditions, and anticipated effects of implementing the alternatives. Chapter 4 provides a list of preparers for the EA, as well as a summary of agencies, individuals, and organizations that were contacted while conducting public outreach. Supporting documents, including resource specialists' reports containing details of the existing condition and resource effects, are included in the project record.

Background

The Hassayampa Allotment is located on the Bradshaw Ranger District of the Prescott National Forest (PNF) and represents the project area for this analysis, an area of approximately 10,500 acres. The allotment is located in the southwestern portion of the District, approximately one-half mile southeast of Wilhoit, Arizona. The Forest boundary forms the allotment boundary on the west and the south sides of the allotment. (See maps in Appendix 1)

The Hassayampa Allotment is divided roughly down the middle, north to south, by the Hassayampa River. The landform along the river consists of numerous ridges with moderate to fairly steep slopes and narrow ridge tops. These ridges run east and west of the river. Elevation ranges from about 4,000 feet near Collins Spring on the south side of the allotment to 5,750 feet near Quartz Mountain on the north. The topography of the allotment is very steep in the northern region of the allotment to moderately steep throughout the remainder. A minor portion of the allotment is considered gently sloping with gradients less than 10% in the floodplain areas adjacent to the Hassayampa River. Allotment acreage within slope classes can be broken down as follows: 0-10% slope – 11%; 11-30% slope – 76%; 31-60% slope – 13%; above 60% slope – less than 1%.

Precipitation patterns in this area are bi-modal with monsoon events occurring during the summer and a second period of precipitation occurring within the winter season. Average annual precipitation across the area ranges from 17 to 20 inches. Precipitation data from a rain gauge on the Walnut Grove Ranch, about 5 miles southeast of the allotment, reveal a 6.77 inch

warm growing season average (June-September) and a 17.81 annual average from 1981 through 2008. Typical in the Southwest, the summer rains are very cyclic from year to year. In the period from 2001-2005 a prolonged period of below average growing season precipitation was apparent. In 2009 the summer rains were only 33% of average.

Vegetation on the allotment consists mainly of chaparral and pinyon-juniper. Canopy cover from shrub species is moderately to extremely thick in some locations to the extent that herbaceous forage is reduced or absent. The forage base of the allotment is primarily provided by desirable browse species such as mountain mahogany, deerbrush, Apache plume, and silktassel. Perennial grasses can be locally abundant, especially on south-facing slopes. Important forage grasses on the allotment include sideoats grama, black grama, blue grama, squirreltail, and curlymesquite.

Some non-native invasive species have been seen on this allotment. Isolated individual plants of Dalmatian toadflax and saltcedar are found in the Hassayampa River corridor. Treatment of noxious weeds is addressed in the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mohave and Yavapai Counties, Arizona. Treatment of invasive plant populations will be managed under the Forest's noxious weeds program and will not be further addressed in this analysis.

The Hassayampa River through this allotment has an interrupted, intermittent flow regime with some segments exhibiting surface ephemeral characteristics due to subsurface flows in the Orofino and Middlewater pastures. There are pockets of old growth Fremont cottonwood stands in the Quartz Mountain pasture with mature cottonwood and mixed stands of riparian saplings in the south end of the Middlewater and in the Carter pasture. Herbaceous vegetation is sparse throughout the river floodplain. Net leaf hackberry, desert willow, seep willow, desert broom, burro brush, and mesquite make up the woody components associated with the ephemeral river corridor in the Middlewater and Orofino pastures.

There are several unpatented mining claims and high use recreation activity throughout the allotment. Recreation is primarily associated with gold panning, shooting, and off-highway vehicle use.

History of Use

The currently configured Hassayampa Allotment, comprised of the previous Hassayampa and Orofino Allotments, is permitted for 49 head of cattle, cow/calf, yearlong. It has been managed for a total of 588 animal-unit-months (AUMs) of forage-use since 1993. An AUM is defined here as a measure of the average amount of forage consumed by one cow-calf pair over the course of one month. There are 6 pastures recognized on allotment maps: North Rootplow, South Rootplow, Quartz Mountain, Orofino, Middlewater, and Carter. In recent years, pasture division fences have not been maintained in the Rootplow pastures, so these areas are used concurrently when cattle are in either the Quartz Mountain or Orofino Pastures. The watergaps across the Hassayampa River have not been regularly maintained at the pasture divisions for the Quartz Mountain/Orofino and Middlewater/Carter Pastures.

The allotment has been managed recently by rotating the cattle between the four northern pastures used together (North and South Rootplow, Quartz Mountain, and Orofino) and the two southern pastures used together (Middlewater and Carter Pastures). Livestock grazing

generally occurs in the northern pasture group in the spring and summer then moves to the southern pastures in fall/winter, depending on water availability. There are 7 earthen stock tanks in the uplands, but these tanks are mostly unreliable. The reliable water sources are Middlewater Well adjacent to the Hassayampa River in the southern pasture group, Orofino Wash Well #2, about ½-mile west of the river in the northern pastures, and occasional water at Pothole Tank adjacent to the Hassayampa River in the Orofino Pasture. Sometimes there is seasonal water available in the Hassayampa River itself, especially in the Quartz Mountain Pasture below the concrete dam. It is recognized that lack of reliable water sources to support the entire herd in either the north or south pasture group alone has resulted in opening the gates between the north and south pastures and scattering cattle throughout the allotment at times.

Purpose of and Need for Action

The purpose of and need for action is to modify the authorization of livestock grazing on the Hassayampa Allotment in a manner consistent with the Prescott Forest Plan while meeting resource management objectives by applying adaptive management principles. Modification of the livestock grazing authorization is needed for the Hassayampa Allotment because:

- Where consistent with other multiple use goals and objectives, there is Congressional direction to provide for livestock grazing on suitable lands under the Multiple Use Sustained Yield Act of 1960, the Wilderness Act of 1964, the Forest and Rangeland Renewable Resources Planning Act of 1974, and the Federal Land Policy and Management Act of 1976, as amended.
- It is Forest Service policy to continue to make contributions to economic and social well-being by providing opportunities for economic diversity and by promoting stability for communities that depend on range resources for their livelihood (FSM 2202.1).
- The Hassayampa Allotment is scheduled for an environmental analysis of grazing management practices at this time in order to comply with section 504 of the Emergency Supplemental Appropriations and Rescissions Act of 1995, as amended (the Burns Amendment, P.L. 104-19).
- It is Forest Service policy to make forage available to qualified livestock operators from lands suitable for grazing, consistent with land management plans (FSM 2203.1, 36 CFR 222.2 (c)).
- The lands making up the Hassayampa Allotment are identified as suitable for domestic livestock grazing in the Forest Plan and continued domestic livestock grazing is consistent with the goals, objectives, standards, and guidelines of the Forest Plan.
- There is a need to authorize management changes to address site-specific resource concerns and allow for attainment of desired conditions while in compliance with the Forest Plan, as amended.

Desired Conditions & Resource Objectives

The desired conditions on this grazing allotment, based on the Forest Plan and the work of the Interdisciplinary Analysis Team, include:

- range administration that provides for the maintenance of satisfactory Rangeland Management Status (RMS) with a static or upward apparent trend;
- management of the grazing operations using a system that is responsive to changing climatic or environmental conditions;
- the maintenance of vegetation with mid- to high similarity to the Desired Vegetative Status (DVS) providing for ecological functionality and resiliency following disturbance while sustaining long-term productivity of the land;
- the installation and maintenance of structural improvements, such as water-supply systems, that enhance management control and flexibility and allow for effective distribution of forage use;
- the maintenance of soils in satisfactory condition over the long-term, or show improvement in areas departing from satisfactory condition where livestock grazing is contributing to the departure;
- the maintenance of satisfactory conditions for water resources that meet State water quality objectives;
- the maintenance of functioning spring-fed riparian systems, and saturated soils where potential exists, that support vegetation within site potential and provide habitat for riparian-dependent plants and animals while providing water sources for wildlife and livestock needs;
- the maintenance of fully functional riparian systems supported by herbaceous and multi-age woody vegetation, within site potential, that provides for geomorphically stable stream channels and banks and habitat for riparian-dependent plants and animals;
- protection and preservation of important historic and cultural sites; and
- the maintenance of suitable habitats for Management Indicator Species, Migratory Bird Treaty Act species, Forest Service Sensitive species, and for indigenous plant and animal species.

Forest Plan Direction

The Prescott Forest Plan provides the following guidance, management direction, and standards and guidelines for management activities:

The project area includes two Management Areas as delineated in the Prescott National Forest Land and Resource Management Plan (PNF LRMP).

1. Desert Grasslands – approximately 76% of allotment (MA 5): There are 227,288 acres of national forest land, 28,275 acres of private land and 1,092 acres of State land included in this management area. 181,420 acres (71 percent) are in the Verde Ranger District and 75,235 (29 percent) are in the Bradshaw District. The predominant vegetation is juniper, but the area is distinguished by desert shrub vegetation and open grass savannas. There are 386 miles of roads, for a road density of 1.0 mile per square mile. There are 49 miles of trails.

Management Emphasis: Range and watershed management will be emphasized with Level E (maximum livestock production) management in the grass and desert shrub vegetation type. Green and dead firewood will be harvested from the juniper vegetation types with emphasis on enhancement of wildlife habitat. Dispersed recreation will be managed to maintain environmental quality and reduce user conflicts. Improve all riparian areas and maintain in

satisfactory condition. This management area is an emphasis area for interpretation. Interpretation efforts will be focused on high-use roads, trails, sites, and areas.

2. Chaparral – approximately 24% of allotment (MA 3): There are 278,380 acres of national forest land and 15,883 acres of private land. 220,186 acres (75 percent) are in the Bradshaw Ranger District, 63,151 acres (21 percent) are in the Verde District, and 11,026 acres (4 percent) are in the Chino Valley District. The predominant vegetation is chaparral with interspersed stands of pinyon/juniper and juniper. Generally, the chaparral lands are adjacent to commercial timber lands and other high-value resource areas. The 2,028 acres of ponderosa pine in this area will be managed as commercial timber. The area has 100 acres of developed recreation (Powell Springs Campground). There are 291.4 miles of road, for a road density of 0.6 mile per square mile. There are 201.8 miles of trails.

Management Emphasis: In the high chaparral vegetation areas, the emphasis will be to increase water yield. Watershed condition will be improved and maintained on the majority of the chaparral acres. Range management will be at Level E in the chaparral, desert shrub and grassland. The remaining range acres will be managed at the current level or below. Wildlife management is emphasized in the ponderosa pine, pinyon/juniper, chaparral and juniper areas. There will be some green and dead firewood harvested in the P/J type. Fire management will be emphasized in the chaparral lands that are adjacent to high value resource areas, private land in-holdings and communities such as Prescott and Crown King. Improve all riparian areas and maintain in satisfactory condition.

All Resources:

- The forest is managed with a primary emphasis on healthy, robust environments with productive soils, clean air and water, and diverse populations of flora and fauna. (pg. 11)
- Cross-country travel by any vehicle is prohibited, with the following exception(s): Approved resource management activities (employees/permittees) (pg. 19).
- Implement appropriate [access restriction] measures to ensure that significant long-term resource damage does not occur (page 20).
- Management projects within riparian areas will be in accordance with legal requirements regarding flood plains, wetlands, wild and scenic rivers, cultural and other resources and will be in accordance with standards and guidelines identified in the Southwestern Regional Guide. (pg. 30)

Range Management:

- rangeland management that can respond to local or national demands for livestock production while maintaining air, soil and water resources at or above minimum local, State or Federal standards (Forest Plan, pg. 11)
- Provide forage to grazing and browsing animals to the extent benefits are relatively commensurate with costs without impairing land productivity, in accordance with management area objectives. (pg. 12)
- Identify key ungulate forage monitoring areas. These key areas will normally be one-quarter to 1 mile from water, located on productive soils on level to intermediate slopes, and be readily accessible for grazing. Size of the key forage monitoring areas could be 20 to 500 acres. In some situations, such as high mountain meadows with perennial streams, key areas may be closer than one-quarter mile from water and less than 20 acres. Within key forage monitoring areas, select appropriate key species to monitor average allowable use.

(pg. 155, Prescott Forest Plan, as amended, and Record of Decision for Amendment of Forest Plans, USFS Southwestern Region, 6/96)

- Satisfactory management occurs on allotments where management actions are proceeding according to a schedule (allotment management plan), which leads to fair or better range condition with an upward trend. (pg. 32)
- Unsatisfactory condition rangelands will be treated through implementation of approved allotment management plans. Treatments will include structural or nonstructural range improvements necessary to implement or maintain prescribed intensity levels; or adjusting stocking levels as necessary to maintain prescribed intensity levels (p. 59 and 65 for MA 3 and MA 5, respectively)
- Manage livestock grazing to achieve soil and water protection objectives. Make use of cost effective range improvements and management techniques. (pg. 32)
- Control livestock grazing through management and/or fencing to allow for and favor adequate establishment of riparian vegetation and elimination of overuse. (pg. 32)
- Implement grazing systems and/or methods that will advance the ecological objectives for riparian dependent resources, and require sufficient recovery rest to meet the physiological needs of the plants and plant associations. (pg. 35)
- Proper allowable use within riparian areas will not exceed 20 percent on woody species. (pg. 35)
- Salting within a quarter mile of riparian areas for the purpose of management of livestock is prohibited. This includes the use of salt to gather livestock. (pg. 35)
- Manage range resources at Level E in Management Area 3 (chaparral, desert scrub and grassland). Level E management seeks to realize maximum livestock production and utilization of forage allocated for livestock use consistent with maintaining the environment and providing for multiple use of the range. Substantial increases in new structural and nonstructural developments are made to help achieve these objectives. (pg. 58 & pg. 125)
- Manage range resources at Level E (described above) in the grass and desert scrub vegetation type in Management Area 5 (p. 64)

Soils, Watershed and Riparian Areas:

- Protect and improve the soil resource. (pg. 13)
- Give riparian-dependent resources preference over other resources. (pg. 14)
- Improve all riparian areas and maintain in satisfactory condition. (pg. 14)
- Maintain riparian communities by providing water for wildlife and livestock away from sensitive areas. (pg. 31)
- Livestock will be utilized to achieve soil and water protection objectives when:
    - The ability of livestock to achieve these objectives has been substantiated by verifiable monitoring and/or independent research;
    - Use of livestock is the most cost-effective means of achieving these objectives; and
    - Use of livestock will not lead to unacceptable levels of conflict with other resources or management area direction. (pg. 34)

- Minimize impacts to soil and water resources in all ground-disturbing activities. Where disturbance cannot be avoided, provide stabilization and revegetation as part of the project. (pg. 39)
- Through the use of best management practices (BMPs), the adverse effect of planned activities will be mitigated and site productivity maintained. (pg. 40)
- Meet the following riparian standards in the Southwestern Regional Guide for 80 percent of riparian areas by the year 2030: (pg. 30)
    - Projects impacting riparian areas will be designed to protect the productivity and diversity of riparian-dependent resources. Emphasize protection of soil, water, vegetation, wildlife, and fish resources. (pg. 30)
    - Riparian-dependent resources will have preference over other resources. Other resource uses and activities may occur to the extent that they support the objective of riparian enhancement. (pg. 30)
    - Manage the ground surface layer to maintain satisfactory soil conditions (*i.e.*, to minimize soil compaction) and to maintain hydrologic and nutrient cycles. (pg. 145)

Wildlife, Rare Plant, Fish & Aquatic Species Management:

- Manage for a diverse, well distributed pattern of habitats for wildlife populations and fish species. (pg. 13)
- All water developments will consider small game and nongame needs and escape devices. (pg. 27)
- All new or reconstructed fencing will be to wildlife standards and consider local species' needs. (pg. 27)
- Emphasize maintenance and restoration of healthy riparian ecosystems through conformance with Forest Plan riparian standards and guidelines. Management strategies should move degraded riparian vegetation toward good condition as soon as possible. Damage to riparian vegetation, streambanks, and channels should be prevented (p. 141).

Heritage Resources:

- The forest will comply with the National Historic Preservation Act, Executive Order 11593, the Archaeological Resources Protection Act, the Native American Graves Protection and Repatriation Act, and the Programmatic Agreement regarding cultural resources protection and responsibilities executed by the New Mexico, Arizona, Texas, and Oklahoma State Historic Preservation Officers (SHPO), the advisory Council on Historic Preservation, and the USDA Forest Service, Southwestern Region. (pg. 21)

Public Involvement

Notice of the intention to initiate the present analysis of the proposed action for this allotment was provided in the Schedule of Proposed Actions (SOPA) at http://www.fs.fed.us/sopa/. A letter dated 5/22/2013 describing the two alternatives for grazing management of this allotment was sent to the permit holder of the allotment, and to members of the public, non-profit groups, and other entities who have expressed interest in livestock grazing activities. It was also sent to State and Federal government entities and to six Native American Tribes interested in activities in the area inviting them to provide information regarding concerns or opportunities related to the proposal. The Draft Environmental Assessment (EA) was mailed to those parties that

responded to scoping and to the permit holder. A legal notice was published in the Prescott Courier newspaper on 9/6/2013 to solicit comments on the EA during the 30-day comment period. There were 3 letters received within the 30-day comment period.

Scoping Response / Issue Identification

The purpose of scoping is to provide an opportunity for the public to share concerns or provide feedback regarding an action being proposed by the Forest Service. Issues are defined as concerns about the effects of a proposed action that are not addressed by the project design or alternatives to the proposed action. The subject of an issue must be within the scope of the proposed action and relevant to the decision to be made, and not already decided by law, regulation, or higher-level decisions; and must be supported by scientific or factual evidence. Concerns or issues brought forth from scoping that meet these criteria may be determined to be key issues and may drive the development of alternative actions for analysis if they have not been resolved or already addressed in an alternative.

No responses received during any of the public comment periods have raised concerns that will not be addressed through project design, including resource protection measures and incorporating Best Management Practices, and following the standards and guidelines of the Prescott Forest Plan.

Permit and Consultation Requirements

Consultation with the Arizona State Historic Preservation Office, in compliance with the National Historic Preservation Act of 1966, will be completed before a decision is made regarding this allotment. Consultation with the Hopi, Hualapai, Tonto Apache, Yavapai Prescott Tribes, Fort McDowell Yavapai, and Yavapai-Apache Nations was conducted through project scoping and continued coordination.

Consultation with the US Fish and Wildlife Service (FWS) is not being conducted because there will be no effects to Federally listed species (Endangered, Threatened, Proposed, or Candidate) or their designated Critical Habitats by implementing this project.

The selected alternative for management of this allotment will be implemented through Allotment Management Plans (AMPs) and Annual Operating Instructions (AOIs), issued by the District Ranger, under a Term Grazing Permit issued for up to 10 years. Additional permits may be issued as long as desirable resource conditions continue to be maintained or are moving toward desired conditions.

Decision to be Made – Decision Framework

The Bradshaw District Ranger is the responsible official who will decide, based upon the Purpose and Need for this action, the information provided in this EA, the project record, and other considerations, whether to continue livestock grazing on the Hassayampa Allotment; if so, under what conditions; and whether new improvements including water developments and fencing will be constructed. The decision will also include a determination of consistency with the Forest Plan, National Forest Management Act, National Environmental Policy Act, and other applicable laws, regulations, and executive orders. The decision to implement the road closure activities described in Alternative 1 can occur independently of the decision whether or not to continue livestock grazing on the allotment.

In addition to this decision, the Ranger will make a finding on the significance of the environmental effects anticipated from the implementation of the selected action and whether an environmental impact statement (EIS) will need to be prepared.

Future Review of the Decision

Adaptive management, as described in this document, is based on the cycle of implementation of a course of action, monitoring of conditions and results, and adjustment of management as needed to continue to make progress towards project objectives. Monitoring of adaptive management is designed to answer the question "Is acceptable progress being made towards attainment of resource management objectives and thus desired conditions?" Changes in management actions are considered and implemented as appropriate when monitoring indicates that current actions are not being effective in reaching defined objectives. Through the implementation of a NEPA decision that includes adaptive management principles and which identifies an array of possible management practices, the grazing permit, Allotment Management Plan (AMP), and/or Annual Operating Instructions (AOI) may be administratively modified or re-issued over time, based on monitoring, as long as the modified permit, AMP, and/or AOI are within the bounds of the original adaptive management decision and supporting NEPA analysis and documentation. (FSH 2209.13, Section 92.23b)

A project-level, NEPA-based decision, such as the decision to be made based upon this analysis, remains valid as long as the authorized activity continues to comply with laws, regulations, and the Forest Plan. Reviews of existing project-level decisions are made periodically to determine if the grazing activity, permit(s), AMP, and AOIs are consistent and within the bounds of the existing NEPA documentation; if that analysis and documentation continue to remain valid; or if new information exists that requires some further analysis and potential modification of the activity. If the responsible official determines that correction, supplementation, or revision is not necessary, implementation of existing decisions shall continue.

Departure between Existing and Desired Resource Conditions

A comparison of existing resource conditions with desired conditions forms the basis for determining a course of grazing management actions. If existing conditions are the same as desired conditions, there is no need for a change from current livestock management. If existing conditions and desired conditions are not the same, there is a need for change. This project will only address changes that can be brought about by changes in livestock management. For example, it may be desirable to have fewer juniper trees on a woodland site, but this cannot be accomplished with livestock management. The desired condition for vegetation is to achieve (or move towards) mid to high similarity with the desired vegetation status (DVS). The Interdisciplinary Team (IDT) and the deciding official determined DVS using the potential natural plant communities as described in the Ecological Classification of the Prescott National Forest (draft 2005). Five pastures on the allotment were surveyed by the Interdisciplinary Team (ID Team), and four representative Terrestrial Ecological Unit Inventory (TEUI) map units were chosen in areas that are accessible to cattle and are representative of the forage base of the allotment. Inventory of the vegetation and soil was conducted to determine if desired resource conditions were being met. Vegetation was found to be meeting desired condition at 4 out of 5 sites. The area needing improvement in perennial grass cover and/or species composition to achieve mid to high similarity with the site potential is TEUI 448 in the North Rootplow Pasture (261 acres). The shrub cover at this sample site was not departed from the site potential, so perennial grass cover has the potential to improve with changes in management and adequate

precipitation. This same map unit was sampled in the Quartz Mountain Pasture, where shrub cover was found to be 26% higher than the average shrub cover at site potential. It would be desirable to have TEUI 448 in the Quartz Mountain Pasture exhibit less shrub cover and higher perennial grass cover, but that outcome is unlikely through changes in grazing management alone. Were there to be some type of brush control implemented in TEUI 448, it would be desirable to manage the livestock grazing in order to promote perennial grass establishment towards the 9% average cover levels at site potential.

Soils were determined to be in impaired condition at TEUI 429 in the Carter Pasture (349 acres), TEUI 448 in the North Rootplow Pasture (261 acres), and within TEUI 407 in the Middlewater Pasture (805 acres). Improved management that allows for retention of biomass on site will improve water infiltration and nutrient cycling functions of the soil. Improvement in litter and vegetation cover and its spatial distribution will protect soil from accelerated erosion. Improvements in the functional capability of the soil will mean progress towards improvement in soil condition, although changes in soil function can be quite variable and actual changes in soil condition class could take up to 100 years on some soils that are currently in less than satisfactory condition.

Improving the condition of the riparian vegetation of the Hassayampa River is important for stream channel function, wildlife habitat, and watershed health. Although neither the long term site potentials nor rates of recovery through successional stages can be predicted, there are achievable short term recovery goals that are attainable within a 10-year timeframe. None of the Forest Plan goals of advancing ecological objectives for riparian dependent resources or maintaining satisfactory riparian conditions can be achieved until the overuse of riparian plant communities is alleviated. The desired conditions for riparian areas include both short-term (10 year) and long-term timeframes (> 10 years).

The most important short-term recovery goals for riparian vegetation are:

- Allowing riparian trees and shrubs that are hedged to recover to a natural growth form;
- Maintaining and increasing the cover, density, biomass and seed production of native riparian grass and herbaceous species to prevent their loss from the riparian area.
- Optimizing riparian tree and shrub establishment, especially following episodic, regional winter storms.

Resource Management Objectives:

Resource management objectives are concise statements of measurable, time-specific outcomes intended to move toward achieving desired conditions. Management objectives are the means of measuring progress toward achieving or maintaining desired conditions. The ID Team developed the management objectives and time frames to achieve them, considering the best available science as it pertains to the potential for resource improvement that could be realized by changing grazing management only. The following management objectives were developed to measure progress towards meeting desired conditions:

Vegetation:

- Improve or maintain cover of perennial grasses to achieve mid- to high similarity with the potential perennial grass canopy cover and composition as shown in the Ecological Classification for the Prescott National Forest for key TEUI map units; achieve an upward trend in vegetation condition towards this objective.

Soils:

- On Carter TEUI 429, Middlewater TEUI 407, and North Rootplow TEUI 448, detect an improvement of vegetation spatial distribution within 5-7 years.

Riparian Areas:

- Quartz Mountain Pasture. Maintain existing woody species composition and achieve age class distribution through recruitment. Increase herbaceous cover along the greenline where potential exists.

- Orofino and Middlewater Pastures. Promote woody riparian establishment along greenline and in floodplain (primarily seep willow and desert willow in all but short segments adjacent to Quartz Mountain Pasture and Carter Pasture where some mature cottonwoods are present). Detect an establishment and increase of perennial herbaceous plants on the seasonal greenline where the plants can grow (no rock) and indicators of increased bank and channel stability within 3 – 5 years.

- Carter Pasture. Maintain existing herbaceous cover and increase native composition within the riparian corridor. Maintain existing woody composition and achieve age class distribution through recruitment. Increase cottonwood and willow distribution along greenline. Improve bank and channel stability. Detect an establishment and increase of perennial herbaceous plants on the seasonal greenline where the plants can grow (no rock) and indicators of increased bank and channel stability within 3 – 5 years.

Attainability of Resource Management Objectives:

Improvement towards and maintenance of desired condition for vegetation is expected to be measurable within the 10-year timeframe indicative of the term grazing permit. Improvement will depend on adequate precipitation within normal ranges. Prolonged drought would cause conditions to deteriorate even in the absence of grazing. Annual monitoring of the implementation of the grazing plan will occur as well as monitoring of short-term rangeland health indicators. This annual and short-term monitoring will be used to inform managers to make needed annual adjustments in livestock management in order to make progress towards meeting desired conditions. It is recognized that current management has not been successful in achieving proper livestock distribution resulting in concentrated, high use within the riparian corridor. Improved distribution will be needed in order to meet allowable use levels, or administrative actions will be warranted such as early removal of livestock once allowable use levels are reached. Annual stocking levels would be commensurate with forage production, and would be greatly reduced or resource protection non-use taken in extreme drought.

Improvement in impaired soil condition is strongly correlated with vegetation distribution and abundance. Leaving adequate residual biomass to protect the soil and improve soil organic matter is essential. Allowable use levels are lower during the growing season for impaired soil locations to allow for more vegetative ground cover to remain on site. Vegetative cover, both from live plants and plant litter, serves to break up runoff patterns during precipitation events, thereby enhancing water infiltration into the soil and mitigating soil loss due to erosion.

There are locations where lack of fire disturbance has resulted in existing shrub canopies that are much higher than site potential, such as TEUI 448 in the Quartz Mountain Pasture. This site

is expected to remain stable regardless of grazing management because of the shrub canopy influence on the grass component. There are no treatments proposed in this action that will reduce shrub cover and promote grass establishment. Establishment of perennial grasses will be limited by the shrub cover, and mid-similarity of grass cover and composition will not be achievable in a 10-year timeframe unless shrub cover is physically removed.

Reaching short term desired conditions for riparian areas and stream channels will depend not only on management activities, but on climatic events. Both drought and floods have the potential to affect riparian areas and stream channels. Although flood events are essential for establishment of cottonwood, willow and many shrub species, high flows (greater than 10 year recurrence interval) are likely to erode and widen impaired or unstable channels. Opportunities for regeneration have been lost in previous decades because of grazing pressure. However, the establishment of the cottonwood – willow stands in the lower Carter Pasture is evidence that recovery is possible.

CHAPTER 2 – Description of Alternatives

This chapter describes the two action alternatives and the no action alternative considered for the management of the Hassayampa Allotment. The alternative descriptions provide the basis for comparison and define the different actions which would be taken. Monitoring to be conducted is also described. Detailed maps of the two action alternatives with proposed improvements are provided in Appendix 1.

Alternatives Considered but Dropped from Analysis

An alternative was considered that would fence the entire Hassayampa River riparian corridor on the allotment, a length of over 5 miles. This alternative was not carried through the analysis because the cost of constructing and maintaining this fence would be extremely high and would not lead to resource benefits that were commensurate with the high cost. The river corridor has extremely variable riparian habitats ranging from broadleaf deciduous riparian communities on wetter sites to desert willow/net leaf hackberry communities on drier sites. Both action alternatives provide for protecting the broadleaf deciduous riparian communities through fencing or restricting season of use. To fence the riparian corridor in the Middlewater and Carter Pastures in their entirety would not result in the protection of considerably more high value riparian habitat. There is an option to fence the broadleaf deciduous riparian habitat in the Carter Pasture under both alternatives 1 and 2 should dormant season grazing alone be ineffective.

Alternatives Studied in Detail

Alternative 1 – Dormant Season Grazing

The following proposal has been developed to meet the project's purpose and need for action and consists of six components: Authorization, Adaptive Management, Resource Protection Measures, Structural Range Improvements, Monitoring, and Road Closure. The proposal follows current guidance from Forest Service Handbook 2209.13, Chapter 90 (Grazing Permit Administration; Rangeland Management Decision-making).

Authorization

The Bradshaw District Ranger proposes to continue to authorize livestock grazing on the Hassayampa Allotment under the following terms:

- A range of stocking from 294 to 656 Animal Unit Month's on a dormant season basis (generally from October 1st through March 31st), annually. As an example, this livestock use strategy would provide for livestock numbers to range from 49 to 109 head of cattle, cow/calf pairs and bulls for 6 months.

- Livestock will be managed by dispersing in the Quartz Mountain, Rootplows, Orofino, and Middlewater Pastures during the dormant season, while Carter Pasture use period is restricted to when woody riparian plants along the Hassayampa River are fully dormant (generally December through February). Livestock may either use the pastures other than Carter simultaneously or in a rotation, depending upon achieving allowable use levels and management objectives.

