Chapter 3 - Affected Environment and Environmental Consequences

Chapter 3 describes the environment and environmental consequences relevant to this analysis. It focuses on the resources that are relevant to or affected by the scope of the analysis: range, botanical, aquatic, wildlife, recreation, scenery, and specially designated areas. The chapter concludes with a discussion of specifically required disclosures. The analysis in this chapter is derived from specialist reports, biological assessments, and biological evaluations contained in the analysis file.

Range Resources

Range resources are described below with respect to range condition and noxious weeds.

Existing Conditions – Range Condition

The JCRAA is comprised of a mix of forestland and rangeland. Forestlands are those areas with at least 10 percent canopy cover and comprise approximately 69 percent of the analysis area and tend to be located on the upper elevation plateaus and in stringers along drainages. Rangeland vegetation exists within these forested areas, and the amount and species depends on the canopy cover. In ponderosa pine stands, the range understory may be Idaho fescue while low quantities of forage will exist in the denser canopies, often intermixed with non-native grass species that were introduced by seeding after timber harvest. Where limited or no tree canopy exists, rangeland types are predominately shrub-steppe plant communities identified as bluebunch wheatgrass/Idaho fescue plant associations that are associated with species such as prairie junegrass, Sandberg's bluegrass, and arrow leaf balsam root.

Rangeland capability is defined in 36 CFR 219.3 as the potential of an area to produce resources under an assumed set of management practices at a given intensity. The Wallowa-Whitman National Forest refined this definition for capable rangeland by establishing criteria for capable lands based on land type, inherent native forage production, conifer or shrub canopy cover, soil depth, slope and elevation, and available water (USDA 1999). A computer model that distinguishes capable lands based on these criteria was run for the JCRAA. A total of 17,860 acres of capable lands were identified. Refer to Figure 3 for a map of capable lands within the JCRAA.

Rangeland suitability is defined in 36 CFR 219.3 as the appropriateness of applying certain management practices to an area of land. On the Wallowa-Whitman National Forest, rangelands are termed suitable unless they are developed campgrounds, administrative sites, exclusive use special use areas, fenced road rights-of-way, Research Natural Areas where the establishment report excludes grazing as a use, Wilderness where grazing was

not permitted at the time of wilderness designation, long-term exclosures, municipal watersheds, townsites, areas administratively closed to livestock grazing, and lands which have been shown to be uneconomical to manage under any reasonable management system (USDA 1999). The JCRAA is allocated to Management Areas 1, 1W, 3, 7, and 12 by the Forest Plan. The Coyote Campground, Joseph Canyon Overlook, and Red Hill Lookout are small areas within the analysis area that would qualify as campgrounds or administrative sites (Management Area 16). These areas comprise about 2 to 5 acres. All other areas within the analysis area would meet the definition of suitable lands.

The following range condition assessment focuses on the non-forested portions of the JCRAA. Approximately 45 percent of the JCRAA is grassland or forestland with less than 40 percent canopy closure. Although range condition is not normally assessed for forested areas, professional judgment indicates that the forested portions of the pastures are vigorous stands of native and non-native species. The non-native species were seeded after previous timber sale activities, and they persist to provide palatable forage and full ground cover. Despite this available forage in forested areas, livestock spend most of their foraging time in rangeland areas; therefore, range condition analysis focuses on the non-forested areas. Range conditions for the rangeland areas are described here as satisfactory or unsatisfactory. Satisfactory range conditions exist when the forage condition is at least 'fair' with a stable or improving trend. Unsatisfactory range conditions exist when the forage condition is 'fair' and in a downward trend or if the forage condition is 'poor', regardless of the trend. The Forest Plan provides direction (Page 4-54) to identify areas in unsatisfactory range condition and to develop allotment plans that define desired future conditions for these areas.

Range condition was evaluated through professional judgment and from Condition and Trend (C&T) plots. These plots were originally established in the 1950s. In 2003, 32 of these plots were revisited within the JCRAA. The remaining pastures did not contain historic plots, and their condition was determined from professional judgment based on over 10 years of notes from field reviews of species composition, plant vigor, and ground cover. Based on professional judgment, 4 pastures were identified as having unsatisfactory condition. From C&T plots, 14 pastures were identified as potentially having unsatisfactory range condition. Because of the length of time between readings, management activities other than livestock grazing can easily influence the results of C & T monitoring. The construction of a road, installation of a pond, building of a fence, or logging of a nearby stand can all cause disturbances to these plots that might change livestock use or forage condition in a small area, but may not represent conditions throughout the pasture. Consequently, field visits and professional judgment were used to sort out which plot results truly represented forage condition and trend related to livestock management. Some pastures contain isolated areas of poor condition range, but the majority of the range condition within the JCRAA is fair or good. When the predominant condition is fair or better, the pastures were then rated as having satisfactory range condition.

Insert Figure 3 – Capable Lands

Based on C&T plots and professional judgment, rangeland throughout the JCRAA is generally in satisfactory condition. Out of 65 pastures it was found that 5 pastures are experiencing unsatisfactory range condition related to current livestock grazing systems. Three additional pastures in the Davis Creek Allotment indicated unsatisfactory range, but the grazing system has changed greatly in the last few years, and an improvement in range condition is anticipated from those changes. Therefore, the five pastures currently of concern with respect to range condition and current grazing systems are the Sumac Pasture of the Cougar Allotment, the Upper Swamp and Bennett Pastures of the Swamp Creek Allotment, and the South Crow and Doe Gulch Pastures of the Crow Creek Allotment.

Another indicator of range condition can be inferred from compliance with allowable utilization standards. Allowable utilization standards are established by the Forest Plan (Pages 4-52 and 4-53). These standards are a means to assure that vegetative conditions are either improving or maintained in satisfactory condition. Monitoring of compliance with these standards occurs at upland and riparian key areas throughout the grazing season. Table 10 displays compliance with utilization standards since 1995.

Table 10 - Annual Compliance with Allowable Utilization Standards

Allotment Pasture	**Compliance with Allowable Utilization Standard**								
	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Al Cunningham									
South Alford	Y	Y	NR	Y	Y	Y	NR	NR	NR
Sumac	Y	Y	NR	Y	Y	Y	Y	NR	NR
North Alford	Y	NR	NR	Y	Y	NR	NR	Y	NR
Shoot Canyon	Y	NR	NR	Y	Y	NR	NR	NR	NR
Cougar Creek									
Trap Canyon	NR	NR	NR	Y	Y	NR	NR	NR	NR
Breeding Pasture	Y	NR	NR	NR	Y	NR	NR	Y	Y
Sumac	Y	Y	NR	Y	Y	NR	Y	NR	Y
Hinton Corner	Y	NR	Y	Y	Y	NR	NR	NR	NR
Boner	Y	Y	Y	NR	Y	NR	NR	NR	NR
Cougar	Y	Y	Y	Y	Y	Y	Y	Y	Y
Peavine	Y	NR	Y	Y	Y	Y	Y	Y	Y
Baldwin	NR	Y	**N**	Y	Y	Y	NR	NR	Y
Muddy	Y	Y	Y	NR	NR	Y	Y	NR	Y
Crow Creek									
North Crow	NR	NR	NR	Y	Y	Y	NR	NR	NR
South Crow	Y	NR	NR	NR	Y	Y	NR	NR	NR
Crow Creek	Y	Y	Y	Y	Y	Y	Y	NR	NR
Special Use	NR	NR	NR	Y	NR	NR	Y	NR	NR
Doe Gulch	NR	NR	NR	NR	NR	Y	Y	NR	NR
Road	NR	NR	NR	NR	NR	NR	NR	NR	NR
Davis Creek									
Davis South	NA	NA	NA	NA	NA	NA	Y	Y	Y
Hillside	Y	Y	NR	Y	Y	NR	NR	NR	Y
Elk Creek	NR	NR	NR	Y	Y	NR	Y	Y	Y
Starvation	Y	Y	NR	Y	NR	NR	NR	NR	Y
Davis West	NA	NA	NA	NA	NA	NA	NA	NA	NA
Davis East	NA	NA	NA	NA	NA	NA	NA	NA	Y
Bennett	NA	NA	NR	Y	Y	Y	Y	Y	Y
Davis Creek	Y	Y	Y	NR	Y	Y	Split into 3 pastures		
West Swamp	Y	NR	NR	Y	**N**	NR	No longer in allotment		