The term grazing permit will be issued for up to ten years. The permit will authorize livestock use within parameters identified in this proposal, and subsequent permits may be issued as long as resources continue to move further toward desired conditions or are being maintained in satisfactory condition, as appropriate.

Adaptive Management
Adaptive management is designed to provide sufficient flexibility to address changes in climatic conditions, seasonal fluctuations in forage production and other dynamic influences on the ecosystem in order to effectively make progress toward or maintain desired conditions of the rangeland and other resources. Adaptive management will also include the implementation of resource protection measures.

Under the adaptive management approach, regular/annual monitoring of short-term indicators will inform the need for administrative changes in livestock management. The need for adaptation would be based on the magnitude or repeated re-occurrence of deviations from guidelines provided, or due to indications of a lack of progress toward desired resource conditions. The timing of such management changes would reflect the urgency of the need for adaptation. Annual Operating Instructions and the Allotment Management Plan may be modified as appropriate to adapt management within the parameters of the chosen grazing alternative.

If monitoring indicates that progress toward desired conditions is not being achieved on the allotment, management will be modified in cooperation with the permittee. Modifications can include adjustments in timing, intensity and duration of grazing. Timing is the time of year the livestock are present in a pasture. Intensity is the degree to which forage is removed through grazing and trampling by livestock. Duration is the length of time livestock are present in a given pasture.

These modifications would be made through administrative decisions such as, the specific number of head stocked on the allotment seasonally; the class of animals stocked (cow/calf pairs vs. yearlings, steers or heifers, etc.); specific dates of grazing; livestock herd movement; and/or periods of rest, deferment or non-use of portions or all of the allotment for an appropriate period of time, as conditions warrant. Such changes will not result in exceeding the AUMs authorized for livestock use included in this alternative.

Future proposals to use other resource management tools such as prescribed fire or mechanical vegetation treatments will be subject to additional project-specific analysis under the

National Environmental Policy Act. Adaptation of livestock management may be applied to accommodate use of these vegetation management tools.

Resource Protection Measures
This alternative is designed to comply with Forest Plan standards and guidelines, as amended. Resource protection measures will be incorporated into the project as design features to protect forest resources such as soil, water, vegetation, riparian habitats, heritage resources and wildlife; as well as to maintain or make progress toward desired conditions. Best Management Practices will be implemented to comply with the Clean Water Act.

Allotment-wide Measures: On those portions of the allotment where no specific resource concerns were identified by the Interdisciplinary (ID) Team, livestock will be managed with the objective of maintaining or improving the condition of rangeland resources through the use of grazing intensity guidelines. Grazing intensity is measured by determining the level of utilization on forage plants. Utilization is the proportion or degree of current year's forage production that is consumed or destroyed by animals (Interagency Technical Reference 1996). Allowable utilization levels are guidelines to be achieved as an average over the long term to maintain or improve rangeland vegetation and long-term soil productivity. Relative utilization may be measured before and during the growing season and can be utilized as a tool to manage livestock so that expectations of end of growing season utilization measurements can be achieved.

In addition to using utilization levels as a tool to manage livestock grazing impacts, the critical stubble height necessary for key forage species to maintain plant health and watershed protection values will also be considered. Allowable utilization guidelines will be applied across the allotment to provide rangeland managers with information needed to adapt management through adjustments, as may be needed, on an annual basis. Utilization data can be used: (1) to identify use patterns; (2) to help establish cause-and-effect interpretations of range trend data; and (3) to aid in adjusting stocking rates when combined with other monitoring data (Interagency Technical Reference 1996). Allowable grazing intensity and forage use guidelines for areas of the allotment that are generally described to be in satisfactory condition include:

1. A management guideline of 35-45% utilization of key forage plants in upland key areas as measured at the end of the growing season or seasonal use period;
2. Up to 50-60% leaders browsed on key upland woody species;
3. Minimum stubble height on key riparian herbaceous species: four to six inches where sedges and rushes are present and eight inches where deergrass is found;
4. Up to 20% use by weight on key woody species within riparian areas; or less than 50% of terminal leaders browsed on woody species less than 6 feet tall.

Site-specific Measures: Through the allotment analysis process undertaken by the interdisciplinary team, some areas have been identified where the current condition of vegetation, soils, and riparian areas are in less than the desired condition. Soil conditions associated with pinion-juniper and chaparral hills were determined to be in impaired condition due to poor spatial vegetation cover and accelerated soil loss.

The Hassayampa River throughout the allotment is in less than functional condition due to unstable channels, very high sediment loads, and inadequate riparian vegetation. Collins Spring in the Carter pasture is non-functional due to head cutting which is dewatering the system and limiting the spring's ability to provide water.

Management objectives will be achieved by applying the following site-specific measures.

1. Up to 30% utilization of key herbaceous plants in the riparian corridor (TEUI 44); use active livestock management techniques (herding, salt and supplement placement, etc.) to disperse cattle throughout the pasture and discourage concentration and trailing within the river corridor.

2. Grazing may be deferred in areas showing recruitment until seedlings become established and can be maintained while withstanding grazing impacts.

3. Manage the Carter Pasture as a riparian pasture. Defer livestock grazing within the pasture annually until riparian vegetation is dormant (generally December through February); manage to encourage woody species recruitment and to establish and maintain effective herbaceous vegetation along the greenline, where present. Emphasize sedges and rushes and/or deergrass for the herbaceous component.

   OR

   Construct a fence along the lower ½-mile of the Hassayampa River in the Carter Pasture to exclude livestock access to the riparian corridor.

In the event that the above resource protection measures and adaptive management changes in grazing intensity, frequency, and duration do not accomplish site-specific resource objectives, additional optional measures can be implemented. These optional measures will be designed to address site-specific resource concerns and may include, but are not limited to, such things as fencing of water sources to control livestock distribution, electric fencing, drift fences, additional livestock exclosures, water pipelines, storage and troughs; reconstruction of non-functional improvements and construction of new improvements such as spring boxes, drift fences, and water gaps.

Structural Range Improvements

Construction of New Range Improvements: This alternative includes construction of the following new structural improvements that have been developed to address resource concerns or improve grazing management. Upland water developments will provide livestock water away from riparian areas and allow for achievement of riparian management objectives. Monitoring may indicate that some of these improvements are not necessary; however, if some or all of these improvements are not implemented, the upper limit of permitted livestock numbers may not be achievable on a sustained basis, or seasonal use periods may be shortened. These are listed in order of importance for implementation to provide sustainable livestock management. Different types of water developments may be employed depending on the location, and could include a catchment apron and storage tank ("trick tank") with pipeline to water troughs, earthen stock tank, or pipelines to water troughs from new wells. The location of proposed range improvements are shown on the map for Alternative 1 in Appendix 1.

1. Increase water storage capacity at the Orofino Well #2 and increase the size of the existing corral.

2. Construct a new water development in the northeast part of the Quartz Mountain Pasture in the vicinity of the south half of section 35 or the north half of section 2.

3. Develop a new water source in the Carter Pasture. This water system will be located in the uplands west of the river and may include such facilities as a well development, storage tank(s), pump/windmill, pipeline, troughs, and corral facilities.

4. Develop a dependable water source at or near Orofino Tank.

5. Develop a dependable water source in the area of Miner's Tank in the Carter Pasture.

6. Construct a riparian exclosure at the lower end of the Hassayampa River in the Carter Pasture if livestock use is expected outside the proposed December through February period, or if 3-5 years of monitoring data shows that desired conditions are not being met through limiting season of use alone.

Maintenance of Range Improvements: The Term Grazing Permit includes a list of all improvements which the permittee will continue to maintain at a level that effectively provides for their intended uses and purposes. Range improvements will be inspected periodically during the term of the permit to document condition. Annual Operating Instructions (AOIs) will identify range improvements in need of maintenance. Existing improvements may be replaced when conditions warrant.

Access to Improvements: Authorization for cross-country motorized travel is provided for the permittee to administer the livestock operation and maintain improvements under the terms and conditions of the Term Grazing Permit.

Annual authorization for actions implementing management direction in the Allotment Management Plan will be included in the Annual Operating Instructions, such as a description of the anticipated level of cross-county travel, travel needed for improvement maintenance, new improvement construction, or reconstruction of existing improvements.

All authorizations for cross-country motorized travel are subject to existing regulations intended to protect natural and/or heritage resources. Cross-country travel is not allowed when such travel would cause unacceptable resource damage.

Monitoring

Three types of monitoring will be used - implementation monitoring, periodic monitoring of short-term indicators of resource conditions, and effectiveness monitoring.

Implementation Monitoring: This monitoring will be conducted on an annual basis and will include such things as livestock actual use (# of head, # of months) and scheduled and unscheduled inspections to ensure that all livestock and grazing management measures stipulated in permits, AMPs and AOIs are being implemented (*e.g.* cattle numbers, on/off dates, rotation schedules, maintenance of improvements, grazing intensity).

Periodic Monitoring of Short-term Indicators of Resource Conditions: Short-term indicators of resource conditions such as forage utilization, residual forage, and/or vegetative ground cover will be monitored on the allotment at key areas and at areas identified with site-specific resource concerns. Methods will include generally accepted monitoring protocols.

The purpose of periodic monitoring of short-term indicators is to determine:

1. If individual plants have had an opportunity to recover, grow and reproduce following grazing impacts.

2. If sufficient residual forage remains at the end of the growing season to provide for other resource values or requirements such as soil productivity, wildlife habitat, and dormant season use.
3. If maintenance or improvement of rangeland conditions are indicated.
4. If management adjustments are warranted for the following season to provide for the physiological needs of primary forage species and other resources identified as concerns.

Effectiveness Monitoring: Long-term monitoring, according to a Monitoring Plan to be established in the Allotment Management Plan, to evaluate the success of management in achieving the desired resource conditions will occur within key areas or on permanent transects at an interval of 10 years or less. Information on species composition, plant cover, frequency or density, groundcover attributes, and riparian condition will be collected to determine if management is making progress in moving towards desired resource conditions. Data collected on this allotment during the current management revision process will serve as baseline information. Effectiveness monitoring may also occur if data and observations from monitoring of short-term indicators suggest a need for additional information.

Both qualitative and quantitative monitoring methods will be used in accordance with the Interagency Technical Reference, Region 3 Rangeland Analysis and Management Training Guide, and the Region 3 Allotment Analysis Handbook.

Road Closure
Vehicular traffic on an existing road located in the riparian corridor of the Hassayampa River is causing damage to plants establishing in the floodplain and disrupting the natural stream channel characteristics. Without protective plant cover in and adjacent to the river, there is the potential for increased sedimentation into the river and degradation of important habitat. The existing forest road proposed to be closed to public access is the 9402R. This road heads south from forest road 72 in section 33 within the Carter Pasture. This road is entirely contained within the riparian corridor of the Hassayampa River for its ¾-mile length that is on National Forest System lands. The road does not continue beyond the forest boundary where it is blocked by an existing fence. It is proposed to block with boulders or gate the road at or near the junction with forest road 72 while allowing a turn-around for vehicles at this road junction. There may be limited motorized use for administrative purposes by either the permittee or Forest Service personnel. Use of the road by the permittee to access range improvements may be approved by the Forest Officer in the annual operating instructions if it is determined that vehicular access would not damage the riparian resources.

Alternative 2 – Yearlong Grazing/Riparian Fencing

The following proposal has been developed to meet the project's purpose and need for action, while allowing for yearlong grazing on the allotment. Many components are the same as alternative 1 and are included by reference.

Authorization
The Bradshaw District Ranger proposes to continue to authorize livestock grazing on the Hassayampa Allotment under the following terms:

- Stocking by up to 588 Animal Unit Months yearlong. As an example, this provides for livestock numbers of up to 49 head of cattle, cow/calf pairs and bulls, yearlong.

- Livestock will be managed under a rotational grazing system using 4 upland pastures (North and South Rootplow, Quartz Mountain, Orofino) that can be used in the spring/summer months, generally April 1st through September 30th once the Hassayampa River corridor is fenced in the Quartz Mountain and Orofino Pastures. The Middlewater Pasture will only be used in the dormant season, generally October 1st through March 31st because livestock will have access to the Hassayampa River corridor. The Carter Pasture contains the best riparian vegetation and will only be grazed when the riparian vegetation is fully dormant (generally December through February). The small riparian pasture created by fencing the Hassayampa River in the Orofino and Quartz Mountain Pastures would be used as a riparian pasture during the dormant season only for limited time or with fewer livestock due to its small size.

The term grazing permit will be issued for up to ten years. The permit will authorize livestock use within parameters identified in this proposal, and subsequent permits may be issued as long as resources continue to move toward desired conditions or are being maintained in satisfactory condition, as appropriate.

Adaptive Management (Same as alternative 1)

Resource Protection Measures

Allotment-wide Measures:

1. A management guideline of 35-45% utilization of key forage plants in upland key areas as measured at the end of the growing season in areas of satisfactory condition;
2. Up to 50-60% leaders browsed on key upland woody species;
3. Minimum stubble height on key riparian herbaceous species: four to six inches where sedges and rushes are present and eight inches where deergrass is found;
4. Up to 20% use by weight on key woody species within riparian areas; or less than 50% of terminal leaders browsed on woody species less than 6 feet tall.

Site-specific Measures:

1. Construct approximately 2.5 miles of fence on the west side of the Hassayampa River in the Quartz Mountain and Orofino Pastures to exclude livestock from the riparian area during the growing season (generally April 1st through September 30th). Stocking levels during the warm growing season will likely need to be reduced below maximum permitted levels until this fence is constructed in order to meet allowable use levels in the Hassayampa River riparian corridor in the Quartz Mountain and Orofino Pastures.
2. The resultant Orofino riparian pasture may only be grazed during the dormant season (generally October through March), and may be deferred from grazing until riparian plants have attained adequate growth.
3. The Carter Pasture contains the best riparian resources and would only be grazed from December through February when plants are fully dormant; or construct a fence along the lower ½-mile of the Hassayampa River in the Carter Pasture to exclude livestock access to the riparian corridor if 3-5 years of monitoring data shows that desired conditions for the riparian area are not being met by limiting season of use alone.

4. In riparian pastures, allow up to 30% utilization of key herbaceous plants in the riparian corridor (TEUI 44); use active livestock management techniques (herding, salt and supplement placement, etc.) to disperse cattle throughout the riparian pasture and discourage concentration and trailing within the river corridor.
5. Grazing may be deferred in riparian areas showing recruitment of riparian species until seedlings become established and can be maintained while withstanding grazing impacts.
6. In areas of impaired soil condition in the Carter (TEUI 429) and North Rootplow Pastures (TEUI 448), light grazing use (0-30%) during the growing season and 35-45% use during the dormant season to improve vegetative ground cover.
7. Maintain existing upland pasture division fences to allow for grazing rotation and deferment in order to provide for improvement of vegetative groundcover and soil condition.

In the event that the above resource protection measures and adaptive management changes in grazing intensity, frequency, and duration do not accomplish site-specific resource objectives, additional optional measures can be implemented. These optional measures will be designed to address site-specific resource concerns and may include, but are not limited to, such things as fencing of water sources to control livestock distribution, electric fencing, drift fences, additional livestock exclosures, water pipelines, storage and troughs; reconstruction of non-functional improvements and construction of new improvements such as spring boxes, drift fences, and water gaps.

Structural Range Improvements

Construction of New Range Improvements: This alternative includes construction of the following new structural improvements that have been developed to address resource concerns or improve grazing management. Upland water developments will provide livestock water away from riparian areas and allow for achievement of riparian management objectives. Monitoring may indicate that some of these improvements are not necessary; however, if some or all of these improvements are not implemented, the upper limit of permitted livestock numbers may not be achievable on a sustained basis, or pasture use periods may be shortened. These are listed in order of importance for implementation to provide sustainable livestock management. Different types of water developments may be employed depending on the location, and could include a catchment apron and storage tank ("trick tank") with pipeline to water troughs, earthen stock tanks, or pipelines to water troughs from new wells. The location of proposed range improvements are shown on the enclosed map for Alternative 2.

1. Construct approximately 2.5 miles of fence west of the Hassayampa River in the Quartz Mountain and Orofino Pastures to exclude livestock access during the warm growing season, generally April 1st through September 30th.

2. Increase water storage capacity at the Orofino Well #2 and increase the size of the existing corral.

3. Construct a new water development in the northeast part of the Quartz Mountain Pasture in the vicinity of the south half of section 35 or the north half of section 2.

4. Restore functionality of existing earthen stock tanks in the uplands or replace them with trick tanks or other reliable water sources. Existing upland water sources that may be

reconstructed are: Rootplow Tank, Orofino Tank, Riggle Tank, Grassy Tank, and Carter Tank.

5. Develop a new water source in the upland Carter Pasture. This water system will be located in the uplands west of the river and may include such facilities as a well development, storage tank(s), pump/windmill, pipeline, troughs, and corral facilities.

6. Develop a dependable water source in the area of Miner's Tank in the Carter East Pasture.

7. Construct a riparian exclosure at the lower ½-mile of the Hassayampa River in the Carter Pasture if livestock use is expected outside the proposed December through February period, or if 3-5 years of monitoring data shows that desired conditions are not being met through limiting season of use alone.

Maintenance and access to range improvements is the same as described for alternative 1.

Monitoring (same as alternative 1)

Road Closure (same as alternative 1)

Alternative 3 – No Action/No Grazing Alternative_____

Alternative 3 is the No Action/No Grazing Alternative required by FSH 2209.13 Chapter 90.

Authorization
Under this alternative, livestock grazing would not be authorized.

Cancellation of the Grazing Permit
Livestock grazing on the Hassayampa Allotment would be discontinued and the Term Grazing permit would be cancelled after a 2-year notification to the permit holder (FSM 2231.62d/FSH 2209.13-16.24). The cancellation of the term permit under this alternative does not represent an official administrative closing of the allotment; rather it would represent the suspension of grazing on this allotment for an undetermined amount of time, until or unless a different decision is made.

New Range Improvements
Under this alternative, no new range improvements would be constructed on the allotment.

Maintenance of Existing Range Improvements
Under this alternative, maintenance of range improvements normally assigned to the permit holder would no longer occur. After cancellation of the Term Grazing Permit, existing structural improvements that contribute to resource protection or that are important to other resources and functions, such as water sources for wildlife populations or fire control, would remain but would not be maintained unless this activity were funded under another resource area on the Prescott NF or by a cooperating partner. Removal of improvements losing their functionality would have to be authorized under a future NEPA decision if new ground disturbance were anticipated. Where allotment boundary fences are necessary, the maintenance of these fences could be re-assigned to adjacent grazing permit holders in order to maintain the integrity of the boundaries of adjacent allotments.

Monitoring

The Forest Service would conduct periodic monitoring to verify that no cattle are present on the allotment once the permit is cancelled.

Road Closure (same as alternatives 1 and 2)
The District Ranger may choose to authorize the road closure activities that are described for alternatives 1 and 2 while not authorizing the continuation of livestock grazing.

Table 1: Comparison of Alternatives and Effects for Hassayampa Allotment

Hassayampa Allotment	Alternative 1 Dormant Season Grazing	Alternative 2 Yearlong Grazing/Riparian Fencing	Alternative 3 No Action/ No Grazing
Authorization (AUMs, Season of Use & Term)	A range of stocking from 294 to 656 Animal Units Months (AUMs) on a dormant season basis, generally from October 1st through March 31st. This equates to a range from 49-109 head of adult cattle for 6 months.	Stocking up to 588 AUMs yearlong, or up to 49 adult cattle for 12 months. Grazing follows a yearlong rotational scheme using 4-6 pastures of differing size that have different forage availability. Stocking levels will be dictated by what can be sustained in each pasture during the season that it is prescribed for use.	N/A
Grazing Intensity	In areas of satisfactory condition, a management guideline of 35-45% forage utilization of key forage plants in upland key areas as measured at the end of the grazing season, and up to 50-60% browse use on key upland woody species; In riparian corridor limit utilization to less than 30% on herbaceous plants and 20% use by weight on riparian woody species.	In areas of satisfactory condition, a management guideline of 35-45% forage utilization of key forage plants in upland key areas as measured at the end of the grazing season, and up to 50-60% browse use on key upland woody species; In riparian corridor limit utilization to less than 30% on herbaceous plants and 20% use by weight on riparian woody species; In areas of impaired soil condition, light grazing use (0-30%) during the growing season.	N/A

Hassayampa Allotment	Alternative 1 Dormant Season Grazing	Alternative 2 Yearlong Grazing/Riparian Fencing	Alternative 3 No Action/ No Grazing
New Improvements	Construct up to 4 new water developments; increase water storage and corral size at Orofino Wash Well #2; road closure in Hassayampa River; possible exclosure in Carter Pasture	Construct up to 7 new water developments; increase water storage and corral size at Orofino Wash Well #2; construct 2.5 miles riparian pasture fence in Quartz Mountain and Orofino Pastures; road closure; possible exclosure in Carter Pasture.	No new range infrastructure implemented, but road closure activities in the Carter Pasture may be authorized with this alternative.
Maintenance of Improvements	Existing necessary improvements listed on the term grazing permit are maintained to standards by grazing permittee; new improvements will increase maintenance responsibility, but to a lesser extent than Alt. 2; dormant season grazing may reduce the need for some existing fences.	Existing improvements listed on the term grazing permit are maintained to standards by grazing permittee; new water developments and 2.5 miles of additional fencing will increase the maintenance workload; existing pasture fences will need to be functional to support rotational grazing practices.	Maintenance of range improvements discontinued except for maintaining allotment boundary fences by adjacent permittees. Without a permittee, maintenance responsibility will default to the Forest Service for any infrastructure deemed essential.
Monitoring	Short and long-term monitoring of imple-mentation and effectiveness of adaptive management during term of permit	Same as Alternative 1	Monitoring of non-use compliance.
Riparian Vegetation Effects	The application of dormant season only grazing may realize an improvement in riparian vegetation cover and frequency if light use levels can be achieved by distributing cattle away from the Hassayampa River. Herbaceous vegetation is lacking and may need restoration treatments or deferment to	Same as Alternative 1 Dormant season grazing achieved through fencing the Hassayampa River in the Quartz Mountain and Orofino Pastures.	Without herbivory other than a trace by wildlife, the herbaceous and woody vegetation would improve at the fastest rate under this alternative.

Hassayampa Allotment	Alternative 1 Dormant Season Grazing	Alternative 2 Yearlong Grazing/Riparian Fencing	Alternative 3 No Action/ No Grazing
	become established.		
Upland Vegetation Effects	Dormant season grazing will give full growing season rest to all warm season grasses, and rest during seed set for cool-season grasses; conservative use levels will lead to 55-65% of biomass being retained on site after grazing to improve litter cover, soil protection, and water infiltration. Improvement in vegetative cover and plant vigor expected given adequate precipitation. Areas of thick brush cover (over 50% canopy cover) will remain static.	Application of conservative use levels during the growing season will allow for retention of 55-65% of herbaceous plant biomass in satisfactory areas; areas where grasses are currently uncommon may be difficult to assess impacts to plant establishment during growing season; growing season deferment will be followed in the two summer pastures to allow for seed production every other year; improvement in herbaceous plant cover and frequency not as rapid as with Alt. 1 since grazing will occur when grasses are actively growing. Areas of thick brush cover (over 50% canopy cover) will remain static.	Livestock use discontinued. Improvement in herbaceous vegetation cover and species composition would occur, but it will be dependent on adequate precipitation and the degree of shrub cover. Those areas with extensive shrub cover are stable and would show little difference from action alternatives.
Watershed/Soil Effects	Soils in less than satisfactory condition would improve within their ecological capability through the application of resource protection measures designed to improve vegetation condition. Implementation of light to conservative use levels allows for 55-	Same as Alternative 1	Soils in less than satisfactory condition would improve within their ecological capability. More biomass is retained on site than alternatives 1 or 2. Retention of biomass would allow organic matter to be incorporated into the

Hassayampa Allotment	Alternative 1 Dormant Season Grazing	Alternative 2 Yearlong Grazing/Riparian Fencing	Alternative 3 No Action/ No Grazing
	70% or more of biomass to be retained on site. Retention of biomass would allow organic matter to be incorporated into the soil for nutrient cycling and protection from accelerated soil loss.		soil for nutrient cycling and ground cover for protection of the soil from accelerated soil loss. Improvement may occur at a slightly faster rate than alternatives 1 or 2.
Wildlife/Rare Plant/Aquatic Species Effects	Since the allotment does not contain known populations of Threatened or Endangered species, and potential habitat is lacking, there will be no effects to Federally listed species or their designated Critical Habitats. One candidate species proposed for listing, the yellow-billed cuckoo, may migrate and forage within the Hassayampa River corridor in spring/summer, but cattle would not be present at this time. Upland areas will improve towards desired conditions by implementing use guidelines. Competition for palatable browse species would occur during the fall and winter months. Some impacts on Management Indicator Species (MIS) habitat, but no effect to trend of	This alternative would have more impact to Forest Service sensitive species, MIS, migratory birds and other wildlife than Alternative 1 because livestock grazing would continue to occur year round. Competition for palatable browse species would continue to occur yearlong. Because of riparian resource protection measures such as light grazing utilization, the desired conditions for the Hassayampa River corridor should be achieved over time. Grazing to Hassayampa River corridor occurs only during dormant season because of implementation of fencing in Quartz Mountain and Orofino Pastures.	Would provide more rapid movement toward desired habitat conditions, especially in riparian area at the Hassayampa River. Any potential impacts to Forest Service sensitive species and MIS from the presence of livestock will no longer occur.

Hassayampa Allotment	Alternative 1 Dormant Season Grazing	Alternative 2 Yearlong Grazing/Riparian Fencing	Alternative 3 No Action/ No Grazing
	MIS species forest-wide. Regional Forester sensitive species may occur or have habitat in the project area. Project actions may impact individuals or habitat of these species, but there would not be a trend toward Federal listing. Because of proposed riparian resource protection measures such as light utilization, livestock grazing impacts to the Hassayampa River riparian corridor will be mitigated and allow for improvement of riparian resources towards desired conditions. Grazing to Hassayampa River corridor occurs only during dormant season because of change of season of use.		
Economics	The Forest Service and permittee realize financial benefits from grazing fees and the sale of livestock from the allotment, respectively. Costs include construction of new range improvements, the administrative costs to Forest Service, and the maintenance cost to permittee for range infrastructure. Cost/Benefit comparison results in a	The Forest Service and permittee realize financial benefits from grazing fees and the sale of livestock from the allotment, respectively. Costs include construction of new range improvements, the administrative costs to Forest Service, and the maintenance cost to permittee for range infrastructure. Cost/Benefit comparison results in a net financial loss of about $4,100 per year using assumptions	No financial benefits realized by Forest Service or grazing permittee. Some repairs to infrastructure and administrative costs still incurred by Forest Service resulting in about $1,750 financial loss per year to Forest Service using assumptions as described.

Hassayampa Allotment	Alternative 1 Dormant Season Grazing	Alternative 2 Yearlong Grazing/Riparian Fencing	Alternative 3 No Action/ No Grazing
	net positive financial gain of about $6,000 per year using assumptions as described in Economics Report.	as described.	
Archeological Effects	No adverse effects on heritage resources. Avoidance of impacts to cultural resources during construction of new range improvements and road closure.	Same as Alternative 1	No effects on heritage resources; avoidance of cultural sites with possible road closure activities.
Recreational Effects	No adverse effects on recreational opportunities	Same as Alternative 1	No effects on recreational opportunities
Compliance w/ Forest Plan and Federal Regulations 36 CFR 222.2 [c]	Yes, through application of grazing management, Forest Plan goals for resource management met over time. Consistent with policy to manage forage-producing federal lands for livestock grazing.	Same as Alternative 1	Yes, achieves Forest Plan resource management goals. Not consistent with direction to manage forage-producing lands for livestock grazing.

CHAPTER 3 – Existing Condition & Environmental Effects

A summary of the existing resource conditions and environmental effects of management alternatives is provided in this chapter. Each resource specialist has considered the direct, indirect, and cumulative effects that would be expected to occur from implementation of the alternatives addressed in this EA. They have considered the past, present, and future activities listed in the table below that may be affecting resources in the cumulative effects analysis area as defined for each resource. Cumulative effects result from the addition of the direct and indirect effects of the proposed action to the effects of these past, present, and reasonably foreseeable future actions. The summation of these effects is reviewed in order to determine if all the effects, when considered collectively, accumulate to a significant level. The resource specialist's reports, included in the project record, contain details of these considerations.

The following table summarizes the past, present, and future activities within the Hassayampa Allotment. For some resource areas, the primary 6th level watersheds that contain portions of the allotment were considered for the cumulative effects analysis. The map in Appendix 3 defines the 6th level watersheds in relation to the project area.

Table 2: Past, Present, and Future Activities on the Hassayampa Allotment

Type of Activity	Past Activities/Events	Present Activities	Future Activities
Wildfire Suppression	Several small fires registered as ignition points; insignificant acreage burned.	None	unknown
Timber/Fuelwood Sales	None	None	None planned
Veg Treatment Projects / Non-Structural Range Improvements / Rx Burns	Prescribed burning for chaparral regeneration from 1995-1999 performed on 5,103 acres. No mechanical treatments recorded in past 20 years.	None in past 13 years; chaparral vegetation has recovered from past activities.	None planned
Livestock Grazing	Project area was two allotments prior to 1993 and stocked up to 139 adult cattle yearlong.	Yearlong grazing by up to 49 cattle on the Hassayampa Allotment. The four 6th code watersheds that contain the allotment have mixed ownership of State, private, and BLM lands. Portions of 4 active allotments on NFS land are within the watersheds; these 4 allotments have	Stocking in balance with forage supplies and water availability; seasonal or yearlong.

Type of Activity	Past Activities/Events	Present Activities	Future Activities
		approved management plans with resource objectives	
Recreational Activities & Fuelwood Cutting	Motorized and non-motorized trails; Dispersed recreation (primarily OHV use, target shooting, hunting)	Same activities; 1.9 miles of existing designated trails – mainly motorized	No anticipated change; no new trails planned
Roads, Utility ROWs, Land Development and Land Exchanges	28 miles of roads on National Forest land; no utility corridors	28 miles of roads on National Forest land; no utilities	No new roads or facilities planned; no land exchanges anticipated
Mining	Placer gold claims; small scale sluicing 1880s-1900s; dragline dredging in the Hassayampa River – 1940s; gold placer mining between 1920-1950 estimated yield of $65,000	84 federal, active placer gold mining claims exist; current activities are occurring at Gold Basin Mine, Western Resources Development claims, Alliance Mining Corp.'s Gold Eagle claim	Continuation of current active claims, possible expansion of exploratory activities such as trenching, drilling, and production mining

Rangeland Vegetation _____

Existing Condition:

The Terrestrial Ecosystem Survey of the Prescott National Forest and its associated Ecological Classification is used in describing the vegetative condition on the Hassayampa Allotment. Process and methodology are described in "Field Process for Assessing Rangeland Conditions as Part of Rangeland NEPA Analysis on the Prescott National Forest". The *R3 Rangeland Analysis and Management Training Guide* outlines procedures for the use of Desired Vegetation Status (DVS) to determine Rangeland Management Status (RMS); RMS is the allotment management's success in meeting resource objectives. For this project, the DVS was determined to be the Potential Natural Community (PNC). In some cases, one or more of the PNC indicator species for perennial grasses may not have been present on a key soil map unit, but if another desirable perennial grasses was present instead, then DVS was being met for grass species composition. The desired conditions developed by the Interdisciplinary Team and the District Ranger reflect this determination.

Table 3 shows the relative acreage of each of these key map units on the allotment, and Figure 1 shows the location of the key TEUI map units in each pasture.

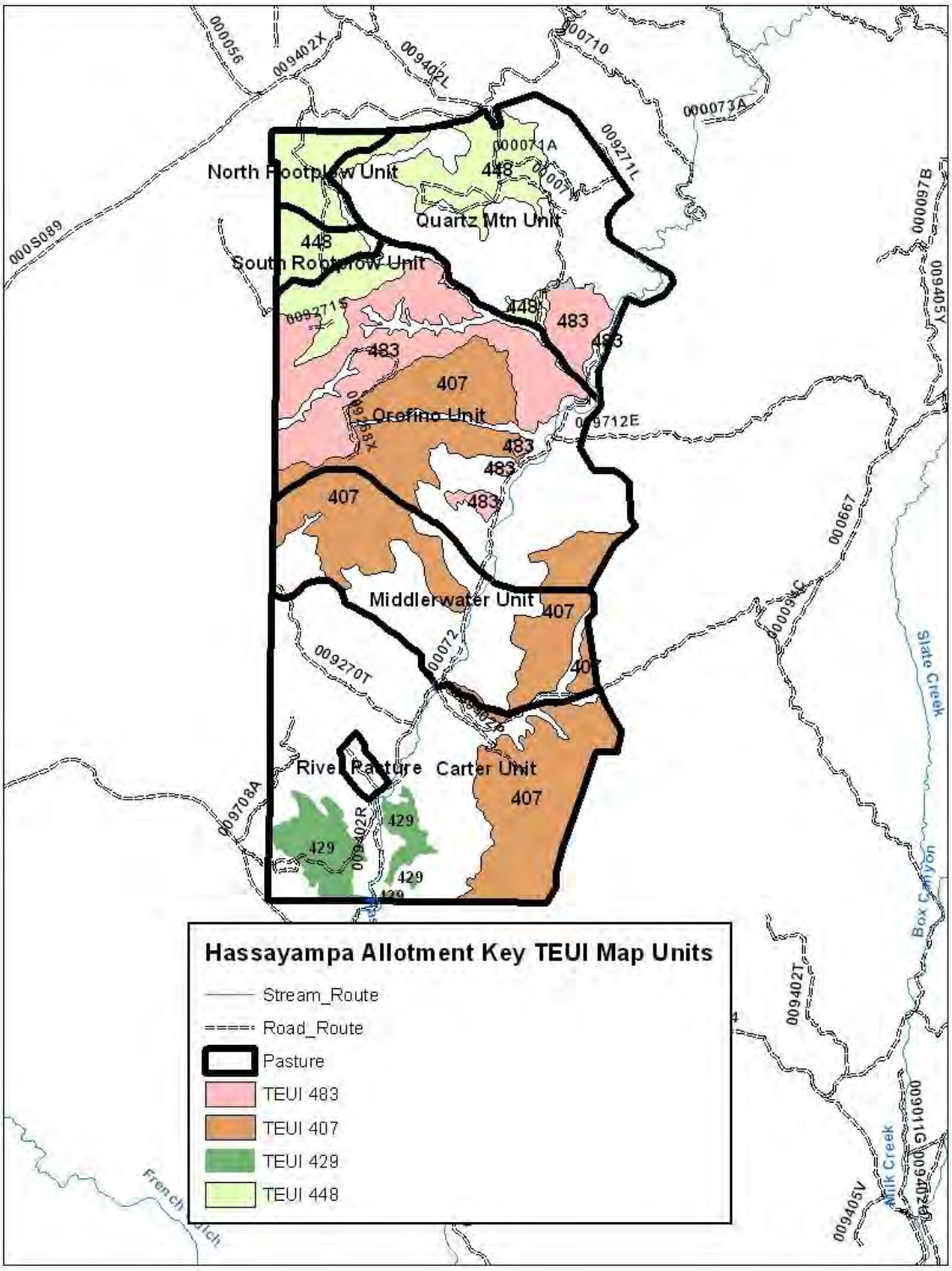

Figure 1. Locations of Key Upland TEUI Map Units

For the purpose of these analyses, it is not practical to individually analyze each map unit occurring within an allotment or project area. To facilitate a meaningful analysis, representative Terrestrial Ecosystem Unit Inventory (TEUI) map units are selected within the allotment. The areas selected for analysis are based on the key area concept; “a relatively small portion of a range selected because of its location, use or grazing value as a monitoring point for grazing use. It is assumed that key areas, if properly selected, will reflect the overall acceptability of current grazing management over the range” (SRM 1998). There were four TEUI map units chosen as key areas on this allotment, with sample locations in five pastures: Carter Pasture, TEUI 429; Middlewater Pasture TEUI 407; Orofino Pasture TEUI 483; Quartz Mountain Pasture TEUI 448; and North Rootplow Pasture TEUI 448. These map units were selected based on their accessibility to livestock, in other words, they are found on flat to gently sloping areas.

Table 3: TEUI Map Units Analyzed

TEUI Map Units	Total Acres	Percent of Allotment
429	349	3%
407	2,451	23%
483	1,221	12%
448	1,177	11%
Total Percent of Allotment Analyzed		49%

The TEUI map units can be further grouped together based on the potential natural vegetation type (PNVT) that occupies a particular TEUI map unit. There are four PNVTs on the allotment. Table 4 shows the relative acreage in each type and which TEUI units are found within each PNVT. The TEUI units displayed in **bold** are the ones inventoried for this analysis. Both the Interior Chaparral and Pinyon/Juniper-Grassland vegetation types were inventoried for this analysis. These types represent 63% of the vegetation on the allotment. Cattle are known to prefer grasses over shrubs when they are available, so the vegetation type with a grassland component was selected as a key area to determine grazing influence on vegetation. Shrubs provide a considerable amount of the available forage on the Hassayampa Allotment, so it was important to inventory this vegetation type as well.

Table 4: Potential Natural Vegetation Type (PNVT) Acreage on the Hassayampa Allotment

PNVT	TEUI included Within	Acreage	Percent of Allotment
Interior Chaparral	436, 438, 443, **448**, 475, **483**	3,938	37%
PJ-Chaparral	43, 406, 430, 434, 460, 462	3,215	30%
PJ-Grassland	**407, 429**	2,800	26%
Mixed Broadleaf Deciduous Riparian Forest	44	604	6%

Desired Vegetation Status and Rangeland Management Status (RMS) for key TEUI map units selected within the pastures on this allotment are shown in Table 5 below. TEUI 448 in the North Rootplow Pasture exhibits low perennial grass canopy cover that is not entirely a factor of the existing shrub cover. Desirable browse species were noted to be hedged at this site, as well. These factors lead to a determination of unsatisfactory Rangeland Management Status (RMS), since current management is likely causing the vegetation to trend away from desired

conditions. The other inventoried map units show either mid similarity for the existing grass cover and composition, or are stable shrub dominated sites (TEUI 448 in the Quartz Mountain Pasture) where the high shrub canopy is the greater influence on grass cover than grazing management. For this reason, the RMS was rated as satisfactory because of the stable shrub cover that was noted as “robust” at the sampling site.

Table 5: Desired Vegetation Status and Rangeland Management Status by pasture

Pasture	TEUI Map Unit	Desired Vegetation Status	Long-Term Parker 3 Step Trend	Rangeland Management Status
Carter	429	Mid to high similarity to Ecological Type (ET) for grasses	C3 Hassayampa, Up	Satisfactory
Middlewater	407	Mid to high similarity to ET for grasses	C4 Hassayampa and C1 Orofino, Down and Up	Satisfactory
Orofino	483	Mid to high similarity to ET for grasses	C1 and C3 Orofino, Up and Stable	Satisfactory
Quartz Mountain	448	DVS is shrub-dominated; existing veg. has low similarity for grasses, high similarity for shrubs	No clusters; Stable due to high shrub cover	Satisfactory
North Rootplow	448	DVS is mid to high similarity for grasses; Existing veg. has low similarity grasses, high similarity shrubs	No clusters; possible Down	Unsatisfactory

Direct & Indirect Effects on Vegetation:

The Hassayampa Allotment Range and Upland Vegetation Specialist Report addresses the direct, indirect, and cumulative effects of each alternative. A summary of the effects is provided here, with further details found in the complete report.

Effects Common to Alternatives 1 and 2:

Grazing by cattle can directly affect upland plants by reducing plant height, total canopy cover, and ground cover. The degree of these effects is influenced by utilization guidelines and timing of use. Over time, if grazing intensity is too high, indirect effects can occur such as a loss of plant species and a resultant shift in composition to less-preferred forage plants, and total forage production can be reduced. Repeated grazing impacts without allowing plants adequate time for regrowth exposes the soil to potential erosive forces from water and wind.

The conservative utilization guidelines as prescribed for this project have been shown to increase forage production and improve vegetation composition (Holechek et al. 2004). Holechek and Galt (2000, 2004) provide a comprehensive review of studies related to residual leaf lengths on Southwestern forage species and growth forms as indicators of grazing intensity. They concluded that grazing at moderate or conservative intensities will generally result in maintaining or improving rangeland conditions over time. Four of the five TEUI sampling sites for vegetation were determined to be in satisfactory rangeland management status (RMS) either because the observed canopy cover of grasses showed mid- to high similarity to site potential, or it was recognized that the existing shrub cover was high and grazing was not having an influence on the amount of grasses present. The latter case was demonstrated at the sampling location in the Quartz Mountain Pasture where there was 78% shrub cover compared to 52% for the Ecological Type 1 for TEUI 448. There would be 9% cover from perennial grasses expected, but the shrub density is likely inhibiting the establishment of any herbaceous cover. This shrub-dominated state is stable and will persist even in the absence of grazing.

The actual use records for the allotment from 1993 through 2012 show a range of stocking levels from complete non-use in 2003 to 588 Animal-Months (AMs), which is equivalent to 49 adult cattle yearlong. The average stocking level for this time period is 511 AMs, or about 43 cattle yearlong. Prior to the current configuration of pastures that was established in 1993, the project area was two distinct allotments with a combined permitted grazing of 139 cattle yearlong. Both allotments were identified as having stocking levels that were above the forage production capacity during forest plan development in the mid-1980s, so when they were combined, stocking levels were reduced to address this concern.

Using the methods outlined in Holechek (1988), grazing capacity estimates were made on the allotment as a whole by calculating the total amount of forage production by TEUI map unit as shown in the Terrestrial Ecosystem Survey of the Prescott NF (“FORG” value). The calculated Animal Units are 43 Animal Units (~ 518 AUM) when 40% of the available forage estimate is allocated to livestock for yearlong grazing, and 109 Animal Units (656 AUMs) when 50% of the forage is allocated for 6 months of dormant season use. The allowable use level for browse plants is 50-60% and it is recognized that cattle will prefer this forage source when grasses are dormant. The allowable use is set at 40% for yearlong grazing because the allowable use for grasses is 35-45%, and cattle will preferentially select grasses when they are actively growing. These calculations were made by reducing the available forage capacity for slopes greater than 10%. The Hassayampa Allotment has 89% of the acreage in slopes greater than 10%. Without reductions for slope, the calculated capacity is 62 animals for 12 months using 40% allowable forage use. The forage production values given in the TES survey are an overall average for TEUI units forest-wide and actual site specific production may vary considerably.

As with any capacity estimate, monitoring over time will be necessary to validate the proposed stocking rate. The adaptive management approach to grazing management seeks to balance stocking levels with forage production on a yearly basis. This allows for stocking in response to changes in forage production that naturally occur as a result of fluctuations in precipitation levels and seasonality.

The grazing guideline of overall light use (0-30%) for the riparian corridor at TEUI 44 will aid in leaving residual biomass and plant litter on the soil, thereby improving water infiltration, soil organic matter, and plant production over time. TEUI 44 is present in all pastures that contain the Hassayampa River. The perennial herbaceous plants that are present are mainly upland varieties such as sideoats grama, mat muhly, and threeawn grasses. There are some small patches of non-native Bermuda grass found along the stream channel. Providing upland grass

species found along the riparian corridor with rest for a majority of the growing season should help to establish new perennial grasses when precipitation is adequate.

Water sources will need to be developed away from the riparian area in order to meet the 30% allowable use level prescribed for TEUI 44. It may also be necessary to limit access to existing water sources near the Hassayampa River once use levels are met. This could be achieved by turning off water at Middlewater Well, and by fencing the Pothole Tank in Orofino Pasture and closing it off once use levels are met in the vicinity. Meeting allowable use levels can be used to trigger pasture moves or removal from the allotment prior to the scheduled end of the grazing season. Current management has not been successful in distributing cattle away from the riparian corridor.

Alternative 1 – Dormant Season Grazing

The dormant season grazing proposed with Alternative 1 will allow for growing season rest every year for warm-season grasses such as black grama, blue grama, and curlymesquite grasses that are found on the allotment. Black grama is a species that can be damaged by summer grazing, but retains good nutrient quality when dormant. Another common species, sideoats grama, is known to green up early in the spring and could be preferentially grazed in March before cattle are removed by March 31st. True cool-season grasses such as squirreltail may also be preferentially selected in early spring. Compliance with allowable use levels should provide for maintaining and improving the cool-season grass species that are present.

Applying specialized grazing systems is useful when the range is characterized as being rugged, lacking good water distribution, having the presence of riparian areas, or there is erratic distribution of precipitation across the range. All of these circumstances apply on the Hassayampa Allotment. Only 11% of the acreage has slopes of 0-10%, and this is mainly located along the Hassayampa River corridor. The allotment easily reaches temperatures in the upper 90s during the summer, and water is typically lacking in all upland stock tanks by the late spring and early summer. Cattle will be unlikely to distribute themselves more than a mile from existing water sources in summer due to the rough terrain and high summer temperatures. In contrast during the winter, slopes may be preferred to the drainages as cattle seek out sunny south-facing slopes instead of low-lying areas where cool air will settle.

The 5 areas inventoried for vegetation cover had an average of 38% shrub cover and only 10% perennial grass cover. Browse plants provide much more forage on this allotment than do grasses. Browse plants may be preferentially selected by cattle when grasses are dormant since the nutritional content of evergreen browse plants remains higher in the winter months than many dormant grasses. Dormant season grazing would take advantage of the browse forage that is preferred at this time of year anyway, and provides most of the available forage on the allotment. Under the dormant season grazing scenario, it may be possible to spread the herd throughout all pastures during the dormant season, except for the Carter Pasture that is proposed for use only from December through February. Since grasses are dormant, it is not necessary to provide for grazing deferment during the growing season through pasture rotations. Some existing pasture fences may not be necessary under this alternative, unless monitoring shows that the existing fence configuration is needed to improve livestock distribution. Controlling access to waters may also aid in improving livestock distribution.

Water sources will need to be developed away from the riparian area in order to meet the 30% allowable use level prescribed for herbaceous plants in TEUI 44. Several upland stock tanks were cleaned in the mid-1990s and were functional at that time (Riggle, Rootplow, and Orofino). The annual precipitation is generally greater during the October through March period than from

April through September. In times of lower temperatures during the winter months there is less evaporation loss from stock tanks. There may be greater chance that water is present in existing stock tanks during the winter in years with average or better winter/spring precipitation. In order to not exceed allowable use levels in the riparian corridor during the dormant season, it will be necessary to furnish at least 3 water sources away from the riparian area, and perhaps limit access to Pothole Tank and Middlewater Well adjacent to the riparian area. One additional upland water source is proposed in the north end of the Quartz Mountain Pasture. The most dependable upland water may be provided by replacing an existing stock tank such as Grassy Tank with a trick tank and pipeline system that will feed a trough farther south in the vicinity of the existing Carter Tank (a distance of about ½-mile). In order to use the Carter Pasture for 3 months during the winter and not exceed use levels, there will need to be at least one water source away from the Hassayampa River, such as the new proposed well development.

The one location where perennial grass cover is departed from the site potential that may be influenced by grazing is in the North Rootplow Pasture in TEUI 448. This soil map unit comprises 261 acres in this pasture of 276 acres. The observed shrub cover is 59%, only slightly higher than the site potential. The observed perennial grass cover was only 1% as compared to 9% for the Ecological Type 1. The change to dormant season grazing would allow complete growing season rest for the warm-season grass at this site, blue grama. The other species observed were sideoats grama and squirreltail; these can green up in the early spring and may be grazed preferentially in late March. These species would receive a majority of growing season rest every year. Improvement will depend on adequate precipitation. Dormant-season grazing should provide more opportunity for improvement at this site than Alternative 2, yearlong grazing. Improvement may take slightly longer than Alternative 3, No Grazing.

Improving plant vigor and observable reproduction (indicators of upward apparent trend) in the existing grasses would be a qualitative indicator of management success in areas needing improvement. Improvement towards meeting desired conditions for herbaceous vegetation is expected under this alternative by applying dormant season grazing and conservative allowable use levels. Since warm-season grasses will receive complete growing season rest under this alternative, improvement in perennial grass cover and vigor is expected to be quicker under Alternative 1 than Alternative 2.

Alternative 2 – Yearlong Grazing/Riparian Fencing

Alternative 2 will require using the Quartz Mountain and Orofino Pastures for a 6-month period during the growing season. Available forage calculations show that the Quartz Mountain Pasture could support 48 head for 2 months, while the Orofino Pasture could support 44 head for 4 months using a 40% allowable use factor. This is slightly less than the proposed maximum stocking rate of 49 adult cattle. It should also be recognized that a portion of the Quartz Mountain and Orofino Pastures that is east of the Hassayampa River will be removed from the pastures once the 2.5 miles of fence is constructed. The river pasture that is created could only be grazed in the dormant season. The Rootplow Pastures have a calculated capacity to support 45 cattle for 20 days at 40% allowable use, which could also be used during the growing season. The Carter Pasture is proposed for 3 months of use from December through February. The calculated capacity of this pasture for 3 months is 59 head when using 50% allowable use suitable for the dormant season. The Middlewater Pasture would then be used for the remaining 3 months during the dormant season, but the calculated capacity of this pasture is only 29 head for 3 months at a 50% allowable use level. Some of the capacity lacking in the Middlewater Pasture may be provided by the newly created riparian pasture made by fencing the river in the Quartz and Orofino Pastures. This pasture may only provide a limited forage resource since the allowable use level is 30% on riparian herbaceous plants, and this could be achieved rather

quickly before cattle even move to the uplands away from the river. The forage production values given in the TES survey are an overall average for TEUI units forest-wide, and actual site specific production may vary considerably. Yearly fluctuations in forage production based on precipitation levels will be taken into account by adjusting annual stocking and pasture rotations through adaptive management.

As with any capacity estimate, monitoring over time will be necessary to validate the proposed stocking rate. The adaptive management approach to grazing management seeks to balance stocking levels with forage production on a yearly basis. The maximum level of stocking (49 cattle yearlong) that is proposed may not be achievable in all years. Actual use records show that the allotment has carried this number of livestock many times in the recent past. Stocked at the maximum proposed level of 49 adult cattle, inspection reports note that allowable use levels have been exceeded in the riparian corridor, but are mainly being achieved in the uplands. The measures to improve livestock distribution, including developing new waters away from the Hassayampa River and fencing 2.5 miles of the river, will be essential to the success of this alternative in meeting the desired condition for vegetation.

The 5 areas inventoried for vegetation cover had an average of 38% shrub cover and only 10% perennial grass cover. Browse plants provide much more forage on this allotment than do grasses. Cattle prefer grasses and herbaceous plants to shrubs when both are actively growing. Due to the limited amount of perennial grasses on the allotment, it will be necessary to follow pasture deferment during the growing season in the Quartz Mountain and Orofino Pastures that are proposed for growing season use under this alternative. If grazing starts in the spring (April-June) in the Quartz Mountain Pasture in year 1, then in year 2 the same pasture should be used during the later summer period (July-September). This will require maintaining existing pasture fences so that the deferred rotation can be followed. Deferred rotation grazing provides a better opportunity for preferred plants (grasses) and areas (flat, gentle terrain) to maintain and gain vigor than does continuous grazing. Growing season deferment allows key forage species the opportunity to store carbohydrates and set seed during periods of seasonal rest.

The grazing guideline of overall light use (0-30%) during the growing season where impaired soil condition exists in TEUI 448 in North Rootplow, TEUI 407 in the Middlewater Pasture, and TEUI 429 in the Carter Pasture will aid in leaving residual biomass and plant litter on the soil, thereby improving water infiltration, soil organic matter, and plant production over time. Under this alternative it is likely that the North Rootplow Pasture will be used during the growing season, while the Middlewater and Carter Pastures would not be used during the growing season so the reduced allowable use levels would not apply. In order to meet allowable use levels, proper livestock distribution within pastures will be critical. Factors affecting livestock distribution include distance from water, steep or rugged terrain, diverse vegetation, and weather. Distribution problems have been noted in range inspections documented in the District 2210 Files. About 89% of the allotment acreage has slopes greater than 10%, and the gentle slopes are mainly in the river corridor. Summer temperatures are often in the mid- to high 90s. Current reliable water sources are either adjacent to the Hassayampa River or within ½-mile of the river corridor. The lack of water in all pastures has made it impossible to follow a rotational grazing system amongst the 6 existing pastures, and some pasture fences are not functional. All of these factors combined have caused poor livestock distribution and a tendency for livestock to concentrate along the riparian zone.

The one inventory location where perennial grass cover is departed from the site potential that may be influenced by grazing is in the North Rootplow Pasture in TEUI 448. The observed shrub cover is 59%, only slightly higher than the site potential. The observed perennial grass

cover was only 1% as compared to 9% for the Ecological Type 1. The Rootplow Pastures are in the north part of the allotment that would be grazed during the growing season once the river corridor is fenced. It will be necessary to monitor utilization of grasses very closely during the growing season in order to prevent over utilization of the limited amount of grasses that are present. The inventory of TEUI 448 showed only 1% existing grass cover from sideoats grama, blue grama, and squirreltail. At this level of cover, it can be difficult to adequately monitor grasses since they are widely spaced. There may not be an adequate sample size to assess utilization properly at the end of the growing season. It will require new grass plants to become established to improve the perennial grass cover towards the site potential of 9%. New grass seedlings may be impacted by grazing or trampling during the warm growing season before this can be detected by monitoring. It would be desirable to limit grazing in the North Rootplow Pasture to short time frames with a limited number of cattle to allow new grasses to establish when precipitation patterns permit. This will require that existing pasture fences be maintained so that cattle use can be better controlled in those areas needing improvement. Currently, the Rootplow Pastures are not maintained as separate units, and are generally grazed along with the Quartz Mountain and Orofino Pastures.

Under Alternative 2, the Hassayampa River corridor will be fenced in both the Quartz Mountain and Orofino Pastures. These pastures, along with the Rootplow Pastures, will then be grazed for 6 months during the summer, generally from April through September. The inventory sites in these pastures averaged only 5% perennial grass cover: 1% in North Rootplow, 0% in Quartz Mountain, and 15% in Orofino. Since cattle prefer grasses over shrubs when grasses are actively growing, it may be difficult to achieve allowable use levels in key areas that are grass-dominated. To promote maintenance and improvement in the grass component, there will be growing season deferment in the summer pastures. This means the livestock use will be rotated between the two summer pastures during this 6-month period.

Under Alternative 2, allowable use levels would not be exceeded in the riparian zone in the Quartz Mountain and Orofino Pastures because the Hassayampa River corridor would be fenced, and use therein could be easily controlled by removing livestock from the riparian pasture once use levels are met. In upland areas and unfenced riparian areas, allowable use levels as proposed are likely to be exceeded by 49 head of livestock unless additional water sources are developed to disperse the grazing use. There should be at least 2 water sources per pasture for adequate distribution. There are currently no reliable water sources in the Rootplow Pastures. To make the forage resources in these pastures usable will require establishing a water source, perhaps by reconstructing Rootplow tank, or making the Orofino Windmill functional again. The Quartz Mountain Pasture has only one reliable water source, Orofino Wash Well #2. The White Spar Well at the north end of the pasture is not functional. To be able to use the Quartz Mountain Pasture for 3 months, either the existing White Spar Well will need to be made functional, or the proposed new water source will need to be implemented. The Orofino Pasture has one reliable water source, the shared access to Orofino Wash Well #2. There is sometimes water available at Pothole Tank next to the river, but the proposed fencing of the river will need to be engineered in such a way as to allow access to the tank and not the river. This would require fencing crossing Forest Road 72 at one additional spot at a minimum. A cattleguard would be needed if fencing crossed the road due to the high level of traffic by recreational users. There needs to be a reliable summer source of water in place on the west side of the Orofino Pasture. The most dependable water source would be to construct a trick tank at Orofino Tank, then add a pipeline to provide water at a trough farther south on the route to Riggle Tank. Active grazing management will likely be needed in order to not exceed allowable use levels during the growing season. Practices could include herding, salt and supplement placement, or manipulating access to waters.

It will also be essential to maintain existing pasture fences so that warm-season deferment can be followed in the Rootplow, Quartz Mountain, and Orofino Pastures. For the Middlewater and Carter Pastures that can be used in the dormant season, there will need to be adequate water developed away from the riparian area or the 30% allowable use will likely be exceeded in the riparian corridor. In order to use the Carter Pasture for 3 months during the winter and not exceed use levels, there will need to be at least one reliable water source away from the Hassayampa River, such as the new proposed well development. The Carter Pasture is a large pasture with more forage resources than the Middlewater Pasture, so it is desirable to develop at least 2 new water sources to make use of the upland forage. The new proposed water source in the vicinity of Miner's Tank could greatly improve distribution. The most dependable water source at Miner's Tank would be a trick tank system. In the Middlewater Pasture, the existing water source at Middlewater Well will draw the cattle to the riparian area, so the 30% allowable use level will likely be exceeded prior to the end of the 3-month use period unless another water source is developed in the uplands. This could be achieved by replacing at least one stock tank (Grassy Tank or Carter Tank) with a trick tank and having pipeline to at least 2 troughs in the west part of the Middlewater Pasture.

Improving plant vigor and observable reproduction (indicators of upward apparent trend) in the grasses that do exist would be a qualitative indicator of management success. Adequate precipitation is essential to achieving optimal plant vigor and production. The proposed new water sources will aid in proper livestock distribution. More reliable upland water will also alleviate cattle watering from riparian areas. Improvement towards meeting desired conditions for herbaceous vegetation is expected under this alternative if allowable use levels are met. In order to facilitate this, water developments will need to be functional in the uplands, with at least two sources per pasture when stocked at 49 head. Alternative 2 is likely to provide for slower recovery and improvement in perennial grass cover and vigor than Alternative 1 because pastures with limited grass components will be grazed during the growing season.

Alternative 3 – No Action/No Grazing Alternative

Under the No Grazing Alternative, all cattle grazing within the allotment would be phased out over a 2-year period. Livestock impacts on vegetation would be removed. Only incidental wildlife grazing would occur sporadically at light intensities. The removal of grazing may allow for more rapid improvement in vegetation cover, vigor, and composition in TEUI map unit 448 in the North Rootplow Pasture and impaired soil locations in TEUI 429 in the Carter Pasture than Alternative 1 or 2. Where shrub cover is currently considerably above what would be expected at PNC in TEUI 448, there will likely be no improvement in perennial grass cover unless the shrub canopy is removed by fire or vegetation treatments. This stable state of shrub dominance is expected to persist even in the absence of grazing. Those areas currently considered in satisfactory condition would remain as such under the no grazing alternative, but shrub-dominated areas would need to retain natural fire disturbance regimes to retain current productivity. Removal of grazing would have the greatest impact within and adjacent to the Hassayampa River, where current grazing effects are concentrated. High use levels now seen within this corridor would be removed, leading to a faster rate of improvement in herbaceous groundcover than either alternative 1 or 2.

The cancellation of the grazing permit would create an absence of maintenance of structural improvements. Water developments and fencing would no longer be maintained unless sufficient funds in another program area allowed for such maintenance. Allotment boundary fence maintenance would have to be assigned to adjacent grazing permit holders, creating an

economic burden on them. The loss of water system improvements may have adverse impacts on wildlife habitat.

No vegetation would be impacted by the construction of new range improvements. Road closure activities could be selected as part of the No Grazing alternative, and effects would be the same as those listed under alternatives 1 and 2.

Range Improvement Effects

Alternative 1:
Alternative 1 provides for constructing four new water developments, increasing water storage at an existing well, building a new corral and expanding an existing corral, and possible riparian fencing in the Carter Pasture. An existing road would be blocked to eliminate vehicular access along about ¾-mile of the riparian corridor. The road would likely be blocked by placing boulders or other barriers at the access point for the road that is on the east side of forest road 72. The road bed would be allowed to recover through natural processes and would not be subject to further mechanical disturbance. The construction of new water sources and corrals or waterlots around them can result in the removal of vegetation in areas up to ¼-acre each. Water sources will draw livestock to use forage within proximity of the water source. Grazing impacts may be locally heavy within ¼-mile of a water source. Dormant season grazing will allow forage plants to recover after use around all water sources. The new water sources will provide for dispersion of the grazing herd away from the limited water sources currently present that are generally within ½-mile of the Hassayampa River corridor. There is an option to fence about ½-mile of the Hassayampa River in the Carter Pasture if riparian objectives are not being met by restricting timing of grazing alone. Riparian exclosure fence construction would impact existing vegetation in a limited, small area along the fence corridor. Woody vegetation or shrubs may be thinned along the fenceline. Fencing may be used to limit livestock distribution in the riparian area in order to meet long-term vegetation objectives. Access to existing improvements for maintenance and to the site of construction for new improvements may damage some herbaceous plants in a limited area. These plants should recover quickly once precipitation occurs. Employing Best Management Practices (BMPs) that limit travel to when soils are dry should mitigate long-term effects to soils and retain the productive potential for vegetation. No new roads will be created to access new range developments.