Allotment Pasture	**Compliance with Allowable Utilization Standard**								
	1995	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**	**2002**	**2003**
Elk Mountain	Y	Y	NR	NR	Y	NR	No longer in allotment		
Davis Cr Sheep	NR	NR	NR	NR	No longer in allotment				
Dobbins									
Dobbins	NR	NR	NR	NR	NR	NR	NR	NR	NR
Elk Mountain									
Homestead	Y	NR	NR	Y	Y	NR	NR	NR	NR
Fine									
West	NR	NR	NR	Y	Y	NR	NR	NR	NR
Homeplace	Y	Y	NR	Y	NR	Y	NR	NR	Y
Peavine 1	Y	Y	Y	NR	**N**	Y	Y	NR	NR
Peavine 2	Y	Y	NR	Y	Y	NR	NR	NR	Y
Peavine 3	Y	Y	NR	Y	NR	NR	NR	NR	Y
Peavine 4	Y	NR	Y	Y	Y	Y	Y	NR	Y
Hunting Camp / Table Mountain									
Tamarack	Y	Y	Y	Y	Y	NR	NR	NR	Y
Kirkland	Y	Y	Y	Y	Y	NR	**N**	Y	NR
Holding Pasture	Y	Y	NR	Y	Y	NR	NR	Y	Y
Wilder	NR	NR	NR	Y	Y	NR	NR	Y	NR
Joseph Breaks	NR	NR	NR	Y	Y	NR	NR	Y	NR
Horse Pasture	NR	NR	NR	Y	NR	NR	NR	NR	NR
Thorn Hollow	NR	Y	Y	NR	NR	Y	NR	NR	Y
Horse Pas Ridge	Y	Y	Y	NR	NR	NR	NR	NR	NR
Corral Springs	NR	Y	NR	Y	Y	NR	NR	NR	NR
Table Mountain	NR	Y	NR	Y	Y	NR	NR	NR	Y
Dog Fight	Y	Y	NR	Y	Y	NR	NR	NR	Y
Joseph Creek									
Joseph Creek	NR	Y	NR	Y	Y	NR	NR	Y	NR
Swamp Creek									
Lower Swamp	NR	NR	Y	NR	NR	Y	**N**	NR	Y
Baker Gulch	NR	Y	NR	NR	NR	NR	NR	NR	NR
Red Fir	Y	NR	Y	NR	NR	NR	**N**	NR	Y
Lower Davis	Y	NR	Y	Y	Y	**N**	Y	Y	NR
Barney Flat	NR	Y	NR	Y	**N**	Y	NR	NR	NR
Miller Springs	Y	NR	NR	**N**	NR	Y	Y	NR	Y
Beef Pasture	Y	NR	NR	NR	**N**	NR	NR	NR	NR
Swamp Riparian	Y	Y	Y	Y	Y	Y	Y	Y	Y
Upper Davis	NR	Y	Y	Y	NR	NR	Y	Y	Y
Little Elk	NR	Y	Y	Y	Y	**N**	Y	Y	Y
Elk Creek	NR	Y	NR	Y	Y	Y	Y	NR	Y
Dorrance	Y	Y	Y	NR	NR	Y	NR	NR	NR
Holding Pasture	NR	Y	NR	Y	Y	NR	NR	NR	NR
Horse Pasture	NR	NR	NR	NR	Y	Y	NR	NR	NR
Upper Swamp	NR	NR	Y	NR	NR	NR	Y	Y	Y
Snake Canyon	NA	NA	NA	NR	NR	Y	**N**	NR	Y
Bennett	NA	NA	NR	NR	Y	Y	Y	NR	NR
Buck Creek	NA	NA	NR	Y	NR	NR	NR	NR	NR
Catchfly	NA	NA	NA	NA	Y *	Y *	Y *	Y *	Y *

Legend

Y = In compliance with allowable utilization standards

N = Not in compliance with allowable utilization standards

NR = No record of monitoring available, either the pasture was rested or monitoring results were not recorded

NA = Pasture did not exist prior to this date

* = Based on ocular estimates rather than key area information

The previous table reflects conditions that have evolved through a set of Annual Operating Instructions for the permittees that operate on the eleven allotments. For the past nine years, compliance with allowable utilization standards was 95 percent. For the 5 percent where utilization standards were exceeded, several circumstances influenced the situation. The listing of summer steelhead as threatened in 1998 resulted in several changes in grazing rotations to ensure that livestock did not access steelhead fisheries during the period that spawning occurs and the frye emerge from the gravels (April 15 to July 1) These changes required permittees to graze alternate pastures. Using a trial and error approach, the adjustments have eventually been equalized throughout the pastures. Until the new system was ground-truthed, utilization standards in some pastures were exceeded. In no cases, were utilization standards found to exceed more than once in nine years for a particular pasture. Other reasons for not meeting utilization standards include inadequate sampling areas, allowing livestock to retread without first checking vegetation, or delays in removing livestock in a timely manner from a particular pasture.