Alternative 2:
Alternative 2 provides for constructing or reconstructing up to seven water developments, increasing water storage at an existing well, building a new corral and expanding an existing corral, and constructing about 2.5 miles of new fence to prevent cattle access to the Hassayampa River from April through September in the Quartz Mountain and Orofino Pastures. There is also an option to fence about ½-mile of the Hassayampa River in the Carter Pasture if riparian objectives are not being met by restricting timing of grazing alone. An existing road would be blocked to eliminate vehicular access along about ¾-mile of the riparian corridor. The construction of new water sources and corrals or waterlots around them can result in the removal of vegetation in areas up to ¼-acre each. Water sources will draw livestock to use forage within proximity of the water source. Grazing impacts may be locally heavy within ¼-mile of a water source. The new water sources will provide for dispersion of the grazing herd away from the limited water sources currently present that are generally within ½-mile of the Hassayampa River corridor. Fence construction would impact existing vegetation in a limited, small area along the fence corridor. Woody vegetation or shrubs may be thinned along the fenceline. Fencing may be used to limit livestock distribution in the riparian area in order to meet long-term vegetation objectives. Access to existing improvements for maintenance and to the

site of construction for new improvements may damage some herbaceous plants in a limited area. These plants should recover quickly once precipitation occurs. Employing Best Management Practices (BMPs) that limit travel to when soils are dry should mitigate long-term effects to soils and retain the productive potential for vegetation. No new roads will be created to access new range developments.

Alternative 3: No vegetation would be impacted by the construction of new range improvements. Road closure activities could be selected as part of the No Grazing alternative, and effects would be the same as those listed under alternative1.

Cumulative Effects on Range Vegetation Resources

The cumulative effects analysis area considered for effects on range/vegetation resources consists of the Hassayampa Allotment project area. The past and present activities and events that have affected the vegetation include livestock and wildlife grazing, unauthorized OHV use, recreational impacts, mining, and roads. These activities may affect vegetation in ways similar to livestock grazing through removal of plant canopy cover. Indirectly these activities may affect vegetative productivity by causing soil compaction that leads to reduced water infiltration and then to reduced plant growth. Removal of vegetation can expose the soil to erosion and thereby reduce long-term productive potential for vegetation. Prescribed burning for the purpose of chaparral regeneration was conducted from 1995 to 1999 over about 5,100 acres. The vegetation has likely recovered to pre-fire levels in the absence of retreatment. No large wildfires have occurred on the allotment in recent history. There have been several unplanned spot ignitions that have occurred over the years, but these have affected very small acreages.

Site visits show that impacts from recreational activities on the allotment are extensive; consisting of dispersed camping on main roads and at corrals and windmills, target shooting, wood-gathering, and off-highway vehicle use. Recreational use is high due to the proximity to the community of Wilhoit. There are popular pull-off spots along Forest System Road (FSR) 72 where the soil is heavily compacted from vehicles. Vegetation production will be reduced where soil compaction is severe. There is evidence of repeated OHV use in the riparian corridor where it is wide and sandy. This area is not authorized for motorized travel, but enforcement of travel management rules has been lacking. Long-term impacts from 100 plus years of grazing on the allotment are reflected in baseline conditions for vegetation, discussed previously. There is evidence of a trace amount of browse on desirable shrubs by deer and other wildlife, but this use is minimal over the entire allotment. Allowable use guidelines do not distinguish between wildlife use and livestock use.

Mining activities are very active currently and are likely to remain so and expand. Current mining activities are mainly evident in the Quartz Mountain and Orofino Pastures. At present, there are at least 10 acres that are either being actively excavated or are devoid of vegetation due to the presence of mine tailing piles. This could increase as new claims are developed. Where roads exist on the allotment there is an absence of vegetation. No new roads are planned, and this effect should remain constant and localized. Occasional road maintenance may damage or remove small amounts of vegetation adjacent to roads. Run-off from improperly drained roads has the potential to accelerate soil erosion and remove existing plants. The effects of these other activities, when added to livestock grazing and management as described under the proposed action, do not change the anticipated effects over-all with regard to the apparent trend of the desired vegetation status or the rangeland management status. The impacts created through livestock grazing, improvement construction and the adaptive management described for the action alternatives, when added to the other past, present and future activities do not

together accumulate to levels that are considered to be significant for the vegetative resources, nor are they expected to lead to irreversible effects to vegetation.

Soils

Existing Condition:

Soil condition is an evaluation of soil quality or the capacity of the soil to function within ecosystem limitations to sustain biologic productivity, maintain environmental quality, and promote plant and animal health (USDA FS 1999). The soil condition rating procedure evaluates soil quality based on an interpretation of factors that affect three primary soil functions. The primary soil functions evaluated are soil stability, soil hydrology, and nutrient cycling (USDA FS 1999). These functions are interrelated.

Soils in the Orofino and Quartz Mountain Pastures are in satisfactory condition. Some inherent soil instability is occurring due to erosive parent material and very steep slopes. The representative map unit in the Carter Pasture is in impaired condition although the entire pasture contains a mixture of satisfactory and impaired soil condition. The compaction in some areas along with the poor vegetation spatial distribution has accelerated runoff and erosion rates. Soils in the Middlewater Pasture are in impaired and satisfactory condition. Satisfactory soil conditions are associated with north facing aspects that have high levels of vegetative ground cover and are stable. The south facing aspects are exhibiting impaired soil conditions. Poor vegetation spatial distribution has contributed to accelerated soil loss and created erosion pavement patches. Soil conditions in the analyzed map unit of the North Rootplow are highly variable. However, representative sampling indicates impaired soil conditions exist. Graminoid cover is low and vegetation ground cover is not well distributed across the site, resulting in hydrologic runoff connectivity and accelerated soil loss.

Direct & Indirect Effects on Soils:

The effects analysis predicts a soil condition trend but does not necessarily identify a change in soil condition class. There are many factors that influence soil condition processes and changes in soil function are variable and could take up to 100 years on some soils in less than satisfactory condition. However, extraneous factors and TEUI potentials were considered when predicting soil condition classes associated with each alternative within a 10-year time frame.

Alternative 1 – Dormant Season Grazing

All satisfactory soil functions would remain similar because adaptive management measures would be employed to maintain desired conditions. Grazing intensity guidelines would be prescribed to maintain residual biomass for vegetative ground cover retention for the protection and maintenance of soil function, but not to the extent of Alternative 3. Favorable nutrient cycling, soil structure and infiltration, and soil stability would be maintained.

Impaired soil conditions of TEUI 429, in the Carter Pasture, are expected to improve, but not to the extent of Alternative 3. Best Management Practices and resource protection measures would promote the improvement of vegetation spatial distribution. Construction of the two new water developments in the uplands in this pasture would aid in livestock distribution and help achieve the grazing intensity levels. Dormant season grazing would ensure growing season rest for warm season herbaceous plants in this vegetative type, leading to more biomass – both above and below ground – and litter production. Lower grazing intensity levels would also discourage concentrated use and minimize the impacts of localized soil compaction. Retention of additional vegetation biomass would improve soil organic matter and nutrient cycling, assist in

alleviating localized soil compaction, contribute to favorable soil structure and infiltration, and promote soil stabilization.

In the Middlewater Pasture, the impaired soil condition associated with the south aspect of TEUI 407 are expected to improve but not to the extent of Alternative 3. Dormant season use would ensure growing season rest for warm season herbaceous in this vegetative type and there would be reduced frequency of trailing between the upland portions of the pasture and the river corridor for water. Grazing intensities would decrease through implementation of Best Management Practices and management objectives would strive to improve vegetation spatial distribution. Accelerated soil loss associated with erosion pavement patches are expected to stabilize and decrease in size and frequency because additional residual biomass would be retained on the site resulting in an increase and improvement in vegetation ground cover spatial distribution. The allowable use level for impaired soil areas of up to 30% use during the growing season would allow for 70% of residual biomass to be retained, which would improve soil organic matter, nutrient cycling, soil structure, and infiltration, and subsequently decrease runoff and accelerated soil loss.

Impaired soil conditions of TEUI 448 in the North Rootplow would improve but not to the extent of Alternative 3. Following Best Management Practices and implementation of resource protection measures would decrease intensity levels and promote the improvement of vegetation spatial distribution. Lower grazing intensities levels would promote recruitment of graminoid cover. This, along with growing season rest for warm season graminoids, would lead to improved vegetative ground cover spatial distribution and nutrient cycling, improved soil structure and infiltration, decreased hydrologic runoff connectivity, and assist in stabilizing accelerated soil loss.

Alternative 2 – Yearlong Grazing/Riparian Fencing

Effects of this alternative are generally similar to those of Alternative 1. The existing satisfactory soil conditions would continue.

Impaired soil conditions on TEUI 429 are expected to improve similar to Alternative 1 with the similar dormant season use, new water development in the uplands, and application of Best Management Practices, including intensity guidelines.

In the Middlewater Pasture the development of reliable water in the far west portion of the pasture would increase the ability to obtain livestock distribution. Its use during the dormant season would provide growing season rest for warm season herbaceous with similar benefits to the south aspect slopes of TEUI 407 as described under Alternative 1.

Impaired soil conditions of TEUI 448 in the North Rootplow would improve but not to the extent of Alternative 3. This pasture is likely to be used during the growing season, so grasses would be used when actively growing, although applying Best Management Practices and resource protection measures would decrease intensity levels and promote the improvement of vegetation spatial distribution. Lower grazing intensities levels would promote recruitment of graminoid cover and subsequently improve vegetative ground cover spatial distribution and nutrient cycling, improve soil structure and infiltration, decrease hydrologic runoff connectivity, and assist in stabilizing accelerated soil loss.

Alternative 3 – No Action/No Grazing Alternative

All of the satisfactory soil conditions would be maintained because no grazing impacts would occur. More graminoid and vegetative ground cover would be retained on the site than under alternatives 1 or 2. This would promote nutrient cycling, favorable soil structure and infiltration, and soil stability.

Impaired soil conditions would improve because more vegetation biomass and organic matter would be retained on the site and no localized trampling associated with livestock grazing would compact the soils. Vegetation spatial distribution would improve and subsequently improve the spatial distribution of soil organic matter, nutrient cycling, soil structure, and infiltration, and would assist in stabilizing the soils. Erosion pavement patch sizes and frequency would decrease because runoff would decrease which would promote soil stabilization and soil function recovery. Graminoid recruitment would not be influenced by livestock grazing. Improvement of vegetative ground cover spatial distribution would decrease the hydrologic runoff connectivity and would promote soil stabilization.

Range Improvement Effects – Alternatives 1 and 2:

Range improvement construction would eventually impact approximately ¼ acre for water developments, and a thin, linear corridor for fencing. The direct effects of construction activities has the potential to decrease and damage protective vegetative ground cover, and cause soil displacement and compaction over a small, limited area. This has the potential to decrease infiltration, increase runoff, accelerate soil loss, disrupt nutrient cycling, and ultimately negatively impact productivity. Soil disturbance and excavation can also expose unfavorable subsurface soil properties that may reduce soil productivity. These potentially negative impacts would be largely mitigated by implementing range improvement soil and water conservation practices identified in Best Management Practices for project implementation. Range improvement soil and water conservation practices, identified in the BMPs, provide guidance on site evaluation, site preparation, and erosion control measures as a means to minimize soil damage to productivity.

Alternative 3, No Grazing:

There would be no impacts to the soil resources from range improvement installation and maintenance because livestock grazing would not occur. However, the removal of range improvements has the potential to negatively impact the soil resources but these impacts would be largely mitigated by implementing Best Management Practices. Range improvement soil and water conservation practices, identified in the BMPs, provide guidance on site evaluation, site preparation, and erosion control measures as a means to minimize soil damage to productivity.

Cumulative Effects on Soil Resources

See entry on page 55: “Cumulative Effects on Soil, Watershed Condition, and Water Resources”.

Riparian Vegetation Resources_____

Existing Condition:

The Hassayampa River has an intermittent stream flow and supports two distinctive riparian plant communities within the Hassayampa grazing allotment: a broadleaf deciduous riparian community type and a desert willow/net leaf hackberry riparian community type (USDA 2000, 2005). Although surface water is present seasonally within the allotment, presence of the broadleaf deciduous riparian community type indicates that subsurface water with a relatively high accessible water table is present for much of the year. This community type occurs in the

lower Quartz, lower Middlewater and lower Carter Pastures. The desert willow/net leaf hackberry riparian community type is found where the water table of subsurface water is too low to support many obligate riparian species during the year. This riparian community type, although drier, shares many plants listed as wetland indicator species (see table, Appendix 5) that are found in the wetter broadleaf deciduous riparian community type.

Quartz Mountain Pasture Approximately 1.8 miles of the Hassayampa River is located in the Quartz Mountain Pasture at the northern end of the Hassayampa Allotment. The upper 0.8 mile is located in a steep-walled canyon with little development of riparian vegetation because of re-occurring high flows and rocky substrate. No road, mining, or grazing activities occur within this canyon reach. The one mile reach of the Hassayampa River below the canyon lies in a wide valley bottom (> 300 ft.) that supports the most structurally and compositionally diverse stands of mature broadleaf deciduous riparian vegetation in the allotment. This is most likely due to higher water availability supplied by upstream flows confined downstream within the narrow valley bottom of the Quartz Mountain Pasture. This riparian vegetation does not extend much below the dredge tailings in the upper Orofino Pasture. This reach also appears to have the highest livestock use impacts. This may also be attributed to availability of surface water and shade. Mining operations and dredge piles occupy large areas within the riparian area, reducing and fragmenting riparian vegetation, and concentrating the impacts associated with other activities (cattle grazing and roads) on remaining floodplains and terraces.

Although fragmented by mining activities and roads, this mature broadleaf deciduous forest has the highest canopy cover, woody species density, and age class diversity in the allotment. Tree species include cottonwood, red and Goodding's willow, velvet ash, sycamore, box-elder and walnut. Mature and old growth trees are present as well as the more common pole (9-12 inch diameter at breast height or dbh) and medium sized (12-20 inch dbh) trees. Saplings and seedlings indicate that regeneration is occurring, although seedling density is low. Opportunities for tree regeneration may be limited because of the high level of browsing that is occurring. The channel is entrenched but stable because of the dominance of large cobbles and boulders. Cottonwood and willow regeneration is most successful on fine sediment deposits, largely lacking in this reach. This may be due in part to placer mining, and also because of the scouring flows that occur below the canyon. Large, old broadleaf deciduous trees occur on the older terraces associated with the drier desert willow and net leaf hackberry community type. The desert willow/net leaf hackberry community type is also present.

Riparian mid-story plant species diversity is also highest within this pasture. As with tree species, tall and midsize shrubs, including net leaf hackberry, waterweed, false indigo, mulberry, canyon grape and desert honeysuckle are heavily hedged. Even riparian trees and shrubs with low palatability ratings, (walnut, desert willow, burrobrush, brickellbush, and desert broom) are moderately to severely hedged.

Species diversity of the herbaceous component (grasses and forbs) of both riparian communities has been the most affected. Both cover and species diversity is extremely low. Non-native and annual species are the most commonly occurring species. Bermuda grass, a nonnative but functionally important species, is also uncommon. It is grazed continuously to less than 0.5 inches stubble height. Its rhizomatous roots are important for protecting the few remnants of highly altered streambanks comprised of fine textured sediments. Only a few individual plants of native deergrass, sedge, rush, and mint were observed.

In addition to damage caused by browsing, breakage of the lower limbs of trees and shrubs is common. Livestock seem to prefer to trail and loaf on the terraces because they are dominated

by fine textured sediments (sand and small gravel). These areas have high levels of ground disturbance.

Orofino and Middlewater Pastures The stream channel, valley bottom and riparian vegetation in the Orofino and Middlewater Pasture is similar and described together. The Orofino Pasture includes about two miles of the Hassayampa River. The Middlewater Pasture includes about one mile of the river. The Hassayampa River in these pastures is wide, braided, unstable, and typically occupies at least 25% of the valley bottom. Desert willow/net leaf hackberry community is the predominant riparian community type. This vegetation type is found both on older terraces and on more recently created developing floodplains. The older terraces are characterized by fine textured sediments, a slightly higher density of plants and taller shrubs, and pinyon pine. The dominant sediment of the newer terraces is coarse, unsorted gravel and cobble. Cattle's browsing of riparian vegetation is similar on both fluvial surfaces, although trailing and ground disturbance are more apparent on the terraces.

Isolated and small groups of large, old, often decadent cottonwood and ash dot the valley bottom, most commonly at the mouths of tributaries or along hill slopes bordering the riparian area. Seep willow is often found in these areas. The highest density of these trees occurs at the southern end of the Middlewater Pasture, where there are small stringers of younger, broadleaf deciduous trees adjacent to new channels. Heavily grazed Bermuda grass patches are found under some of the old trees. Recreational impacts are also associated with these areas. Off-road vehicle use is common.

Carter Pasture The Carter Pasture includes about two miles of the Hassayampa River. The upper one mile of the riparian area is similar to that of the upstream Middlewater Pasture. The valley bottom is wide. The channel is braided, and the developing floodplain and terraces support the desert willow/net leaf hackberry community type. There are stringers of even-aged cottonwood, ash and occasional Goodding willow, potentially established post 1990s floods. There are a few patches of very large old cottonwood and ash in the Middlewater and Carter Pastures. There are no stands of trees between these very old and relatively younger stands, leaving a gap in age class distribution. This reach may also be supported by contributing, subsurface flows from Middlewater Creek, a tributary to the Hassayampa River that drains from the east.

There is a change in geologic type in the middle of the pasture. The valley side slopes steepen, often forming volcanic cliff faces. The valley bottom narrows from 300 feet to less than 100 feet at the south end of the allotment. The extent of terraces is reduced as the canyon narrows downstream. In the lower end of the canyon, the stream channel and floodplain occupy the valley bottom. Most of the patches of mature broadleaf deciduous trees and old single stem hackberry found in this lower mile occur on terraces in the desert willow and net leaf hackberry community type. The few red willow, Mexican elderberry, mulberry and desert olive observed on the allotment were found in these small tree stands.

The sand, gravel and cobble dominated channel and floodplain support early successional shrubs, and seedling and sapling trees typical of the broadleaf deciduous riparian plant community. Young seep willow, Fremont cottonwood, burrobrush, velvet ash, desert willow, hackberry and Goodding willow line newly created stream channels and spread out across developing floodplains. It appears that recent, reoccurring flood flows are maintaining vegetation in an early successional stage, with only a few trees reaching the 5-9 inch dbh pole size. However, this one mile reach is the only section of the Hassayampa River in the grazing allotment where reproduction of broadleaf deciduous trees is vigorous. Drought stress is

causing some mortality of trees and shrubs. Cattle browsing and hedging was observed on some seedling trees and shrubs in 2012. In June 2013, little hedging was observed. As in the other pastures, the understory is lacking in species diversity and cover, dominated by annuals and non-natives. Livestock impacts from trailing, loafing, and grazing are higher in the upper end of the Carter Pasture where the primary source of livestock water, the Middlewater Well, is located.

Little has been said about the smaller shrub component that provides diversity in the mid layer. Typically, false indigo, California buckthorn, waterweed, and a variety of other mid-level shrubs contribute to the spatial and species diversity of the mid-level riparian vegetation. Many of these plants are not wind-disseminated and are infrequent or missing from the Hassayampa flora. The plants that are present are usually heavily browsed.

Riparian management should focus on improving the following existing conditions:

- There is low density of riparian tree and shrub (including but not limited to cottonwood, ash, willow, net leaf hackberry, grapevine, mulberry, honeysuckle, false indigo, and waterweed) seedlings and saplings.

- Riparian trees and shrubs less than 8 feet in height (include seedlings, saplings as well as older, suppressed plants) in both riparian community types are heavily hedged.

- Net leaf hackberry and California brickellbush (rated as having moderate/low palatability) are important wildlife forage species that are heavily hedged and with low reproduction and young plant density.

- Both the annual and often the previous year's growth of low trees and shrubs are browsed.

- Hedging of unpalatable species–desert willow, honeysuckle, elderberry, waterweed, Arizona walnut, burrobrush—indicates a lack of suitable forage in the riparian corridor.

- In addition to browse use, the lower branches of woody species are often damaged physically. Occasionally, higher, out-of-reach upper branches become broken when cattle "walked" them down to access browse.

- There are numerous cattle trails and indications of soil disturbance on riparian terraces.

- Riparian vegetation that should have dense cover and shade is open and dry because of hedging and physical impacts.

- There are a few remnant streambanks in the allotment with a protective cover of Bermuda grass. All of these areas are heavily trampled and Bermuda grass is less than one inch high.

- There is very low species diversity, density, and cover of native herbs and grasses, often with high grazing use.

- The herbaceous layer is dominated by non-native species.

Effects Common to Grazing Alternatives:

Under alternative 1, the Hassayampa River corridor would be grazed from October through March, with the Carter Pasture section being grazed only from December through February. Under alternative 2, the river corridor will be fenced in the Quartz Mountain and Orofino Pastures, and only grazed during the dormant season. The Middlewater Pasture will be grazed in the dormant season, and the Carter Pasture will have the same December through February use period. Effects of dormant season grazing will apply to both alternatives.

Implementing dormant season grazing is expected to facilitate improvement in the riparian zone by allowing for growing season rest during the summer precipitation period, which is also a time that livestock tend to congregate in riparian areas to access shade from summer heat and to access reliable water found at wells in proximity to the riparian area. Reaches within each pasture differ in existing riparian condition and potential for recovery.

If the change in grazing season is accompanied by a clear preference for upland use with incidental use in riparian areas, the condition of the riparian vegetation is expected to improve. Water availability in the uplands will have to be sufficient to provide adequate dispersion. Because water is currently unavailable in the uplands, numbers should not be increased until the planned structural improvements are functional. Even during the cooler six month season (10/1-3/31), cattle may still prefer the Hassayampa River corridor. Although riparian trees and shrubs may shed their leaves sometime during this period, they can still remain palatable as browse plants. More than incidental use on riparian plants that have been over-used in the past will inhibit recovery and regeneration that is needed to improve plant health.

At the current time, herbaceous plants are lacking in the Hassayampa River corridor. The stubble height guidelines could only be applied if herbaceous plants become re-established. Only a few remnant sedge, rush, and deergrass plants were found in the allotment's riparian area. The frequency of these graminoids is so low that it would be difficult to select a key species for monitoring. Monitoring protocols generally have sample size criteria that currently could not be met. Most herbaceous species will also be dormant during this period. But it is not unusual to see grasses and low shrubs used during cooler seasons if they provide the most palatable forage.

Protocols for monitoring browsing intensity of woody species generally recommend that plants have a natural growth form, or that they are allowed to recover from a hedged condition prior to use. Sample sizes of key species may also be inadequate in some pastures for monitoring protocol criteria.

Generally, cattle are least likely to browse woody riparian vegetation during dormancy after leaf drop has occurred. Many other factors influence browsing preferences, especially the availability of other forage. The lower reach of the Hassayampa River in the Carter Pasture has a dense, young stand of riparian trees and shrubs. It is the only known place on the allotment where browse protocols could be successfully implemented. If this reach is used, conservative guidelines of light use may not negatively affect the development of this vegetation. The condition of riparian vegetation in the upper end of the pasture near the Middlewater Well may differ from that in the southern end. If young trees and shrubs have been heavily browsed, then only incidental use should occur until plants recover.

Riparian Function Riparian function is critical to the improvement of stream channel morphology and function. Opportunities for stream channel changes will become possible as the condition of riparian vegetation improves. Sites with the most available water will provide the best opportunities for riparian vegetation recovery. Some reaches may experience limited

recruitment and establishment of riparian vegetation due to the lack of available water in the channel, therefore remaining in unstable condition indefinitely.

Construction of Improvements
No new range improvements are to be constructed within the riparian corridor under either alternative 1 or 2. The proposed river fencing would be near the existing FSR 72 that is outside the riparian corridor. It will be important to construct the proposed fence in a location that is not subject to frequent flooding. Additional proposed water sources in areas located well outside the riparian area will be critical to improving stock distribution, even during the 10/1 - 3/31 season. This is also the period of time when water is most likely to be present in the Hassayampa River. Having the ability to manage the availability of developed water in the riparian area may also improve distribution.

Alternative 3 – No Action/No Grazing Alternative

The No Grazing Alternative eliminates the direct effects of livestock grazing. Rates of riparian vegetation recovery will be more rapid than if plants are grazed. The most predictable and rapid change will be in the growth form of plants currently suppressed by grazing or browsing. The release of these plants will increase vertical and horizontal cover, biomass, and reproduction.

Long term changes associated with desired structural and compositional components of riparian vegetation described in the desired conditions section may take much longer, and will vary considerably depending upon riparian attributes. Recovery often follows an exponential curve, very slow in the beginning with more rapid change occurring with time. There have been changes in site potential, most noticeably by the placement of old, large mine dredge piles adjacent to the channel that no longer allows the river to flow into its natural floodplain. Plant species have likely been lost. Some of the desired conditions expressed for riparian vegetation may not be possible throughout the riparian corridor on the allotment.

Herbaceous species Non-use will allow the existing herbaceous component the opportunity to recover. Individual plants should respond to eliminating grazing use with increased plant vigor, biomass, cover and seed production. Plants unknown to occur in heavily used areas will reappear. Within the 10-year planning time frame, the herbaceous component can be re-evaluated to determine if key species remain absent and if opportunity exists for re-introduction. Unlike many wind disseminated trees and shrubs, when herbaceous sedges and rushes are eliminated, fragmentation of riparian sites prevents their recovery into formerly occupied areas. Many of these rhizomatous plants can be pivotal for recovery of fine sediments and creation of streambanks.

Woody Species Decades have passed during which flooding likely created recruitment opportunities for development of new stands of riparian trees but establishment was impacted by grazing practices. Stands of riparian trees are scattered throughout the allotment. The lower Carter Pasture is evidence that reproduction is still possible. Eliminating browsing of woody riparian vegetation will allow for the attainment of multiple age classes over time. It is recognized that recurrent flood events are needed to promote seedling establishment, and these events may not occur except on decadal timeframes. Drought events will also affect the survivability of seedlings even in the absence of grazing.

Cumulative Effects for Riparian Vegetation Resources

The riparian areas of the Hassayampa River corridor in this allotment have been altered from historic and on-going mining, grazing, recreation, road impacts, and watershed changes. These activities have resulted in some irreversible changes of the condition and function of the

Hassayampa River riparian area. Because most of the riparian areas in the Hassayampa Allotment are in less than desired condition, monitoring and management will be guided by the site-specific management objectives. Compliance with site specific best management practices should result in improved riparian conditions. Therefore, the environmental consequences of the alternatives described in this environmental assessment should not result in adverse cumulative effects to the riparian areas of the Hassayampa Allotment.

Watershed and Water Resources_____

Existing Condition:

Watershed condition consists of the upland area condition plus the streamcourse or riparian condition. The upland condition is assessed via soil condition –hydrologic function, stability, and nutrient cycling. The Proper Functioning Condition (PFC) assessment method (USDI BLM 1998) is the minimum standard for assessment of riparian condition (Thomas 1996). These assessments were conducted by an interdisciplinary team including hydrology, soils, and range ecology skills. The descriptive notes recorded as a part of this assessment help to provide additional, more specific information beyond the classification.

The allotment contains portions in both satisfactory and impaired watershed condition. The upland areas which were rated impaired are TEUI 429 in the Carter Pasture, TEUI 448 in the North Rootplow Pasture and the south aspect portion of TEUI 407 in the Middlewater Pasture. Where impaired, the soil hydrologic functions of infiltration and percolation have been impacted, resulting in greater surface runoff from intense rainstorms, along with greater soil detachment and removal through erosion. The rating of impaired means that, although it is not currently in satisfactory condition, it can more readily recover through management than if it was rated as unsatisfactory.

Table 6: Watersheds in the Project Area

Hassayampa Allotment Acres by Watershed and Pasture										
5th HUC	6th HUC Watershed		Acres by Pasture							
Watershed	Number	Name	North Rootplow	South Rootplow	Quartz Mtn	Orofino	Middlewater	Carter	Total	% of HUC
Upper Hassayampa	150701030102	Buzzard Roost Wash	82	64	2026	2580	1392	354	6498	37
	150701030112	Moore's Spring				19	265	2818	3102	14
Kirkland Creek	150302030107	Sheppard Wash	117	141		634	2		894	4
	150302030109	Elmer Tank	80						80	< 0.5
Pasture Total			279	205	2026	3233	1659	3172	10574	

The Hassayampa River is the primary drainage, traversing north to south through the allotment for a distance of approximately 7 miles within the allotment and exiting the Prescott National Forest at that point. Tributaries entering within the allotment include Orofino Wash, Buzzard Roost Wash, and Middlewater Creek. The watershed area of the Hassayampa River upstream from the allotment is approximately 44 square miles. At the lower end of the allotment it is about 66 square miles, meaning that in these 7 lineal miles contributing watershed area has increased by 22 square miles, or about 50 percent.

Riparian/wetland areas are properly functioning when adequate vegetation, physical channel features, and debris is present to 1) develop root masses that stabilize streambanks against cutting action, 2) dissipate energies associated with stream flow, 3) filter sediment, capture bedload, and aid in floodplain development; and 4) improve flood-water retention and ground water discharge.

The Proper Functioning Condition (PFC) method is a qualitative, point-in-time, interdisciplinary assessment of stream channel function. Condition was assessed in the Quartz Mountain and Carter Pastures for the broadleaf, deciduous riparian community type. The reach in the Quartz Mountain Pasture was assessed to be stable and in Proper Functioning Condition given the long-term change in site potential caused by dredging and mining. The reach in the lower Carter Pasture was assessed as Functional – At Risk because of stream channel instability and inadequate riparian vegetation. It has an upward trend based on the establishment of a young, post-flood, vigorous riparian tree and shrub community. A Proper Functioning Condition assessment was not completed for the middle reach because the interdisciplinary team considered the vast majority of this reach to exhibit poor potential for recruitment and establishment of riparian vegetation due to the lack of surface water and greater depth to free water in the soil. The desert willow-netleaf hackberry community that is present will likely improve in density and cover with improved grazing management, but the overall reach is likely to remain in its current state for the foreseeable future.

Streamflow is intermittent with varying lengths of time of flow between segments and, to some degree, years. It appears to be affected by the valley bottom configuration with the widest portions generally having shorter periods of surface flow. This is the case between Orofino Wash and Middlewater Creek where the valley bottom width ranges from about 150 to 300 meters. Vegetation in this reach is primarily the desert willow – net leaf hackberry community indicative of drier sites. Just below the confluence of Middlewater Creek the valley walls close in for a distance of several hundred meters and portions of the bottom have a width of only about 75 meters. Surface water flows for a longer period of time in this portion but gradually declines as the valley bottom widens out. About one-half mile above the allotment boundary, the valley bottom narrows as the river has cut through a volcanic basalt flow. Just above the boundary, the valley bottom is only about 40 meters wide. This area in the Carter Pasture exhibits longer periods of surface flow as evidenced by the presence of broadleaf deciduous woody riparian vegetation.

Although entrenchment ratios and width/depth ratios were not measured, portions of the channel appear to have characteristics of both Rosgen D and Rosgen C classes (Rosgen 1996). Some portions have considerable braiding with multiple channels while in others there is a primary channel with a wide overflow area. These are generally consistent with valley form and width, with braiding being present in the wider valley sections and the channel tending more toward Rosgen C in the narrower segments. Even in some of the more xeric portions of the channel, some pool-riffle sequence was observed with alternating sand and gravel/cobble substrates. Channel braiding is the result of high sediment supply, highly erodible banks, moderately steep gradients, and very flashy runoff regimes. Soils described as having a severe erosion hazard comprise 58 percent of the allotment, with the highest erosion rates in soils found adjacent to much of the Hassayampa flood plain. In addition, there is considerable length of channel cutting into the toe of the steep slopes along its east side, primarily in the Orofino and Middlewater Pastures, providing an additional source of sediment. Sediment deposits are generally of coarse materials.

There are major historical impacts from hydraulic mining circa late 1800s to early 1900s followed by dragline dredging in the 1940s (Weldon 2013). Approximately one mile of channel in Quartz Mountain Pasture and the upper end of Orofino Pasture has tailings piles adjacent to the channel. This caused reconfiguration of the channel and limited room for lateral movement and development of sinuosity. The channel was probably moved in some segments as a part of the dredging process.

Water Quality:

Within the allotment there is very limited water quality data. Several stream segments of the Hassayampa River were assessed by ADEQ in the 2010 Status of Water Quality Arizona's Integrated 305(b) Assessment and 303(d) Listing Report, December 2011 to determine if Beneficial Uses were being met. A summary of this assessment for each of the segments is discussed below:

1. Hassayampa River from Copper Creek to Blind Indian Creek

This 20 mile reach includes all of the Hassayampa River within the allotment, plus several upstream and downstream miles. Copper Creek enters the Hassayampa approximately 3 miles upstream from the allotment. Blind Indian Creek's confluence is approximately 10 miles downstream from the allotment. This reach was sampled between 2004 and 2005. Although no exceedances were found, it was assessed as inconclusive for all beneficial uses due to inadequate samples for coverage of all seasons (ADEQ, 2011).

2. Hassayampa River from Cottonwood Creek to Martinez Wash

This reach begins 1.7 miles below Blind Indian Creek and extends for approximately 32 miles downstream. It was sampled between 2004 and 2008 and assessed as attaining all designated uses except Aquatic and Wildlife warmwater, which was Inconclusive. Among a number of samples one exceedance each of dissolved oxygen and E. coli bacteria was found in the lower portion of this 32 mile reach and more samples were recommended. This reach begins nearly 12 miles downstream from the allotment, with the exceedence sample taken at a distance of 35-45 miles downstream from the allotment. Once the Hassayampa River leaves the allotment it flows through private and State lands with many different uses. It is highly unlikely that the management practices on the allotment would contribute to the water quality values so far downstream and not be recognized from the sampling reach that contains the allotment.

Effects Common to Action Alternatives:

Alternatives 1 and 2 both continue livestock grazing but with changed season of use in Alternative 1 and with seasonally limited access to primary riparian areas in both alternatives. Effects of grazing management are both direct and indirect. Direct effects include the physical effects of trampling/trailing on soils within the riparian zone and on stream banks. Impacts on soil may include compaction, increases in bulk density, reduced macropore volume, and reduced infiltration and percolation rates. Both action alternatives would limit the use in the riparian corridor to 30% or less. The reduced grazing intensity would mean less trampling disturbance and displacement of soil in the riparian corridor. Stream bank effects can include bank shear and bank slope alteration which affect streambank stability. Indirect effects are through effects on vegetation – both woody and herbaceous. Implementing the allowable use guidelines for woody and herbaceous vegetation will allow for more vegetative cover to remain on site, thereby functioning to protect streambanks from loss of stability during normal flow events. Flood events are likely to cause considerable changes to the stream channel due to the large size of the watershed that drains into the Hassayampa River. Retaining adequate amounts of vegetative cover will mitigate some effects of low-intensity flooding. The current condition of

both woody and herbaceous vegetation in much of the riparian zone is such that it is difficult to predict the precise effects of changes in grazing management.

Construction of Improvements -
There are existing low standard roads and/or non-system travelways to previously constructed range water developments that are proposed to be improved or replaced with more reliable sources. Although the installation and maintenance of range improvements has the potential to damage the soil resources, the potential adverse effects would be largely mitigated by implementing Best Management Practices. Range improvement soil and water conservation practices, identified in the BMPs, provide guidance on site evaluation, site preparation, and erosion control measures as a means to minimize soil damage to productivity. Soil and water impacts from construction of the new range structural improvements would be localized and temporary.

The new fence for a riparian pasture in Alternative 2 generally parallels FSR 72 on the uphill side with segments being located on the outer portion of the terrace and on the toe of the steep slopes of TEUI 406 and 407. Best Management Practices to minimize erosion and to safely accommodate flows from lateral channels would be implemented.

Road Closure -
Closure of FSR 9402R would eliminate the periodic impacts of vehicular traffic in the riparian zone at the lower end of the Carter Pasture. The road is both in the active channel and on the terrace. Impacts to woody vegetation recruitment on the terrace and streambank edge would be eliminated.

Water Quality –
The information from the ADEQ assessment indicates that the waters of the Hassayampa River within and downstream from the Hassayampa Allotment are not on the threshold of being impaired. Very slight and temporary amounts of incremental sediment might occur as a result of soil disturbance in construction of range improvements.

Alternative 1 – Dormant Season Grazing

Upland watershed conditions would be maintained in satisfactory condition on those soils currently in satisfactory condition. Dormant season grazing would ensure growing season rest for warm season herbaceous plants, which are important in maintaining soil function in the TEUI units not having chaparral as the overstory, e.g., TEUI 429 in the Carter Pasture and south facing slopes of TEUI 407 in the Middlewater Pasture. This, along with the grazing intensities, would lead to more biomass – both above and below ground – and litter production, improving soil hydrologic functions. This would increase infiltration rates and decrease surface soil erosion.

Development of waters in the uplands would provide alternative water sources for livestock. However, during part of this season water could be flowing in the Hassayampa River for much of its length through the allotment. Livestock which have habituated to primary use along the river corridor might need to be replaced and/or have initial active distribution practices such as herding, salting/supplementation, et al (Wyman 2006) in order to acclimate them to these waters and accompanying forage in the uplands.

In the Carter Pasture the combination of reduced season (Dec-Feb), plus development of new waters in the uplands should reduce grazing impacts on seedlings and saplings of woody plants in the lower end of the pasture and allow their development to increase streambank stability

during interim periods between very infrequent flood events (e.g., ≥ 25 yr. frequency) and for longer periods on the terraces. Remnant native herbaceous plants would have an opportunity to develop and produce seed. The reach at the lower end, currently assessed as Functional-At Risk with upward trend would move toward Proper Functioning Condition. Construction of a riparian exclosure in the lower end of the pasture, if determined to be needed, would increase the opportunity for vegetative recovery and would have similar effects to the no grazing alternative. Because this lower end has water near the surface for a longer period of time, it would have better potential for obligate herbaceous vegetation. However, if the construction of an exclosure results in using the remainder of the Carter Pasture outside the Dec.-Feb period, the riparian segment at the very upper end of the pasture, where there is also a longer period of surface flow, could be impacted, especially with the construction of a new well very close across the river. However, close monitoring and adaptive management could minimize such impacts.

In the Quartz Mountain Pasture, the addition of a new water source in the northeast portion, plus expansion of the Orofino Wash Well 2 storage, would decrease the dependence on the river for water, and excluding the hot weather season would reduce the tendency to use the riparian area for shade. Soils on the banks and terraces would be subject to less trampling and surface disturbance and there would be greater opportunity for remnant herbaceous plants to develop and produce seed. Given time this would lead to more vegetation biomass and would improve soil organic matter and nutrient cycling, contribute to more favorable soil structure and infiltration, and promote soil stabilization. The stream is currently assessed as Proper Functioning Condition within its limitations of past channel impacts, but not at a desired condition due to the riparian vegetation. This would be expected to improve.

In both the Orofino Pasture and the Middlewater Pasture, use during the dormant season would increase the probability of the existing earthen stock tanks being able to provide water for livestock use in the uplands more than a mile from the river (although this would likely vary from year to year depending on precipitation patterns). These, along with development of a reliable water source in the northwest portion of the Orofino Pasture, would provide an opportunity to increase use in the uplands. Excluding the hot weather season would reduce the tendency to use the riparian area for shade. Warm season rest would favor improvement of the remnant herbaceous species within the riparian area. There would be reduced trampling/trailing on the terraces. The net effect would be a gradual increase in vegetation biomass, nutrient cycling, and improvement of soil structure and hydrologic function.

Alternative 2 – Yearlong Grazing/Riparian Fencing

This alternative would continue the current yearlong grazing but would place emphasis on protecting the riparian corridor during the warm season (April – September) with a fence along the west side of the river in the Quartz Mountain and Orofino Pastures creating the Orofino Riparian Pasture with only dormant season use. The Middlewater Pasture would have only dormant season (Oct-Mar) use. In addition the Carter Pasture would be limited to December -- February use. It would require improving existing or developing new water sources in the uplands of both the Orofino and Middlewater Pastures.

In the Carter Pasture the effects would be similar to Alternative 1.

In the Quartz Mountain and Orofino Pastures the development of a riparian pasture would provide flexibility for adjusting use in the riparian corridor based on year to year conditions. The impacts of trailing across steep slopes to water at the river (and then frequently staying along the river corridor for extended periods) would be eliminated. The effects along the river corridor would be generally similar to Alternative 1; however, the flexibility afforded by having the

separate riparian pasture would provide a greater opportunity for adaptive management to capitalize on recruitment episodes or to adjust timing and intensity as suggested by monitoring.

In the Middlewater Pasture, the effects would be generally similar to Alternative 1 due to the same season of use. However, the additional reliable waters would provide the ability to reduce the degree of livestock trailing to the river and then staying along the corridor.

Alternative 3 – No Action/No Grazing Alternative

The No Grazing Alternative eliminates the continuing effects of livestock grazing to stream courses and riparian areas in the Hassayampa Allotment. The potential and rates of recovery are variable and difficult to predict, but will be most rapid under this alternative.

Riparian areas are generally regarded as having high inherent potential for recovery from disturbance (Milchunas 2006). Stream channel and riparian area recovery are considered optimal when the direct effects of livestock grazing are eliminated (Clary and Kruse 2003). The amount of time required for riparian recovery after severe degradation can vary from several years to decades (Clary and Kruse 2003). Recovery is dependent on existing condition of the watershed, stream channel and riparian area (flow regime, channel gradient, dominant channel substrate, watershed area, type and extent of riparian vegetation) and future management, climate and natural disturbances. As pointed out in the riparian vegetation report, recovery of riparian vegetation often follows an exponential pattern – very slow initially, gradually improving and then more rapid improvement over time.

Without removal of vegetation by livestock, the increase of above- and below-ground biomass would improve soil conditions and litter production, improving soil hydrologic functions. A trace to light localized use would still occur from wildlife. Retaining biomass on site would increase infiltration rates and decrease surface soil erosion. Increases in vegetative ground cover within the floodplain, especially from dense stem and/or leaved herbaceous plants, would begin to trap some of the finer sediment from overbank flows which would add to the substrate for supporting herbaceous vegetation. Eventually, this could result in additional infiltration of flood water and bank storage providing additional water for intermittent flow and support of streambank riparian vegetation.

In the Quartz Mountain Pasture, the existing shrubs and seedling/sapling trees within the riparian area would be protected from the existing very heavy utilization and would move toward their normal growth form with increased above and below ground biomass, increased soil organic matter and nutrient cycling, contribute to more favorable soil structure and infiltration, and promote soil stabilization. The stream is currently assessed as Proper Functioning Condition within its limitations of past channel impacts but not at a desired condition due to the riparian vegetation. This would be expected to improve.

The riparian area within most of the Orofino and Middlewater Pastures is the net leaf hackberry/desert willow community. The valley bottom through most of this section is wider with braided channel, lower water table and shorter period of intermittent streamflow. Vegetative recovery potential is less than in the Quartz Mountain or Carter Pastures. Elimination of grazing would allow existing shrubs and seedling trees to reach their normal growth form and there would be some increase in biomass with the effects as described above. Some increase in herbaceous vegetation is expected to occur on the terraces with elimination of repeated soil disturbance of trailing and trampling. This would gradually improve soil organic matter, structure and hydrologic properties.

In the Carter Pasture, existing seedlings and saplings along the lower end of the pasture and saplings and poles at the upper end would continue to develop and increase streambank stability during interim periods between very infrequent flood events (e.g., ≥ 25 yr. frequency) and for longer periods on the terraces. Remnant native herbaceous plants would have an opportunity to develop and produce seed. The reach at the lower end, currently assessed as Functional-At Risk with upward trend would move toward Proper Functioning Condition.

Cumulative Effects on Soil, Watershed Condition, and Water Resources

In summary, by following the resource protection measures, the proposed project would incrementally improve the soil and water resources. Any potential adverse impacts to the soil and water resources due to the construction and reconstruction of range structural improvements would be temporary, localized, and would be mitigated by implementing soil and water conservation practices (BMPs). The activities affiliated with the Hassayampa Allotment grazing management would not add to the cumulative watershed effects of the other listed actions to a degree sufficient to create significant cumulative effects.

Wildlife, Aquatic Species, and Rare Plants_____

The Wildlife, Fish, and Rare Plant (WFRP) Specialist Report (project record) serves as the Biological Assessment and Evaluation that documents the effects of the two action alternatives and the no action alternative on plant and animal species and habitat that have the following status: Federally listed under ESA (Endangered Species Act), any designated or proposed critical habitat under ESA, and USDA Forest Service Region 3 sensitive species. This report also documents the effects of the alternatives on Prescott National Forest MIS (management indicator species), and species under the Bald and Golden Eagle Protection Act and Migratory Bird Treaty Act.

The best available science was used in the completion of this report. Upon review of PNF habitat data, it was determined that federally listed species under the ESA do not occur in the project area, but there is one candidate species that is proposed for listing.

Existing Condition:

The various vegetation types on the allotment support a variety of big and small game species. Big game species include mule deer, bear, and javelina, and small game includes rabbits, Gambel's quail, dove, and squirrels. Predators such as coyote and bobcat are also likely present on the allotment. Nongame species include a variety of birds, mammals, and reptiles. Availability of forage, both from shrubs and herbaceous plants, is essential to sustaining wildlife populations as is the availability of water from both natural sources and livestock water developments. The canopy cover provided by shrubs and small trees, as well as the canopy of herbaceous plants, is an important habitat constituent that provides thermal and hiding cover, and nesting sites for birds. The habitat types on the allotment include the following:

<u>Chaparral Habitat</u>

Interior chaparral habitat covers approximately 3,938 acres or 37% of the allotment. Chaparral communities include shrub oak, mimosa, ceonothus, catclaw, snakeweed, and prickly pear cactus. Shrub density is variable across this type, and perennial grasses are often found inter-mixed, especially on south-facing slopes.

<u>Pinyon-Juniper Habitat</u>

Pinyon-juniper covers approximately 6,015 acres or 57% of the allotment. Pinyon-juniper with chaparral includes a tree overstory with Utah and/or alligator juniper, with shrubs in the understory. Grasses may be common, especially on the south-facing slopes.

Riparian Habitat

The Hassayampa River is the primary drainage, with an interrupted and intermittent flow regime, traversing north to south through the allotment a distance of approximately 7 miles within the allotment and exiting the Prescott National Forest at that point. The riparian corridor consists of 604 acres or 6% of the allotment. Tributaries entering within the allotment include Orofino Wash, Buzzard Roost Wash, and Middlewater Creek. These stream courses are mainly intermittent with only short reaches of perennial water along the Hassayampa River. Collins Spring in the Carter Pasture is the only spring in the water inventory for the allotment.

Special status species are those given status by agencies responsible for managing plants, wildlife, and their associated habitat because of declines in the species' population or habitat. Birds are given provisions under the Migratory Bird Treaty Act. Special status species that occur, or have suitable habitat on the allotment and will be considered in this assessment are listed in table 7 below.

Table 7: Special Status Species

Common Name	Status
Western Yellow-billed Cuckoo	Candidate/Proposed for Listing
Western red bat	Sensitive
Pale Townsend's big-eared bat	Sensitive
Lowland leopard frog	Sensitive
Phillip's agave	Sensitive
Desert sucker	Sensitive

Candidate/Proposed for Listing - Fish and Wildlife Service has enough information on file to propose listing as threatened or endangered but listing has not yet been completed

Sensitive - Species found on Regional Forester's Sensitive Species List for Southwestern Region. The list was updated on 9/18/2013 that resulted in five species being dropped from the list that was used in the initial analysis (common black hawk, Abert's towhee, pocket free-tailed bat, Arizona toad, and longfin dace), and two species were added (A caddisfly and Verde breadroot). For the two species that were added, neither the species nor its habitat occurs within the project area as documented in the WFRP Specialist Report.

Management indicator species (MIS) were selected during the Prescott NF planning process to adequately monitor implementation of management actions on wildlife habitat and species diversity. These indicator species reflect general habitat conditions or habitat components that are of value to these and other species with similar habitat needs. Habitats for many of the Forest MIS occur on the Hassayampa Allotment. Surveys specific to this allotment are not available. Because most MIS are not rare species and the allotment contains a variety of vegetation types, it is assumed that at least some individuals of each MIS for the specific habitat type are present on the allotment. The MIS that have been analyzed for this project are listed in table 9.

Executive Order 13186, January 10, 2001, directs Federal agencies to support migratory bird conservation and to "ensure environmental review processes evaluate the effects of actions and

agency plans on migratory birds, with emphasis on species of concern." Important bird areas (IBAs) are sites that provide essential habitat for one or more species of bird, including sites for breeding, wintering, and/or migrating birds. No designated IBAs occur within the action area.

Candidate Species/Proposed for Listing:

Western Yellow-billed Cuckoo

Affected Environment: The yellow-billed cuckoo was proposed for listing under the ESA in the Federal Register on October 3, 2013. This species is associated with mature stands of cottonwood-willow riparian deciduous forest. It is also known to use dense thickets comprised of mixed hardwoods species with tamarisk included. The species is known to occur at the confluence of Verde River & Sycamore Creek, on Sycamore Creek in Sycamore Creek Wilderness Area, at Duff Spring, and at Perkinsville. It forages in the cottonwoods for large insects. In the arid Southwest, yellow-billed cuckoos are primarily restricted to densely wooded rivers and streams and damp thickets with relatively high humidity (Corman and Wise-Gervais, 2005).

Surveys have not been conducted for the cuckoo; but it could migrate through and forage in portions of the riparian habitat type within the project area. During field reconnaissance, western yellow-billed cuckoo was not observed. The majority of the cottonwood/willow habitat associated with the project area does not appear to have a consistent dense understory, an important habitat criteria used for nesting by this species. The riparian zones are intermittent with sections of mature cottonwood habitat. There is not continuous well-developed deciduous broadleaf riparian habitat in the project area that would be preferred by this species. As previously stated, yellow-billed cuckoos may utilize the riparian habitat within the allotment to migrate through and forage in, but not for nesting. Yellow-billed cuckoos are neotropical migrants and they would not be present during the dormant season. The Arizona HDMS has a documented observation during the nesting season within private lands on the Hassayampa River south of the allotment boundary near the town of Wagoner. But the USFWS map clearly illustrates that the majority of the USFWS recognized occupied areas on the Hassayampa River in Arizona are located approximately 20 miles south and off of National Forest in lower elevation desert riparian beginning near Wickenburg, AZ. This is an area that exhibits a mature riparian broadleaf deciduous forest with a well-developed understory and more stable water flow regime.

Direct and Indirect Effects:

Alternative 1: This alternative including the adaptive management and utilization guidelines for the riparian areas will help to maintain and improve the habitat conditions over time. With dormant season grazing and light grazing intensity, the existing riparian habitats will be minimally impacted by livestock grazing which will allow for future development of the understory habitat. Alternative 1 would not impact any individuals that may forage or migrate through the allotment, because yellow-billed cuckoos are neotropical migrants and they would not be present during the dormant season grazing proposed under this alternative. Livestock grazing would not be concentrated in the riparian corridor by implementing light use levels during the dormant season. This should allow for the recruitment of additional tree and shrub age classes that would improve habitat conditions for this species over time. With the proposed water developments, livestock should have better distribution especially along the south facing slopes of the uplands within the allotment. The range improvements would not be constructed in the riparian corridor, so would not affect this species. The proposed road closure in the Carter

Pasture would be beneficial since vehicular traffic would no longer be a potential disturbance in the lower portion of the Hassayampa River corridor.

Alternative 2: Same as alternative 1 since grazing in the riparian areas would only occur during the dormant season and would be restricted to light use levels. The 2.5 miles of fencing would provide for dormant season use in the riparian area once it is implemented. The resultant riparian pasture created in the Quartz Mountain and Orofino pastures would only be grazed in the dormant season, and would be subject to light utilization levels in the riparian corridor. The implementation of light use levels during the dormant season will allow for recruitment of riparian trees and shrubs over time, which would improve habitat conditions for the species. Alternative 2 will continue to graze year around in the upland habitats of the allotment pastures immediately adjacent to the riparian corridor, but the yellow-billed cuckoo is found in well-developed riparian broadleaf habitats that would be protected under this alternative. The construction of the riparian exclosure fence will occur west of FSR 72 and is not within the riparian corridor, so no effects should be seen from this construction activity that is specific to this alternative. Effects are the same as alternative 1 for other improvements and the road closure.

Alternative 3: Since there would be no grazing or associated management activities within the allotment, then there would be no direct impact to the species from livestock grazing or its management activities. Riparian area conditions in the mid-level and understory would be restored through natural processes. If yellow-billed cuckoo had utilized this riparian corridor in the past, they may recolonize if suitable habitat is restored over time.

Cumulative Effects: Additional past, present and future activities that may impact western yellow-billed cuckoo include: livestock grazing, roads, mining, and recreational activities including dispersed camping and OHV use (potential indirect disturbance). Riparian areas are attractive use areas for both livestock and humans. Livestock grazing on other allotments would follow management direction for riparian areas and species. Mining and recreation use will continue to impact vegetation and create noise from human disturbance. Use of unimproved roads adjacent to and crossing riparian zones will continue as a potential disturbance. Authorization of livestock grazing, as described in Alternatives 1 and 2 with the adaptive management tools towards desired conditions, in conjunction with the cumulative past, present and future activities would improve suitable habitat for western yellow-billed cuckoo over time. With no direct or indirect effects, there would be no cumulative impacts associated with livestock grazing or management on the western yellow-billed cuckoo.

Effects Determination, Alternatives 1, 2, and 3
No Effect

Regional Forester Sensitive Animal & Plant Species:

Western red bat

Affected Environment: This species is associated with broad-leaf deciduous riparian forests and woodlands. It roosts by day in tree foliage. Western red bats are solitary animals that prefer riparian areas dominated by walnuts, oaks, willows, cottonwoods, and sycamores where they roost in these broad-leafed trees. The western red bat is an insectivore. When it emerges from its daytime roost it searches out primarily flying insects such as moths, flying ants and beetles. On occasion it will capture an insect on the ground. Studies indicate that Western red bats migrate during the winter to Mexico and Central America to hibernate.

Pale Townsend's big-eared bat

Affected Environment: This bat is a habitat generalist, occurring from semi-desert shrubland to montane forest. It roosts and hibernates in caves, abandoned mines, crevices in rock faces, and occasionally in abandoned buildings. Available shelter appears to be a limiting factor, as is human disturbance. Because this species is sensitive to disturbance, it has been documented that they will abandon roost sites after human interference. In large portions of its western range, their dependence upon abandoned mines has put them at risk. Pesticide spraying also may affect their food source. This species feeds primarily on Noctuid moths, which are obligate users of vascular hydrophytes (plants wholly or partially submerged in water; they also grow in very moist soil). Although specializing in eating moths, they will feed on other insects such as beetles, flies and wasps. The AZGFD Heritage database (HDMS) identified three bat locations, one possibly within and two adjacent to the allotment.

Lowland Leopard Frog

Affected Environment: Lowland leopard frog occurs in perennial aquatic systems in grassland to pinyon-juniper woodlands from central to southeastern Arizona below the Mogollon Rim, generally below elevations of 6,200 feet (AZGFD 2006). They are habitat generalist and can be found in rivers, streams, springs, and earthen cattle tanks. Adults breed primarily from January to May. Egg masses are attached to submerged vegetation, bedrock, or gravel in perennial water. Eggs hatch in 15-18 days. Larvae can metamorphose in 3-4 months or as long as 9 months. Dense streamside vegetation is important escape cover (Zwartjes and others 2005). Other important streamside vegetation structures include tree root wads, debris piles, and logs. This species is known to occur in the Hassayampa River within the project area in the canyon-defined reach in the upper portion of the Quartz Mountain Pasture (Emmons and Nowak 2012). This stream segment is not accessible to livestock. Suitable habitat within the allotment is limited to short perennial reaches of water along the Hassayampa River in the Quartz Mountain and Carter pastures.

Phillip's Agave

Affected Environment: This is a large suckering agave with very tall, open, unfruited flower stalk and a dense rosette. The flower stalk has few lateral branches that are perpendicular to the main stalk. It is usually found on south and southwest facing slope edges and atop benches, occasionally on northeast facing gentle slopes. It occupies cobble and gravelly, deep and well-drained soils at elevations from 2,300 to 5,100 feet, and is often associated with prehistoric sites. Our corporate GIS database has approximately 10 locations of Phillip's agave on the north end of the allotment on various slopes within the Quartz Mountain and Orofino Pastures, and a few in the Middlewater Pasture adjacent to the Hassayampa River riparian corridor.

Desert Sucker

Affected Environment: Desert sucker are found in rapids and flowing pools of streams and rivers primarily over bottoms of gravel-rubble with sandy silt in the interstices (AZGFD 2002b). Elevation ranges from 480 to 8,840 feet. Spawning is generally in late winter and early spring in riffle areas. Eggs hatch in a few days. This species is known to occur in the Hassayampa River (Desert Fishes Team 2004). Suitable habitat within the allotment is limited to short perennial reaches of water along the Hassayampa River in the Quartz Mountain and Carter pastures.

Table 8: Summary of Effects for Region 3 Forest Service Sensitive Species

Species Name	Status	Alternative 1	Alternative 2	Alternative 3 No Grazing
Western red bat	Sensitive	No Impact	No Impact	No Impact
Pale Townsend's big-eared bat	Sensitive	No Impact	No Impact	No Impact
Lowland leopard frog	Sensitive	MIIH	MIIH	No Impact
Phillip's Agave	Sensitive	No Impact	MIIH	No Impact
Desert sucker	Sensitive	MIIH	MIIH	No Impact

MIIH – May impact individual or habitat

Direct and Indirect Effects

Effects Common to Alternatives 1 and 2

Livestock grazing can affect wildlife and their habitat through direct competition for forage, alteration of wildlife habitat structural components, trampling of nests or young, or disturbance and displacement of individuals due to the presence of livestock. The analysis of effects is based on how the action of the alternatives may affect species and their habitats in the project area. For either alternative 1 or 2, a term grazing permit would be issued for up to ten years. The permit would authorize livestock use within parameters of the alternative. Subsequent permits may be issued as long as resources continue to move further toward desired conditions or are being maintained in satisfactory condition. It incorporates monitoring of the various resources, adaptive management principles, range structural improvements, resource protective measures, and best management practices. There would be livestock grazing short-term impacts to vegetation and soil conditions in the uplands of the project area. The establishment of conservative utilization standards on upland areas in satisfactory condition, and the implementation of lighter grazing intensities during the growing season on those areas not meeting desired conditions should result in vegetative improvement.

In riparian areas, livestock grazing has the potential to reduce insect diversity and suitable habitat by reducing herbaceous ground cover, riparian tree/shrub density and recruitment. This effect will be mitigated by the implementation of dormant season only grazing at light utilization levels of 30% or less for herbaceous plants and 20% or less by weight for woody plants. The current state of the riparian vegetation is such that the herbaceous habitat component is lacking, and the observed high utilization on shrubs and small trees is affecting the structural habitat diversity and the reproductive potential of woody riparian vegetation. Reducing the level of use on riparian vegetation will be essential for the maintenance of important avian and other wildlife habitat along the Hassayampa River. Proposed water developments in the uplands would reduce livestock dependence on water sources at or near the river. The riparian areas would only be accessed during the dormant season under either alternative. Alternative 1 dormant season grazing would be immediate, but Alternative 2 would not be effective until the proposed 2.5 mile fencing in the Quartz Mountain and Orofino Pastures has been constructed. Both action alternatives may still impact regeneration of overstory tree species by incidental browsing of seedlings during the dormant season. Construction of new proposed water developments would occur outside the riparian area, therefore this activity should have no impact to species that depend on this habitat. The proposed road closure would not involve disturbance in the riparian area, so would also have no impacts.