A discussion of range conditions by allotment follows:

Al-Cunningham Allotment – Range conditions within this allotment are satisfactory. A single C&T plot indicated unsatisfactory conditions, but further investigation showed the site as being mistyped and the site is in satisfactory condition with a static trend. Remnants from historic homesteading along Joseph Creek show unsatisfactory riparian range condition at the old home sites and adjoining benches, but these areas comprise a small portion of the allotment.

Cougar Creek Allotment **–** Trend monitoring summaries from 2003 within the Cougar Allotment indicated 3 pastures with unsatisfactory range condition – Sumac, Peavine, and Cougar pastures. The remaining pastures are in satisfactory range condition. Field verification of the condition and trend plots showed that the Peavine and Cougar Pastures demonstrated satisfactory range condition and the plots indicating unsatisfactory condition did not represent the pasture conditions as a whole.

In the Sumac Pasture, several condition and trend plots were monitored and summarized in 2003 one of which revealed unsatisfactory range condition. To determine the nature and extent of this assessment, and if it was representative of the pasture as a whole, a field reconnaissance was completed in 2004. This C&T is located approximately 100 feet below a road and 200 feet below a pond, and is in the southeast corner of the pasture. When established in 1958, this range site was considered to be in satisfactory condition; however, the pond and fenceline did not exist at this time. Due to close proximity of water, and the constriction caused by the fence, range condition on this site is not expected to improve over time. In cases such as this, the C&T plot location is no longer representative of the pasture condition, and the plot is moved to a more representative location. Field observations in other open range sites within the Sumac Pasture revealed a mixture of range conditions ranging from poor to fair. Although utilization standards are usually met in this pasture, they are close to the maximum established by the Forest Plan (50% use on satisfactory range). Much of the condition of the open range sites is due to historic grazing practices which included annual season-long grazing. For the past 8 years, this pasture has been grazed in the spring only and has been rested every other year.

In the Cougar Pasture, two condition and trend plots indicate unsatisfactory range condition. In one case, range condition has not changed much since the time of establishment, and is associated with a shallow-soiled scabland site within a small forest opening. Field notes and photos describe a basically healthy scabland plant community minimally impacted by livestock with an upward trend. This upward trend is expected to continue. The other area of poor condition range is within a south facing slope associated with shallow soil and past grazing practices as mentioned above. Livestock impacts are moderate in this immediate area due to water location and easy accessibility from a road. In addition, elk use of this immediate area is high. This open rangeland site represents a very small portion of this pasture, as other areas checked were in satisfactory condition (field review 2004). Utilization standards at key areas in the Cougar Pasture have been met for the past nine years. As the pasture is grazed in late summer and fall, grazing impacts to these hot dry sites are light unless they are in close proximity to watering facilities. Grazing management in this pasture includes a late summer-fall rotation with the Peavine Pasture.

In the Peavine Pasture, two plots indicate unsatisfactory range. One plot is located in a low potential shallow soil site that was in this condition at the time of establishment in the 1950's. This site is not influenced by livestock grazing and is actually considered a non-capable range site due to site characteristics. Another plot is located in a small opening of ponderosa pine. Field observations (2004) indicate that these sites are not representative of the pasture as a whole. Much of this pasture is timbered types with grass/shrub understory. Grazing management in this pasture includes a late summer-fall rotation with the Cougar Pasture.

The remaining pastures in the allotment are in satisfactory condition. While the Muddy Pasture of this allotment showed a single unsatisfactory condition plot, the plot was clearly not representative of the remainder of the pasture. Unsatisfactory range condition from this plot is associated with isolated shallow soil sites that were in unsatisfactory condition when established back in the 1950's and is not attributed to livestock grazing pressure.

Crow Creek Allotment – While no C&T plots were established in this allotment, field observations record unsatisfactory conditions within two pastures – South Crow and Doe Gulch. These conditions are a remnant of historical management practices that included over stocking and season-long grazing pressure. Some of this area will remain in this condition regardless of grazing management. Current management consists of a short early spring season, and a short winter season for these pastures. In addition, livestock are trailed through the pasture in the fall.

Davis Creek Allotment – Several C&T plots were rated as unsatisfactory within this allotment due to a past grazing system that has since been changed. While some of the plots were disturbed or influenced by past road construction, logging, or fence building, some of the plots correctly represented disturbance by livestock grazing. Livestock grazing within this allotment was modified two years ago by splitting the former Davis Pasture into three pastures, allowing for a rest rotational schedule. In addition, livestock numbers changed from 224 to 112 cow-calf pairs.