Alternative 1 – Dormant Season Grazing

This alternative includes dormant season grazing, implementation of light use levels in the riparian corridor, and other adaptive management adjustments that will help to maintain or improve the habitat conditions over time, especially in riparian areas. The existing riparian habitats will receive complete rest from April through September, and will be lightly impacted by grazing during the dormant season through the implementation of light allowable use levels (30% or less for herbaceous species and 20% or less by weight for woody species). These measures should allow for maintenance of insect populations that are important for many bird species. Livestock grazing would not be concentrated in the riparian corridor because of the light use levels proposed, and the proposed water developments should promote better distribution, especially along the south facing slopes of the uplands that may be favored in winter months. Riparian habitat quality should improve over time by implementing the resource protection measures associated with this alternative.

This alternative would be beneficial to wildlife because livestock grazing would occur during the late fall and winter months when the vegetation is dormant. During this time, big game species will usually make a seasonal movement down to lower elevations to avoid inclement weather. There would be no competition on the allotment with livestock for palatable browse species during the spring and summer months. With the exception of some resident species, most of the bird species present during the spring and summer months will also migrate south for the winter and will not be present during the time livestock are grazing. Recovery of understory herbaceous and shrub species within the Hassayampa River riparian corridor would occur slowly over time by implementing resource protection measures such as light use and deferment of grazing if new plants become established that need to be protected until they can withstand grazing impacts.

Alternative 2 – Yearlong Grazing/Riparian Fencing

This alternative would have more impact to wildlife because livestock grazing would continue to occur year around. Competition for palatable browse species would continue to occur within the Hassayampa Allotment during the spring and summer. The indirect effects of upland grazing during the growing season may impact watershed health because forage grasses would be grazed while growing so they may not attain the vigor and reproductive potential that would be afforded by growing season rest. Reduction of herbaceous cover in the uplands can indirectly have negative consequences to riparian areas such as increased sedimentation that could affect channel characteristics and flood flows. Alternative 2 may impact ground and shrub nesting birds that are present in the spring and summer through direct trampling and disturbance of nest sites by cattle. The implementation of resource protection measures should allow the riparian habitat to improve in the long term, but not as quickly as alternative 3, no grazing. Recruitment of cottonwood, willow and other deciduous riparian tree species should occur with the construction of the proposed 2.5 mile riparian fence in the Quartz Mountain and Orofino Pastures and implementation of resource protection measures that allow for grazing deferment to protect newly established plants in the riparian corridor.

Alternative 3 – No Action/No Grazing Alternative

There would be an immediate beneficial impact to wildlife habitat under this alternative in the Hassayampa riparian corridor and the adjacent uplands where most of the heavy grazing has occurred over the years. Alternative 3 would be the best alternative for immediate response of riparian vegetation and avian species within the riparian corridor. The migratory and resident avian species associated with the understory and ground vegetation would benefit the most once the native forbs, grasses, sedges, rushes, and shrubs begin to re-establish themselves. The shrub species that have been heavily hedged will grow and regenerate. The cover

component and vertical structure important for many species of birds and mammals will begin to replace the existing open and sparsely vegetated understory amongst the large cottonwood galleries found on the north and south ends of the allotment.

Cumulative Effects on Regional Forester Sensitive Species

The cumulative effects analysis area for the Hassayampa Livestock Grazing Project includes the 6th Level HUCs watersheds that include the project area. Projects considered for cumulative effects to wildlife and their habitats for this analysis include wildfire suppression, fire and fuels projects including prescribed burning, livestock grazing, water improvements, recreational activities, roads, and mining. The activities considered in the cumulative effects analysis may modify or remove vegetation structure, which can cause a temporary loss of habitat. The effects of past prescribed burning activities are no longer noticeable in the chaparral vegetation type as this type of vegetation can recover from fire often in 3-5 years. Recreational activities are extensive in the project area and can cause wildlife displacement from human disturbance. Water improvement construction can cause minor and temporary impacts to vegetation. Improved water availability can improve habitat quality. Most wildlife will habituate to the existing roads, but habitat quality and use along and adjacent to roads drops as the road density increases. Mining activities in streams can disrupt existing aquatic habitat. Human activity and noise from mining can displace wildlife. Authorization of livestock grazing, as described, should result in improvement towards or maintenance of desired conditions and would not add to any habitat alteration or degradation that has occurred in conjunction with past, present, and future activities as described for the project area.

Management Indicator Species:

The Forest Service is required to address MIS in compliance with various regulations and Agency policy (36 CFR 219, Forest Service Manual (FSM) 2621 and 1920), which are, themselves, tiered to the Forest and Rangeland Renewable Resources Planning Act of 1974, as amended by the NFMA. The Prescott National Forest Plan was prepared under planning regulations issued in 1982. Forest level habitat and population trends for management indicator species (MIS) were discussed in "Forest Level Analysis of Management Indicator Species for the Prescott National Forest" (USDA Forest Service 2010) and excerpted for the following MIS analyzed in the project area. Management Indicator Species for which the majority of the habitat occurs and could be found in the Hassayampa Allotment are mule deer, spotted towhee, and macroinvertebrates.

Table 9: Summary of Effects on Management Indicator Species (MIS)

Mule Deer

Affected Environment: This is the MIS for early seral stage of pinyon-juniper and chaparral vegetation types (Forest service 2010). There are 635,637 acres of pinyon/juniper and 403,376 acres of chaparral vegetation on the forest. The species is present in habitat type within the project area. About 9,953 acres or 0.95% of the allotment is in various seral stages of pinyon/juniper and chaparral vegetation type. The population trend for this species is decreasing on the forest which is similar to statewide and regionwide trends.		
	Action Alternatives	**No Action**
Project Level Effects on MIS Habitat Quantity	Both Alternatives 1&2 would not alter habitat quantity of early seral stage of chaparral. Much of the chaparral habitat except for the lowest slopes near the Hassayampa riparian corridor, adjacent to the desert shrub habitat) on the allotment is steep. Proposed water sources in the allotment will increase distribution of cattle and concentrate use around the new water developments but this impact will be minimal and would not change the habitat quantity.	The No Action alternative would not alter habitat quantity of early seral stage pinyon-juniper and chaparral. Therefore no change to habitat quantity of early seral stage of pinyon juniper and chaparral vegetation.

Project Level Effects on MIS Habitat Quality	Construction of new and maintenance of existing water improvements will benefit mule deer by providing reliable water sources across the allotment and improving overall habitat quality for mule deer and other wildlife. It will also promote better distribution of livestock grazing. Some forage competition with cattle (primarily forb spp. during the growing season) can occur under Alternative 2. Livestock may compete with mule deer for browse forage (particularly in the spring/fall, since by summer they utilize grass species almost exclusively); this dietary overlap is relatively of short duration and will not measurably affect habitat quality. Fences can hinder deer movement somewhat; all fences are constructed to Forest Service big game standards. Some displacement by cattle may occur at water sources/developments. Under Alternative 1, dormant season grazing by livestock, will have little to no impact on preferred early seral browse species and there will be no grazing during spring and summer months. Alternative 2 year around grazing by livestock will continue to heavily impact palatable early seral browse species adjacent to the riparian corridor.	May somewhat reduce the quality of habitat that is available since existing water developments would not be maintained or expanded; natural water sources would remain the same on the allotment. Forage availability would increase with a decrease in competition. Habitat quality would improve in areas where grazing pressure has occurred in the immediate upland habitat adjacent to the riparian corridor.
Effects to MIS Habitat/ Population/ Forest-wide Trends	The action alternatives would not alter habitat quantity and would have a small change to habitat quality. The project area represents less than 1.0% of forest-wide habitat. No effect/change to forest-wide habitat or population trends for mule deer.	This alternative would not alter habitat quantity and would not change habitat quality. The project area represents less than 1.0% of forest-wide habitat. No effect/change to forest-wide habitat or population trends

Spotted towhee

Affected Environment: This is the MIS for late seral stage chaparral vegetation type (Forest service 2010). There are 403,376 acres of chaparral vegetation on the forest. About 3,938 acres or 0.97% of the allotment is in various seral stages of chaparral vegetation type. Spotted towhees were observed and heard within project area during field reconnaissance. They are ground nesters and forage in the leaf litter for insects. The population trend for this species is decreasing.

	Action Alternatives	**No Action**
Project Level Effects on MIS Habitat Quantity	Alternatives 1 & 2 would not alter the quantity of late seral stage chaparral. Especially since later seral stages of chaparral can grow thick and decadent, becoming a barrier to cattle movement. There would be no effects/change to late seral chaparral from grazing.	The no action alternative would not change the quantity of late seral stage chaparral located within the allotment.
Project Level Effects on MIS Habitat Quality	Habitat quality would not have a discernible change in areas of late seral chaparral accessible to cattle. Direct effects such as trampling of spotted towhee nests are very unlikely since late seral stages of chaparral are a barrier to cattle movement.	Habitat quality may improve slightly due to an increased herbaceous component in an ungrazed understory, which would increase the diversity in insect species.
Effects to MIS Habitat/ Population/ Forest-wide Trends	The action alternatives would not alter habitat quantity and would have a small change to habitat quality. There may be changes in use patterns by livestock with construction of future water developments. The project area is 2.6% of forest-wide habitat. Alternative 1: No impacts to nesting spotted towhees with seasonal dormant season grazing. Alternative 2: With yearlong grazing, low shrub vegetation nests could be impacted by livestock as they are browsing	The no action alternative would not alter habitat quantity and would have a small change to habitat quality. The project area is 2.6% of forest-wide habitat. No impact to forest-wide habitat or population trends

	and/or ground nests could be trampled by livestock. No effect/change to forest-wide habitat or population trends	

Macroinvertebrates

Affected Environment: This is the MIS for aquatic habitat and late seral riparian habitat (Forest Service 2010). Current population and habitat trends on the forest are considered stable. There are 79 miles of perennial and intermittent streams on the forest and 17,160 acres of riparian habitat. Streams within the allotment include 7 miles of the Hassayampa River. The majority of the river in the project area has intermittent or ephemeral stream flows. Suitable MIS habitat within the allotment is limited to short perennial reaches of water within the Quartz Mountain Pasture. Approximately 604 acres or 6% of the allotment is in various seral stages of riparian tree species along the Hassayampa River.

Stream channels and riparian areas reflect the very flashy runoff regimes with high sediment bedloads due to geology, steep terrain, shallow soils, and steep gradient streams. Recent riparian-wetland area assessments rated key areas along two reaches of the Hassayampa River were rated as Proper Functioning Condition (Reach 1 – Upper) and Functional-at-Risk (Reach 2 – Lower) (Hydrologist Specialist Report). Water quality monitoring for segments of the Hassayampa River downstream of the project area showed no exceedances in water quality parameters. Ratings of the warmwater aquatic community (i.e. macroinvertebrates) for these stream segments were listed as inconclusive due to inadequate sampling (ADEQ 2010).

	Action Alternatives	**No Action**
Project Level Effects on MIS Habitat Quantity	Dormant season use and light utilization of riparian areas in the project area: The Action Alternatives would not alter the quantity of aquatic habitat or late seral riparian habitat.	The No Action alternative would not alter the quantity of aquatic habitat or late-seral riparian habitat.
Project Level Effects on MIS Habitat Quality	Dormant season use of riparian areas is expected to improve riparian vegetation. There would be short-term impacts from livestock grazing and trailing along streams to streambanks and to water quality from animal waste entering the aquatic system. Implementation of RPMs would maintain vegetative structure and cover to protect streambanks and provide for maintenance of aquatic habitat. Water developments in the uplands would reduce livestock dependence on stream perennial reaches.	There would be no impacts from livestock grazing activities to habitat quality of aquatic habitat and late seral riparian habitat. Aquatic/riparian habitat and upland watershed conditions in livestock impacted areas would improve at a faster rate. MIS habitat quality would be maintained or improved at a higher rate than under the Action Alternatives.
Effects to MIS Habitat/ Population/ Forest-wide Trends	This alternative would not alter habitat quantity and would maintain or improve habitat quality. The project area is 4% of forest-wide riparian habitat. No effect to forest-wide trends.	This alternative would not alter habitat quantity or quality. The project area is 4% of forest-wide habitat. No effect to forest-wide trends.

Migratory Birds

The Forest Service is required to address the effects of agency actions and plans on migratory birds and identify where unintentional take reasonably attributable to agency action is having, or is likely to have, a measurable negative effect on migratory bird populations. In accordance with the Migratory Bird Treaty Act, Executive Order 13186, and the MOU signed December 2008, this project was evaluated for its effects on migratory birds.

Based on the existing habitat vegetation types and their status, 8 species might be expected to occur within the project area including Bendire's thrasher, Bell's vireo, yellow warbler, Virginia's warbler, phainopepla, canyon towhee, black hawk, and black-chinned sparrow. Potential grazing impacts to migratory birds include loss of nesting, foraging, and cover habitat. In riparian areas, livestock grazing in the short-term may reduce insect diversity and suitable habitat by reducing herbaceous ground cover, riparian tree/shrub density, and recruitment. The current state of the riparian vegetation is such that the herbaceous habitat component is lacking, and the observed high utilization on shrubs and small trees is affecting the structural habitat diversity and the reproductive potential of woody riparian vegetation. As a result, the riparian avian fauna has been the most affected wildlife on the Hassayampa Allotment. Ground nesting species are

most affected by cattle grazing, followed by shrub-nesting and canopy-nesting species (Krueper, et al. 2003). Bird species use different strata of vegetation and these strata have different vulnerabilities to grazing. The lower strata can be affected by short-term grazing. The shrub strata and most of its associated bird species can be adversely affected by cattle grazing, while the upper canopy and its birds are not. However, cattle grazing in the riparian zones over several decades can eliminate or reduce the upper canopy by preventing the establishment of saplings (Taylor, 1986). This is most evident in the upper riparian corridor located within the Quartz Mtn and Orofino Units and to a lesser degree in the Carter Unit. Reducing the level of use on riparian vegetation will be essential for the maintenance of important avian and other wildlife habitat along the Hassayampa River.

Alternative 1 – Dormant Season Grazing

This alternative would be beneficial to migratory birds because livestock grazing would occur during the late fall and winter months. With the exception of some resident species, most of the migratory bird species present during the spring and summer months will also migrate south for the winter and will not be present during the time livestock are grazing. Recovery of understory and shrub species within the Hassayampa River riparian corridor would occur slowly by implementing light use (30% or less on grasses, 20% or less by weight on woody species) and in time, new herbaceous plant and shrub recruitment would be expected. No take is expected under this alternative.

Alternative 2 – Yearlong Grazing/Riparian Fencing

This alternative would have more impact to migratory birds because livestock grazing would continue to occur year around. There is still the potential that low shrub and ground nesting migratory birds such as the Virginia warbler, black-chinned sparrow, canyon towhee, and Bendire's thrasher could be impacted by potential trampling, loss of cover, and disturbance from grazing especially in the uplands adjacent to the riparian corridor. Recruitment of cottonwood, willow, and other deciduous riparian tree species should occur over time with the construction of the proposed 2.5 mile riparian fence in the Quartz Mountain and Orofino Pastures, and implementation of light use levels in the riparian corridor. Unintentional take may occur under this alternative because livestock may trample nests in spring and summer for ground nesting birds.

Alternative 3 – No Action/No Grazing Alternative

There would be an immediate beneficial impact to migratory bird habitat under this alternative in the Hassayampa riparian corridor and the adjacent uplands where most of the heavy grazing has occurred over the years. Over time the understory habitat component of herbaceous plants that is currently absent in the riparian corridor will begin to show recruitment. The shrub species that have been heavily hedged will grow and regenerate. The cover component and vertical structure important for many species of birds and mammals will begin to replace the existing open and sparsely vegetated understory amongst the large cottonwood galleries found on the north and south ends of the allotment. Livestock impacts on vegetation would be removed with only wildlife grazing occurring at light intensities. The riparian areas have greater potential for recovery under the no action alternative. No take is expected under this alternative.

Important Bird Areas and Overwintering Areas:

The nearest Important Bird Area (IBA) to the Hassayampa Allotment is located 12 miles away in the Watson and Willow IBAs; therefore no IBAs are affected by the implementation of the proposed action and associated activities. Many overwintering areas are large wetlands; none of this habitat is present in the analysis area. The allotment provides limited wintering habitat for

migrant bird species and can be a staging area for winter migrants before they migrate south for the winter. Since significant concentrations of birds are not known to occur here nor do unique or a high diversity of birds winter here, there will be no effects to important overwintering areas by implementing the proposed action alternatives.

Bald &Golden Eagle Protection Act of 1942

The purpose of this assessment is to document if there is "take of eagles" with the action alternatives and the no action on bald and golden eagles protected under the Bald and Golden Eagle Protection Act. In the B&GEPA "take" is defined to include "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb." No bald or golden eagles are known to occur or nest on the allotment.

Table 10: Summary of Effects for Eagles

Species	Status	Alternative 1 Proposed Action	Alternative 2	Alternative 3 No Grazing
Bald and Golden Eagle Protection Act:				
Bald & Golden eagles	Protected	No Take	No Take	No Take

Economics

Existing Condition:

An economics analysis was conducted to compare the costs and the benefits of implementing the action alternatives and the no grazing alternative. This analysis did not consider the specific ranch operating income or costs of the current permittee, but rather took a generalized look at the relative costs associated with implementing the various alternatives. For instance, under Alternative 1, dormant season grazing, it will be necessary to move the cattle off the allotment for 6 months. There are various options for where the cattle could go during this time: private land, other grazing leases, or sold off as in the case of a yearling operation. The various options will have different costs associated with them. This analysis did not consider the specific action that may be taken by the current permittee since that would occur off forest, and is outside the scope of this analysis.

Direct & Indirect Effects:

Alternative 1 – Dormant Season Grazing

The income that will be generated from grazing on the allotment occurs in the form of grazing fees received by the Forest Service, and income from the sale of calves received by the grazing permittee. The maximum stocking level was used for the economics analysis as the basis for the herd size. Stocking at this level for 6-months will result in about $883 income from grazing fees to the Forest Service given the current fee in 2013. This benefit to the Forest Service is a cost to the permittee, so for the purposes of this analysis of net benefits, the grazing fees are excluded. It was assumed that 80% of the herd will be breeding aged animals, with an 80% calf crop every year. Alternative 1 does have a somewhat higher top stocking rate of 109 head for 6 months than the 49 head yearlong under Alternative 2. The income from the sale for calves under Alternative 1 was cut in half to reflect the fact that the calves are off the allotment for ½ the year, so only half of the potential income is generated from them being on the forest, or about $21,350.

The cost of implementing Alternative 1 range improvements is considerably lower than Alternative 2. For dormant season grazing, the cattle can be spread throughout the 4 upper pastures (Rootplows, Quartz Mountain, Orofino, Middlewater), with the Carter Pasture used from December through February only. In the winter there may be water present in the stock tanks since more precipitation falls during this 6-month period. This could result in fewer upland water developments per pasture since the entire herd may not need to be confined in one pasture as is the case in Alternative 2. For comparison purposes, the new water developments that will be implemented were assumed to have a cost of $25,000 each. Under Alternative 1, there would ideally need to be 4 new water developments constructed in the 10-year life of the grazing permit. In addition, there would be an increase in water storage and corral size at Orofino Wash Well #2 at a cost of about $4,000. The combined cost of these improvements, given the assumptions made, is $103,000 over the 10-year period, or about $10,300 per year.

The cost of grazing permit administration was estimated for both the Forest Service and the grazing permittee. This would include time spent for annual planning meetings, monitoring visits, and the cost of range improvement maintenance that is borne by the permittee. Under Alternative 1, dormant season grazing, it was assumed that 15 days per year would be required for the permittee to maintain the range infrastructure. This figure was doubled for Alternative 2 since cattle are present on the allotment the entire year, and there will be more maintenance of watergaps required to maintain pasture integrity when flooding occurs on the Hassayampa River. The administrative costs for the Forest Service and permittee are about $5,855 per year for Alternative 1.

On a yearly basis given the assumptions used for costs and benefits, there would be net revenue of about $5,195 per year for Alternative 1.

Alternative 2 – Yearlong Grazing/Riparian Fencing

The stocking rate of 49 adult cattle yearlong would yield an income to the Forest Service from grazing fees of about $794 per year at today's fee rate, but this is a cost to the permittee, so it was not used in the calculations of net benefits. The same assumptions were made for the calf crop as Alternative 1, although the entire income from the sale of calves was used since the herd is on forest yearlong. The sale of calves would generate about $18,910 per year under this alternative.

The number of water developments that would need to be implemented under Alternative 2 is higher than Alternative 1 because at least 2 water sources would be needed in each pasture to properly distribute grazing use. In a 10-year period, it was assumed that 5 new water sources would be constructed at a cost of $25,000 each. In addition, this alternative calls for constructing about 2.5 miles of fence to exclude the Hassayampa River in the Quartz Mountain and Orofino Pastures. One bid from a fencing company was solicited, with an estimated cost for labor and materials of $28,750 for this fence. This alternative also would allow for adding water storage at the Orofino Wash Well #2 and increasing the coral size. Given these parameters, the total cost of range improvements over the 10-year period would be about $156,750, or about $15,675 per year. Alternative 2 allows for development or reconstruction of up to 7 water sources. This estimate assumed that only 5 would be implemented in the 10-year period.

The cost of permit administration for the Forest Service was assumed to be the same under Alternative 2 since annual plans and field inspections will be required under either grazing scenario. The cost of maintenance to range improvements for the permittee would be higher under this alternative since fences would need to be maintained for the entire 12-months that cattle are present on the allotment. This alternative will require that all existing pasture fences

be maintained so that a rotation can be followed. For comparison purposes, it was assumed that 30 days of maintenance would be required by the permittee. Given these assumptions, the combined administrative costs for Alternative 2 is about $8,105 per year.

On a yearly basis given the assumptions used for costs and benefits, there would be a net loss of revenue of about $4,870 per year for Alternative 2.

Alternative 3 – No Action/No Grazing Alternative
Under the no grazing alternative, there would be no income from grazing fees or from the sale of permitted livestock or their progeny. Some range improvements may still need to be maintained for wildlife benefit, and some inspections would still occur by Forest Service personnel to ensure compliance with non-use. If about 5 days are spent on the allotment per year by Forest Service personnel, and about $500 per year is spent on materials to maintain essential improvements, then this alternative will result in a net cost of about $1,750 per year borne by the Forest Service.

Recreation

Existing Condition:

The Prescott National Forest in this area is open (unless posted "closed") for dispersed recreation activities such as: camping, hiking, trail use, horseback riding, hunting, mountain biking, target shooting, and motorized recreation. Motorized travel must be on designated roads and trails only (CFR 261.13). The Hassayampa Allotment area is categorized as a "General Forest Area". In a survey conducted in 2007, General Forest Areas had a 60% increase in visitation since 2002.

The Hassayampa Allotment is adjacent to the town of Wilhoit located along State Highway 89. Some people enjoy recreating in and by the Hassayampa River which runs north-south within the allotment. They often take FSR 72 to access the river. FSR 72 also is the main road in the Hassayampa Allotment. This road is a Level II road, which means it is open for use by high-clearance vehicles. Forest System Road 72 gets a lot of use from woodcutters, hunters, and river visitors.

The two motorized trails, Orofino Trail # 107 and Buzzard Trail # 129, do not get used very often. This is probably due to the fact that the trailheads are hard to find and the routes need to be more clearly defined.

People often illegally ride off-highway-vehicles in the allotment area, especially in the river area. Some recreationists have illegally cut Hassayampa Allotment's boundary fences, destroyed corrals, and have negatively impacted the land and cattle in the allotment. Some visitors shoot guns in this area and often shoot at rangeland improvements (windmills, corrals, fences, stock tanks, etc.). Sometimes rangeland improvements are shot up so much that they need repair or removal. Uncontrolled recreation use in some areas has reduced vegetative cover and compacted soils, which can lead to increased soil erosion. There has been a high incidence of illegal trash dumping in the project area.

The Recreation Opportunity Spectrum (ROS) is a land classification system that categorizes national forest land into six classes, each class being defined by its setting and by the probable recreation activities the setting offers. The six settings in the spectrum are classified as: 1) primitive, 2) semi-primitive non-motorized, 3) semi-primitive motorized, 4) roaded natural, 5)

rural, and 6) urban. The entire Hassayampa Allotment is composed of 2 ROS categories; Semi-Primitive Motorized and Roaded Natural. Semi-Primitive Motorized means that a moderate probability for experiencing solitude, closeness to nature, and tranquility in a predominately natural appearing environment is likely to occur. Roaded Natural means having an opportunity to affiliate with other users in developed sites but some chance for privacy is likely.

Special Areas:
A review of the Prescott NF records did not reveal the presence of any research natural areas or inventoried roadless areas within the allotment.

Wild and Scenic Rivers:
There are no Wild and Scenic rivers within, adjacent, or near the project area.

Direct & Indirect Effects on Recreation:

Alternative 1 – Dormant Season Grazing
Recreational opportunities such as dispersed camping, hiking, biking, horseback riding, driving, and other recreational activities are more prevalent in the dormant season (generally from October 1st through March 31st) than in the hot summer months. Recreationists and hunters may encounter cattle, but the presence of cattle and livestock grazing does not preclude or prevent recreational opportunities within the project area. Public perceptions of cattle grazing may affect an individual's recreational experience within the project area, but this is difficult to assess due to the wide range of public opinion on grazing on public lands. Continuation of livestock grazing within the project area will have minimal effect on the recreational experience of Forest users.

Alternative 2 – Yearlong Grazing/Riparian Fencing
The effects of Alternative 2 are the same as Alternative 1 concerning the recreation use of the area.

Alternative 3 – No Action/No Grazing Alternative
Most recreationists participating in various recreational activities such as camping, hiking, biking, horseback riding, driving, other recreational activities, and hunting would not notice a difference if cattle were no longer in the Hassayampa Allotment location.

Cumulative Effects on Recreation Resources
There would be no negative impacts or changes to recreation resources by choosing either Alternative 1 or 2, so there are no cumulative impacts to this resource from this project.

Heritage_____

Existing Condition:
Based on the PNF heritage resource atlas and files from 1987 to the present, heritage specialists and para-archaeologists have conducted 34 heritage resource inventories within the allotment. Projects varied in size from 198 acres to 0.5 acres; surveys were conducted prior to the implementation of range projects (4), mining projects (15), road maintenance or closure projects (11), prescribed burning (1), trail maintenance (1), special use authorization (1), and heritage site evaluation (1). Prior to 1987, para-archaeologists conducted 17 inventories but those inventories do not meet the current heritage inventory standards and the acreage will not

be included in this analysis. Based on the 34 inventories, only 436 acres have been intensively inventoried for heritage resources within the allotment. The heritage reports are on file in the Forest Heritage Resource Section at the PNF Supervisor's Office.

Direct & Indirect Effects on Heritage Resources:

Action Alternatives 1 and 2

It has been documented in the PNF range files that this area of the Bradshaw Ranger District has been grazed by livestock for over 85 years and at numbers higher than current levels. The current Hassayampa Allotment is comprised of two prior separate allotments that were grazed by a combined 139 adult cattle yearlong up to the early 1990s. Alternative 1, dormant season grazing, may allow up to 109 adult cattle to graze for 6-months, contingent upon adequate available forage and water. Alternative 2 would allow up to 49 adult cattle yearlong. Neither alternative proposes grazing at a higher intensity over the project area than was realized prior to when the two allotments were combined.

The following range projects are proposed to be implemented within the next 2 years since heritage surveys have already been completed. Access for these projects will be along existing dirt roads and trails. No road or trail maintenance has been requested.

1. Within the Carter Pasture, construction of a well, storage tank(s), trough(s), corral.
2. Increase water storage and corral size at Orofino Wash Well #2.

Based on the two proposed projects already surveyed and other recent surveys, heritage specialists have intensively surveyed an additional 35.5 acres which brings the total acreage surveyed to 471.5 acres. Four sites were recorded and will be avoided by project activities. In the future, when additional range improvements or other ground disturbing management practices are needed, the Forest Service will complete the appropriate heritage surveys and/or reports as outlined in our Region 3 Programmatic Agreement Regarding Historic Property Protection and Responsibilities between the USDA Forest Service Region 3, the State Historic Preservation Officers of AZ, NM, TX, and OK, and the Advisory Council on Historic Preservation, signed 12/24/2003, and specifically, Appendix H: the Standard Consultation Protocol for Rangeland Management, signed 05/17/2007 and be in compliance with all applicable provisions of Section 106 of the National Historic Preservation Act.

The Forest Service's proposal to continue livestock management as proposed under either of the action alternatives is considered to have a no adverse effect on the heritage resource sites located within the allotment.

Cumulative Effects of Alternatives 1 and 2

Past, present, and reasonably foreseeable future actions on the allotment have been considered as part of this cumulative impacts analysis. Authorization of livestock grazing along with the past, present, and reasonably foreseeable future actions, would have minimal cumulative effects on heritage resource sites.

Alternative 3 – No Action/No Grazing Alternative

If livestock grazing is not authorized then there would be no direct or indirect effects on heritage resource sites. Since no direct or indirect effects are anticipated, there would be no cumulative effects.

CHAPTER 4 – Coordination and Agencies Consulted

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

Individuals/Groups

Center for Biological Diversity
Erik Ryberg
Don Glasgow
Friends of Anderson Mesa
Jeff Burgess
Justin Carter
Lee and Vicki Carter
WildEarth Guardians

Federal and State Agencies

AZ Department of Environmental Quality
AZ Game and Fish Department
AZ State Historic Preservation Office
AZ State Land Offices
USDA Natural Resource Conservation Service
US Fish and Wildlife Service, AZ Ecological Services Office

Tribes

The Fort McDowell Yavapai Nation
The Hopi Tribe
The Hualapai Tribe
The Tonto Apache Tribe
The Yavapai-Apache Nation
The Yavapai Prescott Tribe

Core Interdisciplinary Team Members

Christine Thiel, ID Team Leader/ Writer / Editor/Range Management Specialist
Dave Moore, Forest Soil Scientist
Janet Grove, Contract Riparian Ecologist
Loyd Barnett, Contract Hydrologist

Extended Team Members

Albert Sillas, Aquatic Biologist
Dan Garcia de la Cadena, Wildlife Biologist
Dorothy Baxter, Recreation Planner
Elaine Zamora, Archeologist
Linda Jackson, Bradshaw District Ranger
Nancy Walls, Forest Natural Resources Staff Officer
Thomas Potter, GIS Coordinator

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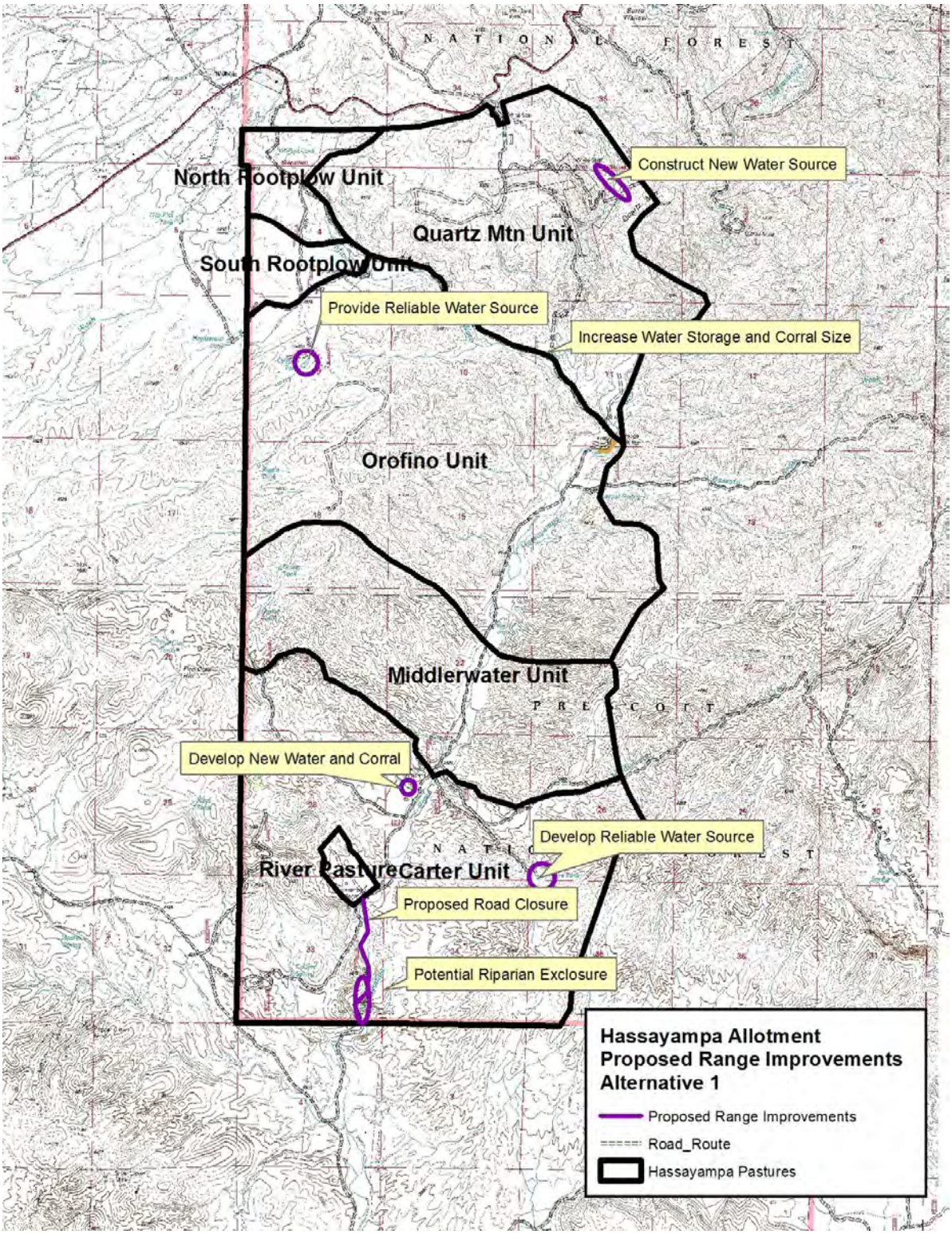
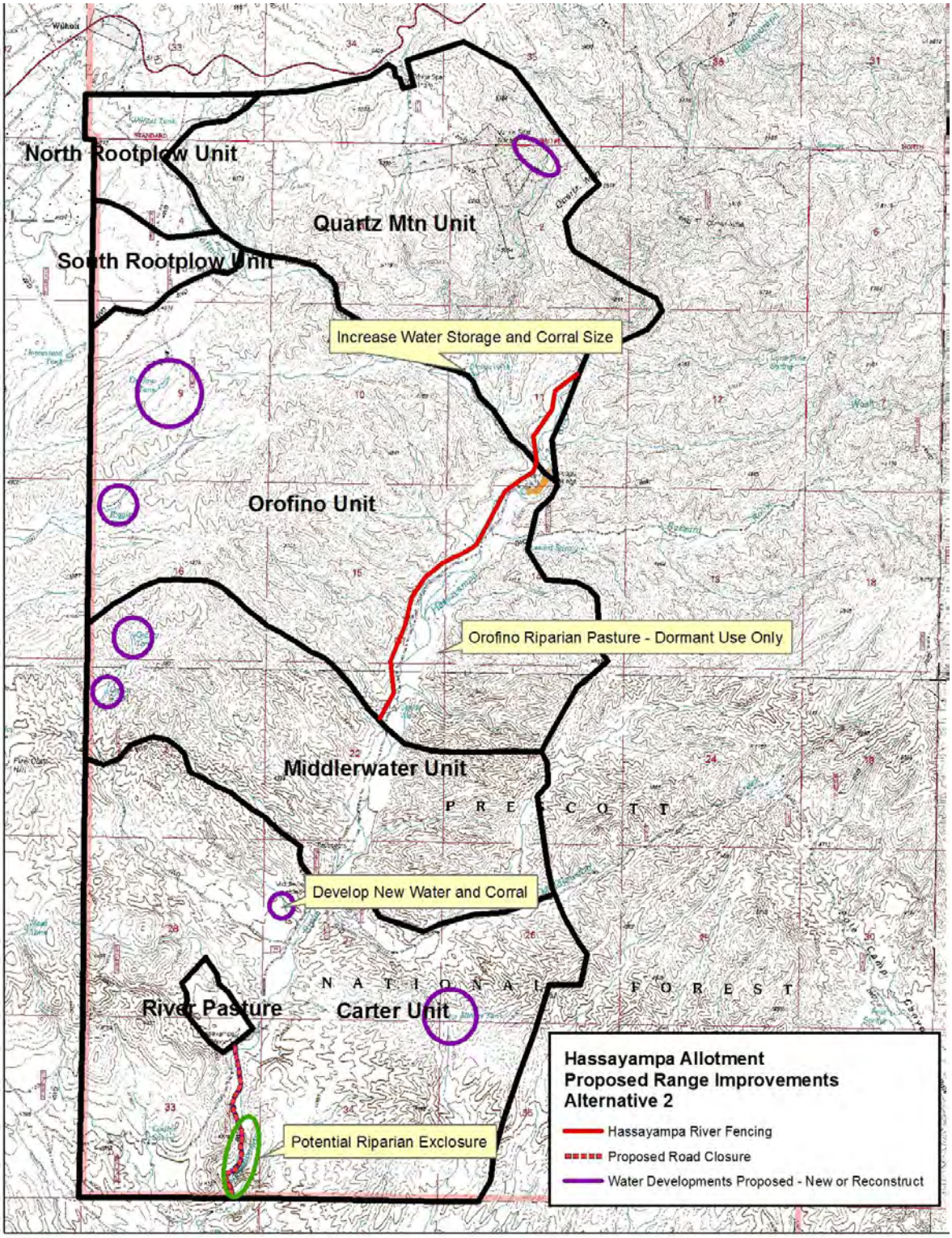
Appendix 1 – Allotment Alternative Maps




North Rootplow Unit
Quartz Mtn Unit
South Rootplow Unit
Increase Water Storage and Corral Size
Orofino Unit
Orofino Riparian Pasture - Dormant Use Only
Middlerwater Unit
PRESCOTT
Develop New Water and Corral
NATIONAL FOREST
River Pasture
Carter Unit
Potential Riparian Exclosure
Hassayampa Allotment
Proposed Range Improvements
Alternative 2
Hassayampa River Fencing
Proposed Road Closure
Water Developments Proposed - New or Reconstruct

Appendix 2 – Glossary of Terms

Adaptive Management- A formal, systematic, and rigorous approach to learning from the outcomes of management actions, accommodating change, and improving management. It involves synthesizing existing knowledge, exploring alternative actions and making explicit forecasts about their outcomes.

Allotment Management Plan (AMP) - An Allotment Management Plan (AMP) is unique, and is based on the individual landscape and ranch operation and will be modified with modification or issuance of a new permit following a NEPA decision to ensure consistency with the NEPA decision.

Animal Month (AM) - A month's use and occupancy of rangeland by a single animal or equivalent.

Animal Unit Month (AUM) – The quantity of forage required by one mature cow (1,000 pounds) or the equivalent for 1 month; approximately 26 lbs of dry forage per day is required by one mature cow or equivalent.

Annual Operating Instructions (AOI) - Instructions developed a guideline for grazing management by the agency and livestock permittee for implementing grazing management activities on a specific allotment for a specific grazing season.

Aquatic – Pertaining to standing and running water in streams, rivers, lakes and reservoirs.

Browse – Young twigs and leaves of woody plants consumed by wild and domestic animals.

Candidate Species- Plants and animals for which the U.S. Fish and Wildlife Service (FWS) has sufficient information on their biological status and threats to propose them as endangered or threatened under the Endangered Species Act (ESA), but for which development of a proposed listing regulation is precluded by other higher priority listing activities.

Community Type – Community types represent existing vegetation communities that do not currently reflect potential due either to disturbance or natural processes related the development of the community. Vegetation may be disturbed by a number of factors including: grazing, fire, and other activities.

Critical Habitat – That portion of a wild animal's habitat that is critical for the continued survival of the species as declared by the Secretary of the Interior.

Cultural Resource – The physical remains of past human cultural systems and places or sites of importance in human history or prehistory.

Desired Conditions- Descriptions of the social, economic and ecological attributes that characterize or exemplify the desired outcome of land management. They are aspirational and likely to vary both in time and space.

Dispersed Recreation – In contrast to developed recreation sites (such campgrounds and picnic grounds) dispersed recreation areas are the lands and waters under Forest Service jurisdiction that are not developed for intensive recreation use. Dispersed areas include general undeveloped areas, roads, trails and water areas not treated as developed sites.

Ecological Type – Ecological types are derived directly from the TES document and describe the potential vegetation for a particular soil type. The potential vegetation was defined through intensive field sampling. See the Terrestrial Ecosystem Survey Handbook, USDA 1986 for a full description of how potential vegetation descriptions were derived.

Endangered Species – Any species that is in danger of extinction throughout all or a significant portion of its range, as declared by the Secretary of the Interior.

Environmental Analysis – An analysis of alternative actions and their predictable short- and long-term environmental effects, including physical, biological, economic and social effects.

Environmental Assessment – The concise public document required by regulations for implementing the procedural requirements of NEPA (40 CFR 1508.9).

Ephemeral – A stream that flows only in direct response to precipitation, and whose channel is above the water table at all times.

Erosion – The wearing away of the land's surface by running water, wind, ice or other geological agents. Erosion includes detachment and movement of soil or rock fragments by water, wind, ice or gravity.

Forage – All non-woody plants (grass, grass-like plants and forbs) and portions of woody plants (browse) available to domestic livestock and wildlife for food.

Forage Utilization – The portion of forage production by weight that is consumed or destroyed by grazing animals. Forage utilization is expressed as a percent of current year's growth.

Forest Plan – A document, required by Congress, assessing economic, social and environmental impacts, and describing how land and resources will provide for multiple use and sustained yield of goods and services.

Grazing Capacity – The maximum level of plant utilization by grazing and browsing animals that will allow plants or associations of plants to meet their physiological and/or reproductive needs.

Grazing Period - The length of time grazing livestock or wildlife occupy a specific land area.

Grazing Permittee – An individual who has been granted written permission to graze livestock for a specific period on a range allotment.

Gully Erosion – The erosion process whereby water accumulates in narrow channels and, over short periods, removes the soil from this narrow area to depths ranging from several feet to as much as 75 to 90 feet.

Habitat – The sum total of environmental conditions of a specific place occupied by a wildlife species or a population of such species.

Impaired Soil Condition – Indicators signify a reduction in soil function. The ability of the soil to function properly and normally has been reduced and/or there exists an increased vulnerability to degradation. Changes in land management practices or other preventative measures may be appropriate.

Improvement – Manmade developments such as roads, trails, fences, stock tanks, pipelines, power and telephone lines, survey monuments and ditches.

Indicator Species – A wildlife species whose presence in a certain location or situation at a given population level indicates a particular environmental condition. Population changes are believed to indicate effects of management activities on a number of other wildlife species.

Instream Flows – Those necessary to meet seasonal streamflow requirements for maintaining aquatic ecosystems, visual quality and recreational opportunities on National Forest lands at acceptable levels.

Interdisciplinary (ID) Team– A group of individuals with skills from different resources. An interdisciplinary team is assembled because no single scientific discipline is sufficient to adequately identify and resolve issues and problems. Team member interaction provides necessary insight to all stages of the environmental analysis process.

Intermittent (or Seasonal Stream) – A stream that flows only at certain times of the year when it receives water from springs or from some surface source such as melting snow in mountainous areas.

Issue – a point of discussion, debate, or dispute with a Proposed Action based on some anticipated effect.

Key Area - A relatively small portion of a range selected because of its location, use or grazing value as a monitoring point for grazing use.

Management Indicator Species – See "Indicator Species."

Mesa – A tableland; a flat-topped mountain or other elevation bounded on at least one side by a steep cliff.

Monitoring - The orderly collection, analysis, and interpretation of resource data to evaluate progress toward meeting management objectives. This process must be conducted over time in order to determine whether or not management objectives are being met.

National Environmental Policy Act (NEPA) – An act to declare a National policy that will encourage productive and enjoyable harmony between man and his environment; to promote efforts that will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man; to enrich the understanding of the ecological systems and natural resources important to the Nation and to establish a Council on Environmental Quality.

National Forest System Land – National forests, national grasslands and other related lands for which the Forest Service is assigned administrative responsibility.

NEPA- See "National Environmental Policy Act"

Perennial Stream – A stream that flows continuously. Perennial streams are generally associated with a water table in the localities through which they flow.

Permitted Grazing – Authorized use of a National Forest range allotment under the terms of a grazing permit.

Proper Functioning Condition (PFC) - A methodology for assessing the physical functioning of riparian and wetland areas. The term PFC is used to describe both the assessment process, and a defined, on-the-ground condition of a riparian-wetland area. PFC evaluates how well the physical processes are functioning through use of a checklist.

Proper Functioning Condition (PFC) Assessment - Provides a consistent approach for assessing the physical functioning of riparian-wetland areas through consideration of hydrology, vegetation, and soil/landform attributes. The PFC assessment synthesizes information that is foundational to determining the overall health of a riparian-wetland area.

Proposed Action – In terms of the National Environmental Policy Act, the project, activity or action that a Federal agency intends to implement or undertake and that is the subject of an environmental assessment.

Range Allotment – A designated area of land available for livestock grazing upon which a specified number and kind of livestock may be grazed under a range allotment management plan. It is the basic land unit used to facilitate management of the range resource on National Forest System and associated lands administered by the Forest Service.

Range Condition – The state of health of a range land site based on plant species composition and forage production in relation to the potential under existing site conditions. Range condition is rated as satisfactory or unsatisfactory.

Riparian – Land adjacent to perennial and intermittent streams, lakes and reservoirs. This land is specifically delineated by the transition ecosystem and defined by soil characteristics and distinctive vegetation communities that require free and unbound water.

Satisfactory Soil Condition – Indicators signify that soil function is being sustained and soil is functioning properly and normally. The ability of the soil to maintain resource values and sustain outputs is high.

Sheet Erosion – The removal of a fairly uniform layer of soil from the land surface by rainfall and runoff water without the development of conspicuous water channels.

Soil Erosion – The wearing away of the land surface by running water, wind, ice or other geological agents, including such processes as gravitational creep. Detachment and movement of soil or rock by water, wind, ice or gravity.

Soil Productivity – The capacity of a soil in its normal environment to produce a specified plant or sequence of plants under a specified system of management.

Species Composition – Species composition refers to a descriptive list of species that together make up a given ecological community.

Species Diversity –Diversity refers to the measure of composition for a given community and is also referred to as species richness.

Stream Reach - the length of the stream selected for monitoring.

Structural Range Improvement – Any type of range improvement that is manmade (e.g., fences, corrals, water developments).

Suitable Range – Range which is accessible to livestock or wildlife and which can be grazed on a sustained yield basis without damage to other resources.

Terrestrial Ecosystem Survey (TES) - consists of the systematic analysis, classification and mapping of terrestrial ecosystems. It describes and maps the soils and potential vegetation (ecological types). This Ecological Classification describes the existing vegetation (community types) associated with the ecological map units.

Threatened Species – Any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Travelway - Any transportation facility that allows vehicle passage of any sort, that came into existence without plans, design or standard construction methods, that is not maintained or signed and has a very low traffic volume.

Trend- The direction of change in an attribute as observed over time.

Unsatisfactory Soil Condition – Indicators signify that a loss of soil function has occurred. Degradation of vital soil functions result in the inability of the soil to maintain resource values, sustain outputs or recover from impacts. Unsatisfactory soils are candidates for improved management practices or restoration designed to recover soil functions.

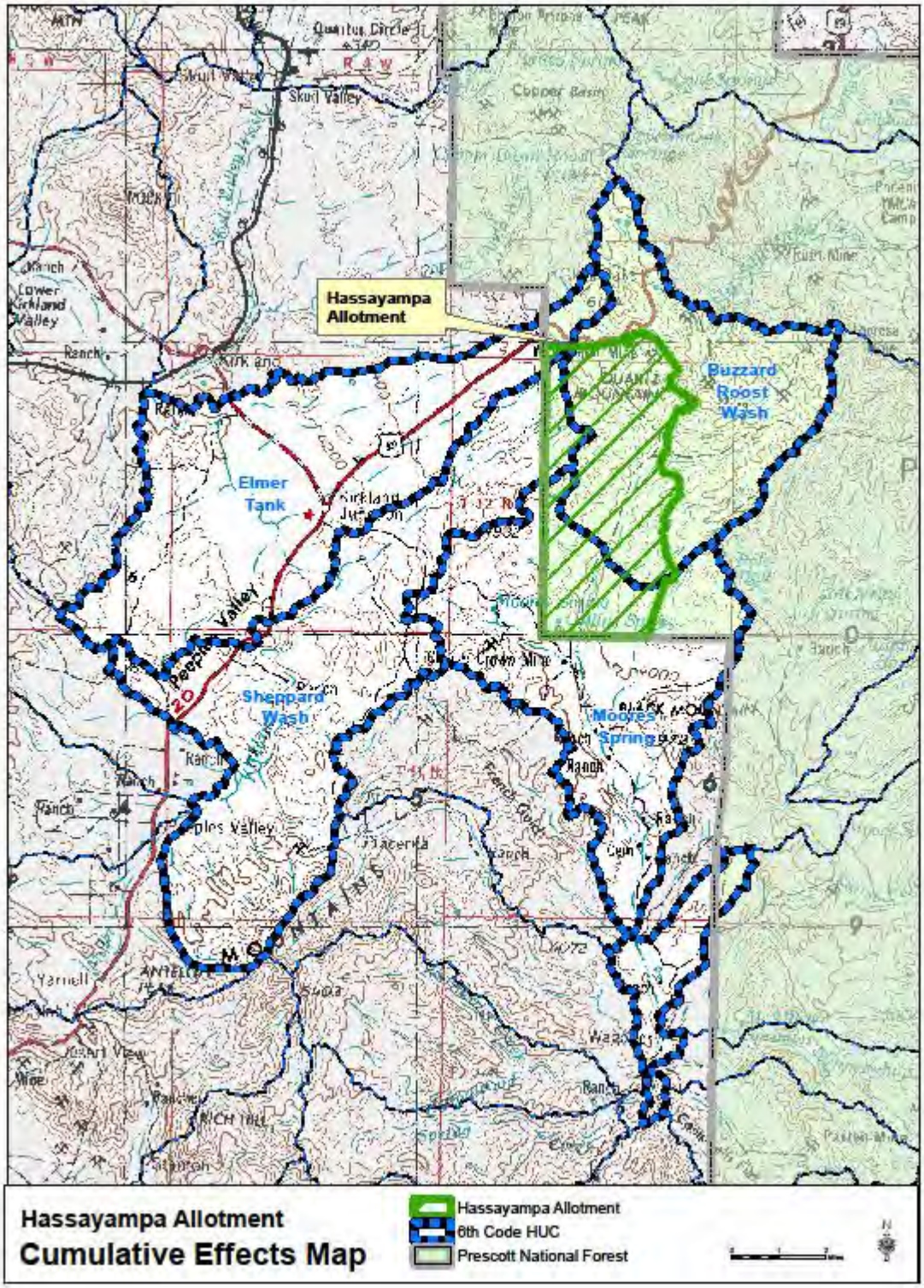
Utilization- The proportion or degree of the current year's forage production that is consumed or destroyed by animals (including insects). The term may refer either to a single plant species, a group of species, or to the vegetation community as a whole.

Watershed – The entire area that contributes water to a drainage or stream.

Watershed Condition – A description of the health of a watershed in terms of the factors that affect the hydrologic function and soil productivity.

Wildlife Habitat – The sum total of environmental conditions of a specific place occupied by a wildlife species or a population of such species.

Appendix 3 - Cumulative Effects Area Map for the 6th Code Watersheds Containing the Project Area



Appendix 4 – Draft EA Comments and Agency Responses

LTR #	CMT#	Comment	Response
1	1	The ecological costs of livestock grazing exceed those of any other use of national forest lands in the American Southwest. In this arid region subject to chronic and intensifying drought (Seager et al. 2007, Seager and Vecchi 2010, Williams et al. 2012), livestock grazing is the most widespread cause of species endangerment, lost soil productivity, and degradation of the human environment (Beschta et al. 2012, Fleischner 1994). Grazing destroys vegetation, displaces soil, and consumes enormous quantities of water to the detriment of native species and the ecosystems on which they depend (Belsky et al. 1999, Belsky and Blumenthal 1997).	The adaptive management proposed under either alternative 1 or 2 would balance stocking levels with forage production on a year-to-year basis using the results of monitoring. Monitoring of yearly forage production will take into account fluctuations in production due to climatic influences. The references cited by the commenter point out negative effects to vegetation and soil that may occur with grazing. As Fleischner (1994) points out "Attempts to discern grazing effects are also hampered by the difficulty in distinguishing between different range management practices. Management variables include grazing intensity ("stocking rate"), livestock species, seasonality of grazing, and degree of active management such as movement of livestock between pastures. Unfortunately, the management history of many sites is unknown. Many studies do not describe grazing intensity". It is recognized that poorly managed grazing can lead to negative outcomes. Both alternatives 1 and 2 have been designed with resource protection measures such as allowable use levels to protect vegetation, soil, riparian areas, and watersheds.
1	2	[I]t is imperative that the Forest Service ensures that national forest lands in the Hassayampa allotment are capable of producing forage for livestock and wildlife at the volume expected under the proposed action. The Prescott Forest Plan designated certain lands as "suitable" for grazing. However, capacity (or capability) is a site-specific determination to be made with the benefit of the best available scientific information	Page 31 of the draft EA explains the methodology for determining grazing capacity. These calculations showed a capacity of 518 Animal Unit Months (AUMs) when reductions are taken for slopes above 10% and allowable use is set at 40% for yearlong use. During the dormant season, browse plants are preferred and the allowable use is 50% on browse plants. The final EA will be clarified to show that during the dormant season using an allowable use of 50% for browse forage results in a calculated grazing capacity of 108 Animal

			Units for 6 months, or 656 AUMs. The calculations are based on soil map unit average forage production. Actual stocking from year to year is based on observations of forage production as subject to variable climate.
1	3	Past grazing management in the Hassayampa allotment has exceeded range capacity. *See* EA at 31 ("Prior to the current configuration of pastures that was established in 1993, the project area was two distinct allotments with a combined permitted grazing of 139 cattle yearlong, but both allotments were identified as having stocking levels that were above the forage production capacity"); 33 ("Stocked at the maximum proposed level of 49 adult cattle, inspection reports note that allowable use levels have been exceeded in the riparian corridor…").	Past allotment management and permitted numbers are provided for reference and to show that the Forest Service has addressed capacity concerns on this allotment before. The conversion from 139 cattle yearlong to the current permitted number of 49 cattle yearlong occurred in the mid-1990s. The decrease in permitted numbers did not result in the resource improvement in the riparian areas that was hoped for, so we are now proposing another change to address resource concerns. This is the basis of adaptive management.
1	4	Alternative 1 (proposed action) would <u>increase</u> stocking on the Hassayampa allotment by *more than double* the current allowable use on a seasonal basis. *See id*. 3 (current permitted use is 49 head of cattle, cow/calf, yearlong, or a total of 588 animal unit months (AUM) since 1993); 12 (Alternative 1 proposes range of stocking from 294 to 656 AUM, or 49 to 109 head, cow/calf pairs, in dormant season). It is not clear how the Forest Service arrived at the proposed maximum stocking level in Alternative 1 (294 to 656 AUM, or 49 to 109 head), which greatly exceeds current management.	Alternative 1 authorizes a range of livestock from 49-109 head for 6 months, or a range from 294-656 AUMs. The current term permit allows for up to 588 AUMs, so at the lower range of numbers, the authorization would be 50% less for Alternative 1 than under the current permit. The upper limit for Alternative 1 would only be expected to be achievable once the proposed range improvements are in place and proper distribution is achieved. The upper limit for Alternative 1 is within the grazing capacity calculations for the allotment as discussed in response at 1-2 that discusses range capacity calculations.
1	5	The proposed stocking level in each of the action alternatives appears to exceed the range capacity calculated by the Forest Service. *Compare id*. 31 ("The calculated Animal Units are 43 Animal Units (~ 518 AUM) when 40% of the available forage estimate is allocated to livestock"); 20-21 (alternatives comparison). No single pasture in the allotment has sufficient capacity to support the proposed stocking levels. *See id*. 33 (pasture-specific capacity analysis). The proposed action must be based on site-specific information about current and foreseeable range condition, and the method for determining capacity and assigning permitted livestock	See response to 1-2 concerning capacity calculations. A higher allowable use of 50% was used to determine dormant season capacity since browse plants are preferred at this time of year, and they are the predominant forage resource on the allotment. The allowable use for browse under alternative 1 or 2 is 50-60%. For yearlong grazing calculations, the allowable use level was reduced to 40% because perennial grasses would be preferred by livestock when actively

		numbers in light of these facts must be clearly described in a way that is understandable to the general public.	growing over browse forage. The allowable use level for perennial grasses is 35-45% under either alternative 1 or 2. The discussion at page 33 of the draft EA points out that under alternative 2, there would need to be timely moves between pastures once allowable use levels are met when stocked at 49 cattle yearlong. The pastures differ in size and amount of forage, so periods of time in each pasture would not likely be uniform. The rotation amongst the four main pastures is necessary under alternative 2 to allow the limited amount of perennial grasses time to grow and set seed during the growing season. This is not required under alternative 1 since grazing will not occur during the warm growing season. It is the purpose of the analysis to point out differences between alternatives when they exist.
1	6	The proposed stocking and utilization levels have no clear relationship to foreseeable drought, which will continue to limit forage availability and range capability over the life of the proposed action. Climate imposes decisive influences on range capacity and forage production, and drought will continue to intensify for the duration of the proposed action.	See responses to 1-1 and 1-2 concerning grazing capacity and actual stocking levels as determined by adaptive management.
1	7	The Forest Service proposes to use annual operating instructions to ensure compliance with standards and guidelines of the Prescott Forest Plan. However, the EA must account for environmental impacts in the event that monitoring is not accomplished or adaptive management simply proves to be ineffective. It is not clear that the Forest Service will commit resources to ensure that monitoring will accomplished in a timely and reliable fashion. In scoping comments, the Center identified the effectiveness of adaptive management in the proposed action as a <u>significant issue</u> for environmental analysis of the Hassayampa allotment, which the Forest Service appears to have ignored.	Both action alternatives have a monitoring component as part of the action, as described on pages 19-20 of the draft EA. It is the monitoring that the Agency has done in the past that showed the need for change from current management that resulted in the development of alternatives 1 and 2. The Agency does have a record of identifying situations that need correction, then proposing management changes to correct the problem. That is the definition of effective adaptive management. The definition of “timely and reliable” monitoring is subject to differences in opinion. Alternatives 1 and 2 outline monitoring that will occur on an annual basis and monitoring that will occur over the long-term.
1	8	Poor soil conditions as a result of past overgrazing and poorly managed grazing that left that	The draft EA on pages 38-39 explains that there are some areas

		significant areas of bare soil, which equate to poor water and nutrient cycling, accelerated water runoff, soil loss and gully erosion, are common in the action area. The analysis should demonstrate that the proposed action will meet desired conditions and standards and guidelines of the Forest Plan, and avoid significant impacts.	of the allotment where impaired soil conditions exist due to poor spatial distribution of plants and litter and some indications of sheet erosion, but there is no mention of "significant areas of bare soil" and "gully erosion". The evaluated soil map units in both the Quartz Mountain and Orofino pastures were characterized as satisfactory soil condition. The draft EA and the Soil Specialist Report provide an analysis of grazing effects. Both action alternatives are expected to meet desired conditions and Forest Plan guidelines for soils, although not as quickly as would be attained under the no grazing alternative.
1	9	The proposed stocking rates already have caused significant damage to riparian habitat associated with the Hassayampa River. *See id*. 33 ("Stocked at the maximum proposed level of 49 adult cattle, inspection reports note that allowable use levels have been exceeded in the riparian corridor") Alternative 2 would continue current stocking levels yearlong throughout the allotment. *See id*. 16; 20-21 (Table 1: comparison of alternatives and effects).	The quote from the draft EA provided by commenter speaks of over-use in the riparian area under current management of yearlong grazing without any fencing along the riparian area. Alternative 2 would allow for fencing of the riparian area in both the Quartz Mountain and Orofino Pastures so that grazing would not occur in the Hassayampa River corridor during the warm growing season. This scenario is not the same as current management, so the effects should not be the same as currently observed.
1	10	The Hassayampa allotment features riparian habitats that are in "less than functional" and "non-functional" condition. Direct, indirect and cumulative impacts to riparian habitat are a <u>significant issue</u> for environmental analysis of the proposed action.	Page 47 of the draft EA discloses the Proper Functioning Condition status for the two reaches that were evaluated in the Quartz Mountain and Carter Pastures. Both the Hydrology and Water Resources Specialist Report and the Riparian Vegetation Specialist Report disclose the direct, indirect, and cumulative effects of the two action alternatives and the no grazing alternative.
1	11	The environmental analysis should address circumstances in which the proposed action may permit livestock access to riparian environments, the locations of access, and potentially significant direct, indirect or cumulative effects. The analysis also should disclose effects of upland grazing and water diversions to riparian environments. Please ensure that grazing complies with Forest Plan desired conditions, standards and guidelines, as well as regional policy affecting management of	Both alternative 1 and 2 describe when cattle would have access to riparian areas. Under alternative 1, cattle could only access riparian areas from October through March in the Quartz Mountain, Orofino, and Middlewater Pastures, and from December through February in the Carter Pasture. Alternative 2 would allow for the same months of

		riparian habitats.	access but this would be provided by fencing the Hassayampa River in the Quartz Mountain and Orofino Pastures. The effects of the water developments are considered in specialist reports for all resource areas. The two action alternatives were developed in order to comply with the Forest Plan and agency policy. Also see response to comment 1-10.
1	12	The *Wildlife, Fish and Rare Plant Specialist Report* supporting the EA notes that yellow-billed cuckoo is a "candidate" for federal listing (Garcia de la Cadena and Sillas 2013: 22-23 – Table 8). According to that report, the Forest Service has no knowledge of cuckoo presence or absence in the analysis area, and statements that it "does not occur" in the Hassayampa allotment present a false negative that is unsupported by factual information:	The *Wildlife, Fish and Rare Plant Specialist Report* (WSR) was in draft form at the time the Draft EA was released for comment. The final WSR report will clarify that the current distribution of yellow-billed cuckoos (YBC) does not include the project area and the necessary habitat components for YBC do not exist on the Hassayampa Allotment. Yellow-billed cuckoo surveys have not been conducted within the analysis area, but USFWS information illustrates areas where YBC are located within the Hassayampa River corridor down to the confluence on the Salt River. Based on a 2008 USFWS map denoting a generalized species location for yellow-billed cuckoos, current distribution of YBC on the Hassayampa River occurs off Forest at lower elevations near Wickenburg, AZ. The map has the following statement: *"Species may occur as a migrant in additional areas where suitable habitat is present"*. Because surveys have not been conducted for yellow-billed cuckoos, it is possible that yellow-billed cuckoos may travel through the riparian corridor within the allotment during migration, but *does not occur* as a breeding migratory bird within the project area.
1	13	Moreover, the proposed listing rule cited above establishes that a population of more than 10 pairs of yellow-billed cuckoo is present on the Hassayampa River, which may include the proposed action area. *See* 78 Fed. Reg. 61622, 61639 (Oct. 3, 2013).	As stated above, the 2008 USFWS map denotes the area/locations where suitable yellow-billed cuckoo habitat occur as being located outside the Prescott NF (PNF) at lower elevations near Wickenburg, AZ and proceeds south to the confluence of the Salt River. The USFWS map illustrates the general locations where nesting YBC pairs

			most likely occur on the Hassayampa River, approximately 20 miles south of the project area.
1	14	The EA further states that Alternative 1 (proposed action) will have "no impact" to yellow-billed cuckoo, while Alternative 2 "may impact individual[s] or habitat," but it contains no species-specific analysis explaining the difference or intensity of effect between the alternatives. EA at 53 (Table 7).	The final WSR will have specific analysis explaining the difference of effect to YBC for each alternative.
1	15	Regarding Alternative 2, the specialist report merely states, "Livestock grazing may reduce insect diversity and suitable habitat in riparian areas by reducing herbaceous ground cover diversity, riparian tree/shrub density and recruitment." Id. It fails to distinguish any reason for the apparent difference between the alternatives of the intensity of indirect effects to yellow-billed cuckoo.	The intensity of indirect effects and the difference between alternatives is disclosed in the Final WSR report.
1	16	The content of the analysis does not support a finding of "no impact," as livestock grazing in riparian areas "may" reduce foraging and nesting opportunities for yellow-billed cuckoo regardless of the alternative implemented. *See* EA at 54 ("Both action alternatives would still impact regeneration of overstory tree species by incidental browsing of seedlings during the dormant season. Alternative 3 would be the best alternative for immediate response of riparian vegetation and avian species within the riparian corridor."). A reader of the EA cannot independently determine whether the context or intensity of effects to yellow-billed cuckoo would be significant.	See response to comment 1-14.
1	17	NEPA requires the Forest Service to take a "hard look" at potentially significant direct, indirect and cumulative effects of the proposed action. Cumulative effects of continued livestock grazing in riparian habitats of yellow-billed cuckoo may be especially significant:	Cumulative effects of livestock grazing for all the proposed alternatives were considered for YBC and FS Sensitive Species and is disclosed in the Final WSR report.
1	18	The analysis should explain how the proposed action meets desired conditions and standards and guidelines of the Forest Plan, maintains viable (wildlife) populations, and avoids jeopardy to listed species or adverse modification of critical habitat.	Standards and Guidelines of the Forest Plan were considered during the development of the alternatives. Maintaining the viability of wildlife populations is developed at the Forest Plan level and is beyond the scope of this project, although the action alternatives of this project were developed to comply with Forest Plan direction. Determination of effect for the YBC is disclosed in the Final WSR Report.
1	19	Livestock grazing in the allotment may impact individuals and/or habitat of sensitive and indicator species, all of which also may be impacted by the	The Bradshaw Vegetation Management Project was considered as part of the cumulative

		Bradshaw Vegetation Management Project in the Upper Hassayampa watershed. Neither the EA nor the relevant specialist report addresses cumulative effects.	effects analysis since it is located within the 6th code watersheds. Also see response to comment 1-17.
1	20	Livestock grazing is a leading cause of biological invasion by invasive species on national forest lands. The analysis should disclose biological invasions in the allotment and explain how the proposed action will contribute to or mitigate significant cumulative effects with particular attention to cumulative effects of motorized travel and fire management. It should specifically assess the methods that will be used to manage invasive species and their effectiveness because existing infestations within the allotments belie contentions that monitoring and adaptive management are sufficient to prevent adverse cumulative effects.	Non-native invasive species have a variety of methods for dispersal. The two main invasive species surveyed on the allotment are saltcedar in the riparian areas and Dalmatian toadflax within previously mined areas of the Hassayampa River. Saltcedar mainly disperses by wind and water. Dalmatian toadflax reproduces by its roots and by seed, but is not eaten by livestock. Neither of these species is found in abundance and has not changed the fuel loading or fire regime on the allotment. Treatment of noxious weeds is addressed in the Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds, Coconino, Kaibab, and Prescott National Forests within Coconino, Gila, Mohave and Yavapai Counties, Arizona. Possible treatment of known weed populations will be managed under the PNF's noxious weeds program and will not be further addressed in this proposal.
1	21	The Hassayampa allotment is adjacent to other livestock grazing allotments in the Prescott National Forest, many of which occur in the same watershed. In addition, motorized recreation in the analysis area cumulatively impacts soils, hydrology and wildlife. The analysis should take a hard look at potentially significant cumulative effects to the environment that may result from the proposed action	Each resource specialist has addressed the direct, indirect, and cumulative effects of the three alternatives in their respective specialist reports.
1	22	The proposed action would implement "Chapter 90" of the Forest Service Handbook at 2209.13, a new administrative rule for livestock grazing that itself did not undergo NEPA review. Prior to applying it at the project level, the Forest Service must review effects of Chapter 90 in an environmental impact statement. The agency also must consult with the U.S. Fish and Wildlife Service on effects that implementation of Chapter 90 may have on federally listed species.	The commenter is suggesting that action needs to be taken concerning NEPA review and consultation with the USFWS on Chapter 90 of Forest Service Handbook 2209.13. The level of analysis that would be appropriate for a service-wide directive such as Chapter 90 is beyond the scope of analysis for this site-specific project.
1	23	The analysis should take a hard look at the location and effects of these proposed actions to the environment, quantify the financial cost to	The environmental effects of the proposed range developments are addressed in each specialist report

		taxpayers of proposed new grazing infrastructure, and specify any source of appropriated funds that the Forest Service intends to use to pay for new infrastructure.	by resource area. New range infrastructure may be funded from range betterment funds that are derived from the collection of grazing fees. The Forest Service policy is to fund range developments cooperatively with the permittee. Other agencies, such as the Arizona Game and Fish Department, have also shared in funding water developments that also serve to improve wildlife habitat quality. An Economics Report was prepared to compare the costs and benefits of the 3 alternatives, including no grazing.
1	24	The Forest Service charges the permit holder $1.35 in grazing fees per animal unit month. In contrast, the average monthly lease rate in 2011 for grazing on private lands in 11 western states was $16.80 per head, over 12 times more than the Forest Service charges permit holders to graze national forest lands. The Forest Service charges the permit holder an unreasonably low fee to graze livestock on national forest lands. As a result, it returns less than 10 percent of its expenditure of public funds for grazing management to the U.S. Treasury. Federal subsidies shield the grazing permit holder from paying market rates for services it acquires on public lands free of charge, and the agency should make this clear in the environmental analysis for reauthorization of the allotments.	The direct comparison of leased private pastures to public land grazing allotments is not advisable in most cases. Grazing fees are determined by Congress and that determination is outside the scope of this analysis. Leased pasture may provide greater forage availability, and may not require that the lease holder maintains fences and waters. On public land, the lease holder is required to maintain extensive amounts of infrastructure that are essential to the grazing operation, but this infrastructure remains the property of the Forest Service.
2	1	As you may know, I visited the allotment on 6/2/13; there's been practically no livestock management occurring on this allotment, and the draft EA confirms my personal observation that this has resulted in completely unacceptable levels of resource degradation. So, the obvious question is: What are you proposing to do to fix the situation?	Under current management, cattle have access to portions of the riparian corridor along the Hassayampa River during the entire year. Under alternatives 1 and 2, there would be access to the river from October through March in the Quartz Mountain, Orofino, and Middlewater Pastures and from December through February in the Carter Pasture. There would be no access to the Hassayampa River during the warm growing season under either alternative provided by either restricting season of use (alternative 1) or by constructing fencing (alternative 2).
2	2	Alternative 1, dormant season grazing, calls for limiting the grazing season on this allotment to the period of October 1st through March 31st annually. But this proposal also includes a provision to increase the maximum permitted number of	The range of numbers provided under alternative 1 allows for some incentives for the permittee to construct additional waters in the uplands to provide for more cattle to

		livestock from the existing 588 animal unit months (AUMs) to 656 AUMs, or about a 12% increase. Considering the poor ecological conditions on this allotment, it's difficult to understand how you can justify increasing the permitted stocking rate. Can you please explain this? Other than that outrageous provision, however, Alternative 1 has some good features. The biggest one is that it would ensure that no livestock are in the riparian corridor during the growing season. It would also limit the use of the Carter pasture to the months of December through February	graze. The proposed upper limit is within the calculated capacity for the allotment given 6 months of dormant season use at 50% allowable use. It is expected that initially the allotment would be stocked at the lower level of the range of numbers. This lower level of the range is 50% of the current permitted number. As explained on page 15 of the draft EA, "if some or all of these improvements are not implemented, the upper limit of permitted livestock numbers may not be achievable on a sustained basis, or seasonal use periods may be shortened". The capacity calculations for the allotment under alternatives 1 and 2 are explained in the response to comment 1-2.
2	3	Alternative 2, yearlong grazing with riparian fencing, also has some good features, including the limit on the use of the Carter pasture to the months of December through February. But I believe it has an Achille's heel in that it relies upon the maintenance of more fencing for its success. From what I saw on this allotment, I have serious doubts that these fences would be maintained, or their gates kept shut. Furthermore, because of the rough topography of this allotment, it would be inherently difficult to maintain these new fences. If the permittee hasn't maintained the existing fences, or kept the existing gates shut, why would the situation be any different with the proposed riparian fences?	The lack of maintenance of existing improvements has been documented by the agency. There are provisions in the term grazing permit that require maintenance of range improvements assigned to the allotment. The agency acknowledges that more needs to be done to enforce compliance with maintenance standards.
2	4	You might argue that the expensive new livestock watering sites proposed for the uplands will allow the permittee to keep the cattle out of the riparian corridor. But that's no assurance that the cattle won't still get into the riparian area during the summer. Only removing them from the allotment every growing season will completely ensure that.	Commenter's opinion is noted, and see response to 2-3 concerning maintenance of range improvements.
2	5	In fact, considering the relative few cattle that can be permitted to graze this allotment, and high cost of the proposed livestock waters to better manage them, it seems obvious that this allotment isn't suited for grazing and the best option would be to implement Alternative 3, the no grazing alternative. But if you decide to continue to permit grazing on this allotment, I suggest that the Carter Unit pasture should be completely removed from the grazing rotation for several years to allow it to recover.	Commenter's statement of opinion is noted. An Economic Report was completed for this project that factors in the cost of constructing and maintaining range developments. The Carter Pasture could be deferred from grazing under either alternative 1 or 2 as provided by the resource protection measure that states "Grazing may be deferred in areas showing recruitment until seedlings become established and

			can be maintained while withstanding grazing impacts" on page 14 and 17 of the draft EA.
3	1	The EA admits that "the Hassayampa River throughout the allotment is in less than functional condition due to unstable channels, very high sediment loads, and inadequate riparian vegetation. Collins Spring in the Carter pasture is non-functional due to headcutting." EA at 14.	The commenter is correct in these statements from the EA that explain why new alternatives for grazing were developed for the Hassayampa Allotment instead of continuing current management that is not meeting Forest Plan guidelines or desired resource conditions for riparian areas.
3	2	In one of five pastures, "current management is likely causing the vegetation to trend away from desired conditions." EA at 29.	The North Root Plow Pasture inventory site did show a reduction of perennial grass cover below the site potential that could be a result of current grazing management. Alternative 1 will allow for growing season's rest every year and is expected to allow for improvement of perennial grass cover at this site. Alternative 2 would provide for improvement in perennial grasses if pasture rotations are followed to allow for periodic rest from grazing and allowable use levels are not exceeded.
3	3	Using traditional grazing capacity methodology, the Forest Service knows that capacity is less than is needed for 49 cows, and has apparently known this for some time, but has continued to graze the 49 cows. EA at 31.	The capacity calculations referenced on page 31 of the draft EA show a capacity of 43 adult cattle yearlong when using forage production estimated from the Terrestrial Ecosystem Survey of the Prescott National Forest and an allowable use level of 40%. The actual use records for the allotment for the period from 1993 to 2012 show an average stocking level of 43 adult cattle yearlong, which is in agreement with the calculated capacity. It should be recognized that the calculated capacity is based on a forage production estimate and that actual forage production will vary considerably from year to year.
3	4	The EA is not clear on this point, but it seems an entire pasture has unsatisfactory or impaired soils with accelerated runoff. EA at 38, 39.	The Soil Specialist report contains a map that shows all pastures contain a mix of satisfactory and impaired soil conditions based on TES survey and field verification. The final EA will be amended to make this point clearer to the reader.
3	5	Even E. coli levels exceed State standards, and although more sampling was "recommended," it apparently never took place.	The reference to E. coli levels that exceed State standards is for a reach of the Hassayampa River that begins 10 miles downstream from

			the allotment and extends for 32 miles. Once the Hassayampa River leaves the allotment it flows into private and state lands that have many mixed uses. The draft EA states on pages 49-50 that "the information from the ADEQ assessment indicates that the waters of the Hassayampa River within and downstream form the Hassayampa Allotment are not on the threshold of being impaired".
3	6	The Forest Service promises to conduct further monitoring before ten years are up to see if the plan is working. This despite other sections of the EA that say after 3-5 years of monitoring the agency will decide whether to build that other fence.	Short and long term monitoring that will be conducted under either alternative 1 or 2 is described on pages 19-20 of the draft EA. The fence that would be built after 3-5 years of monitoring is the riparian exclosure in the Carter pasture. Both alternatives 1 and 2 will have a restricted season of use in this pasture from December through February, which is a change from current management. There is also a provision which would defer grazing in riparian areas that show plant recruitment. Since fencing is very costly to build and maintain, it is only prudent that these less costly measures should be implemented and monitored for success before spending additional funds on fencing.
3	7	The Forest Service also casts considerable doubt on the merits of its "dormant season only" grazing schemes, admitting that this is the time of year there is likely to be water in the river, and it will be hard to entire livestock away from that flat river plain with the riparian vegetation. We agree. Yet the plan offers no solution should this be the case, and with no real monitoring guaranteed for ten years, it may be quite a wait before anybody checks or does anything about it.	Both alternative 1 and 2 have provisions for short term monitoring such as implementation monitoring and periodic monitoring of short-term indicators of resource conditions (draft EA pages 19-20). These types of monitoring would occur on an annual basis. The 10-year interval for monitoring referred to by the commenter would apply to effectiveness monitoring only. Allowable use levels of 30% or less will apply to the riparian corridor under either alternative 1 or 2.
3	8	We also note that the EA admits the current fences and developments are in poor condition because they "have not been regularly maintained." Why is that? What makes you think that the new developments will be regularly maintained? Has something different happened?	We acknowledge that the past record of range improvement maintenance has not been performed to Forest Service standards. It is a term and condition of the term grazing permit that maintenance of range improvements that are the maintenance responsibility of the

			permittee will occur. The Agency can pursue administrative action against the grazing permit for failure to follow terms and conditions.
3	9	Given the condition of the riparian areas and the fact they are the chief grazing area (the vast majority of this allotment has steep slopes), you need another alternative, or at a minimum an alternative that provides some real guarantees about your plan to protect the riparian areas. You need a plan that enforces some kind of monitoring and determines whether the dormant grazing scheme is going to be successful. Your own experts question this, so you need to show what you will do if their concerns hit the mark.	See response to comment 3-7.
3	10	I suggest you consider the effects of starting from a perspective that considers the health of the riparian areas instead of one that considers the health of the rancher's pocketbook. An alternative should be evaluated that retains the livestock but cuts the use in half and then, only after monitoring shows that the livestock are not still trailing in the river and that the new water development plan is working, permits an increase in the numbers.	Alternative 1 allows for authorization of a range of livestock from 49-109 cattle for 6 months. The lower end of the range does equate to 50% of the current term grazing permit authorization that is advocated by the commenter. The upper range would only be achievable once all improvements are in place, and when forage production is exceptionally good. Under alternative 1, stocking at the lower end of this range would be likely until new water developments are in place, and we can determine how much usage in the riparian area is seen under dormant season grazing. If the allowable use level of 30% or less in the riparian area is achievable starting out at the lower range of numbers, then increasing the stocking level could be considered.
3	11	You also need to show how this will meet your Forest Plan. I don't see how you have shown that the current Forest Plan standards for soil, vegetation, riparian, wildlife, and other resources are met. These are binding standards, you can't legally just ignore them, although it seems that is what you have been doing now for years.	Both action alternatives were developed in consideration of Forest Plan standards for soil, vegetation, riparian, wildlife, and other resources. The purpose and need for the project is to develop alternatives that “continue to authorize grazing in a manner consistent with the Prescott Forest Plan while meeting resource management objectives” (draft EA page 4). Both alternative 1 and 2 were developed to meet the project’s purpose and need.
3	12	The carrying capacity analysis also must be clarified. It doesn't currently make any sense and you haven't done it for Alternative 1, only Alternative 2. You need to show this material, and	The grazing capacity analysis is discussed under the rangeland vegetation section of the EA. On page 31 of the draft EA under the

		you also need to “identify” your key sites.	heading “Effects Common to Alternatives 1 and 2” there is a discussion of the grazing capacity calculations. There is some difference in calculated capacity between alternatives since under dormant season grazing cattle are more likely to consume browse species that have a higher allowable use level (50-60%) than grass species that have an allowable use level of 35-45%. The capacity calculations were made using average forage production data for specific soil map units from the Terrestrial Ecosystem Survey (TES) on the allotment, not for key sites.
		The document is unclear on what areas are in functioning, non-functioning, and functioning-at-risk condition.	Page 47 of the draft EA explains that the PFC assessment was done only for the broadleaf, deciduous riparian type indicative of wetter sites on the allotment. The reach of the Hassayampa River in the Quartz Mountain Pasture was assessed to be stable and in Proper Functioning Condition given the long-term change in site potential caused by dredging and mining, and the reach in the lower Carter Pasture was assessed as Functional-At Risk with an upward trend.
3	13	It also does not clarify just what kind of ground the monitored sites cover—for example, if one in five sites is in downward trend, do we extrapolate that 20 percent of the allotment is in downward trend? It isn't enough to say you picked five representative sites, you have to say what they represent. And you have to say why you think they are in upward or downward trend.	Page 27 of the draft EA explains the key area concept that guided the selection of representative map units for each pasture. Since the key soil map unit is representative of the pasture, one could say that the entire North Root Plow Pasture has a downward trend for upland vegetation. The North Root Plow Pasture comprises 276 acres of the entire allotment, or about 3% of the entire allotment, not 20%.
3	14	When you say, as you often do, that the new utilization guidelines will lead to improvement, why do you say that? How different is the 35-45 percent utilization different from what exists currently?	There is not a significant change in allowable use levels than what is presently applied; however, the allowable use levels in the riparian areas are not being met under current management consisting of yearlong grazing and no restricted access to riparian areas. A change in management is proposed to allow use levels to be met. The two action alternatives will restrict the season

			of use in the riparian areas to dormant season only by implementing seasonal grazing or by implementing fencing of the riparian area in two pastures. There are few instances of exceeding allowable use in the uplands over the last 20 years.
3	15	You extol, as always, adaptive management, and say that if “resource objectives” are not met, then “additional measures may be implemented.” The problem is you don't say how you will know if resource objectives are met, you don't say what constitutes “not meeting” the objectives or even what the objectives are, and then there is that word “may.” Wouldn't someone who was serious about this use the word “will”? Why don't you use the word “will”?	Resource Management Objectives for vegetation, soil, and riparian areas are shown on pages 10 and 11 of the draft EA. These are measurable and time-specific indicators to show progress towards desired conditions. The commenter does not state where the word “may” that is being questioned is found. On page 15 and again on page 17 there is use of the word “may” in the section on site specific measures for alternatives 1 and 2, respectively. This states that other structural improvements such as fencing and waters “may” be developed to address resource concerns if the stated measures are not successful. There is no correlation to the use of the word “may” in this instance and to making yearly changes in management through adaptive management. Page 11 of the EA states that “Improved distribution will be needed in order to meet allowable use levels, or administrative actions will be warranted such as early removal of livestock once allowable use levels are reached”.
3	16	Of course, this concern is only amplified when I also read that you may not conduct any monitoring for ten years, and it is hard to have much faith in the stubble-height and other utilization plans when further along your author states that vegetation is so overgrazed it isn't even possible to monitor it. Very little in this document inspires confidence.	See response to 3-7
3	17	In sum, this EA does not show how it will meet the Forest Plan standards and fails to take a hard look at the effects of its proposed action. Indeed, given the Forest Plan problems and the riparian degradation, it appears to us that continued grazing in the fashion described will have a significant effect on the environment and requires an EIS.	See response to 3-11 for compliance to Forest Plan. As stated on page 9 of the draft EA, “the Ranger will make a finding on the significance of the environmental effects anticipated from the implementation of the selected action and whether an EIS will need to be prepared”.
3	18	Certainly another alternative that will provide at least some assurance of recovery for the riparian	Both action alternatives were developed by the interdisciplinary

		area and that takes into account your specialist's concerns is needed. The rangeland, soil productivity, water quality, and wildlife habitat has been significantly impaired by livestock grazing here and it is time the Forest Service admitted it and did something positive for this landscape the wildlife and wildlands they are called to protect.	team in order to meet the stated purpose and need for the project which is to continue to authorize livestock grazing on the Hassayampa Allotment in a manner consistent with the Prescott Forest Plan while meeting resource management objectives by applying adaptive management principles. There are stated resource management objectives for vegetation, soil, and riparian areas that are expected to be met by implementing either of the action alternatives. There were no other alternatives developed and carried through the analysis. The idea of fencing the entire 5 miles of the riparian area was considered but not carried through the analysis because of the extremely high cost of construction and maintenance when the compared to the benefits achieved. Much of the Hassayampa River corridor in the Middlewater Pasture is extremely dry and lacks obligate riparian vegetation. The final EA will contain a reference to this dropped alternative.

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Appendix 5 - List of Plants for Hassayampa River

PLANT SPECIES		Abundant	Common	Uncommon	Trace	WETLAND INDICATOR STATUS 1	PALATABILITY & OBSERVED BROWSING 2	NATIVE/NON-NATIVE
COMMON NAME	**SCIENTIFIC NAME**							
TREES:								
Fremont cottonwood	*Populus fremontii*		X			FACW	**LOW/**HIGH	Native
Velvet ash	*Fraxinus velutina*		X			FACW	**MEDIUM**/HIGH	Native
Goodding willow	*Salix gooddingii*			X		FACW	**MEDIUM/**HIGH	Native
Red willow	*Salix laevigata*				X	FACW	HIGH/HIGH	Native
Box elder	*Acer negundo*				X	FACW	**MEDIUM/**MEDIUM	Native
Arizona sycamore	*Platanus wrightii*				X	FACW	**LOW/**LOW	Native
Arizona walnut	*Juglans major*				X	FAC	**LOW/**HIGH	Native
Pinyon pine	*Pinus edulis*		X				LOW/LOW	Native
SHRUBS:								
Net leaf hackberry	*Celtis reticulata*		X			FAC	**MEDIUM/**HIGH	Native
Desert Willow	*Chilopsis linearis*	X				FACU	**LOW/HIGH**	Native
Salt Cedar	*Tamarix sp.*				X	FAC	LOW/HIGH	Non-native
Velvet mesquite	*Prosopis velutinus*		X			FACU	LOW/MEDIUM	Native
Seep Willow	*Baccharis salicifolia*	X				FAC	LOW/LOW	Native
Desert Broom	*Baccharis sarothroides*	X				FACU	LOW/MEDIUM	Native
Waterweed	*Baccharis sergiloides*			X		FACU	MEDIUM/HIGH	Native
Burro brush	*Hymenoclea sp.*	X					LOW/MEDIUM	Native
False indigo	*Amorpha fruticosa*			X		FACW	**LOW/**MEDIUM	Native
Soapberry	*Sapindus saponaria*				X		MEDIUM/MEDIUM	Native
Canyon grape	*Vitus arizonica*				X	FACU	MEDIUM/HIGH	Native
Mulberry	*Morus microphylla*				X	FACU	MEDIUM/HIGH	Native
Elderberry	*Sambucus nigra ssp.caerulea*				X	FAC	**LOW/**MEDIUM	Native
Desert honeysuckle	*Anisicanthus thurberi*				X		**LOW**/HIGH	Native
Wild olive	*Forestiera neomexicana*				X	FACU	**LOW/**MEDIUM	Native

Catclaw	*Acacia greggii*	X					LOW/LOW	Native
Wait-a-minute	*Mimosa aculeata var. biuncifera*	X					LOW/LOW	Native
Apache plume	*Fallugia paradoxa*			X			MEDIUM	Native
Condalia	*Condalia*				X		LOW/LOW	Native
Broom snakeweed	*Gutierrezia sarothrae*		X				LOW/LOW	Native
Turpentine bush	*Ericameria laricifolia*		X				LOW/LOW	Native
Tarragon	*Artemisia dracunculus*				X		**LOW/**HIGH	Native
Prickly-pear	*Opuntia spp.*		X				LOW/LOW	Native
Brickelbush	*Brickellia spp.*		X				LOW/HIGH	Native
Barberry	*Berberis sp.*		X				LOW/LOW	Native
Sumac	*Rhus trilobata*		X				LOW/LOW	Native
Turbinella Oak	*Quercus turbinella*		X				LOW/LOW	Native
Coffee-berry	*Rhamnus illota*		X		X		LOW/HIGH	Native
Mountain mahogany	*Cercocarpus montanus*				X		MEDIUM	Native
Gray thorn	*Ziziphus obtusifolia*				X		LOW/LOW	Native
FORBS:								
Common mullein	*Verbascum thapsus*		X				LOW/LOW	Non-native
Mullein	*Verbascum virgatum*				X		LOW/LOW	Non-native
Mint	*Mentha sp.*				X		HIGH/HIGH	Native
Wild Petunia	*Petunia parviflora*				X		LOW/LOW	Native
Prickly poppy	*Argemone pleiacantha*				X		LOW/LOW	Native
Four-o'clock	*Allionia incarnata*				X		LOW/LOW	Native
Spurge	*Euphorbia sp.*				X		LOW/LOW	Native
Limabean	*Phaseolus sp.*				X		LOW/LOW	Native
Waterhemlock	*Cicuta maculata*				X	OBL	LOW/HIGH	Native
Buffalo-bur	*Solanum rostratum*				X		LOW/LOW	Native
Rocky Mtn bee plant	*Cleome serrulata*				X		LOW/LOW	Native
GRASSES:								
Bermuda grass	*Cynodon dactylon*				X		**HIGH/**HIGH	Non-native
Deergrass	*Muhlenbergia rigens*				X		**LOW/**MEDIUM	Native

Rush	*Juncus sp.*				X		HIGH/HIGH	Native
Red Brome	*Bromus rubens*			X			LOW/LOW	Non-native

1/ 2012 NRCS National Wetland Plant List: OBG=obligate wetland, FACW = facultative wet, FAC = facultative; FACU = facultative upland.

2/ NRCS data base (USDA.plants/gov) palatability rating in bold print. Followed by normal typeface observed rating; i.e. Low/High
Non bolded palatability rating is based on typical observed use and literature.