Dobbins Allotment – This allotment contains 80% private land which is non-waived. Based on

professional judgment, the National Forest portion of the allotment has a satisfactory range condition with a static trend that receives very little grazing pressure.

Elk Mountain Allotment - This allotment contains 65% private land which is non-waived. Professional judgment and photos reflect satisfactory range conditions with a static trend on the National Forest portion of the allotment.

Fine Allotment – This allotment contains no C&T plots, but based on professional judgment, the range condition is satisfactory with isolated areas of unsatisfactory condition due to historical grazing practices.

Hunting Camp / Table Mountain Allotments – Condition and Trend plot results and professional judgment conclude these allotments have satisfactory range conditions with static or improving trends. One plot in the Joseph Breaks Pasture indicated unsatisfactory range conditions, but the plot is in a transition area from rangeland to forestland, and the tree cover has increased and diminished the range condition potential. This plot is not representative of the remainder of the pasture or an indicator of livestock pressure. Remnants from historical homesteading along Joseph Creek show unsatisfactory range condition at the old home sites and adjoining benches, but these areas comprise a small portion of the Table Mountain Allotment.

The Joseph Breaks and Wilder Pastures include the potential Haystack Rock RNA and portions of the Joseph Creek Wild & Scenic River. Field observations, C&T plot results, and riparian area monitoring indicate that the Joseph Creek Wild and Scenic River corridor is lightly used by livestock as evidenced by less than 10 percent shrub utilization and the presence of a wide variety of shrub species such as common snowberry, black hawthorne, choke cherry, mock orange, clump birch, alder, red osier, dogwood, and willow.

The potential RNA receives light grazing. What little grazing that occurs is located along the old farm fields along the western portion of the potential RNA. Because these farm fields do not contain the species for which the potential RNA was identified, final establishment of the RNA boundary would exclude the farm fields and expand the boundary to the best replacement areas for representing the target plant communities. Refer to the section for Specially Designated Areas later in this chapter for further information.

Managing these allotments together started four years ago. At that point, the grazing season was shortened by 15 days and numbers were reduced from 100 to 90 for Hunting Camp Allotment. The numbers permitted for the Table Mountain Allotment remained at 278.

Joseph Creek Allotment **-** This allotment is in satisfactory condition with static to upward trends. The C&T plot reviewed in 2003 identifies poor condition range due to introduced species. Grazing pressure did not induce these conditions. The plot is on private land that was seeded with non-native grasses approximately 30 years ago after a logging operation and is consequently considered as a non-range site that is not suitable for range study areas.

Swamp Creek Allotment – Range conditions in most of this allotment are satisfactory with static to upward trends with the exceptions of isolated areas of unsatisfactory range associated with past management or perhaps stock watering facilities. In the Little Elk Pasture, unsatisfactory range conditions were indicated for one C&T plot because of a decrease in palatable perennial grasses. Further review of this plot in the summer of 2004 indicated that one reading was taken in an area that is naturally a low potential site, and two readings occurred in areas with satisfactory condition. Ocular observations throughout the pasture correlated with the two satisfactory condition readings. Range conditions in the riparian areas of two pastures, Upper Swamp and Bennett Pastures, remain a concern.

The Upper Swamp and Bennett Pastures include the meadow section of Swamp Creek. This segment has been altered through a history of railroad logging, homesteading, road construction, and grazing. Until the late 1990s, most of this segment and its adjoining floodplain was in private ownership, and grazing of the lands was not waived. As a result, in the portion of the stream that widens to a meadow system (from the Forest Service boundary to the Swamp Creek Cow Camp) lacks shrub species diversity and quantity, and some streambank reaches are unstable. The current shrub component along Swamp Creek is sporadic and is predominately alder with some dogwood, hawthorn, willow, and water birch. Other species appropriate for this area are lacking, such as mountain maple, aspen, mountain snowberry, service berry, black elderberry, black cottonwood, and mountain ash. Much of the herbaceous plants include non-native seeded grasses such as timothy, orchard, and brome.

The Swamp Creek Restoration Project is in progress for the meadow segment. The project purpose is to restore the physical, chemical, and biological processes along the meadow section of Swamp Creek. Project objectives include: improve streambank stability, increase and diversify riparian vegetation, improve floodplain functionality and reduce erosion, improve habitat for a variety of fish and wildlife species, decrease stream temperatures, improve fish passage, decrease sediment entering the stream from roads, inventory heritage resources, and provide local school students educational opportunities. The project will achieve the objectives through upland water developments, riparian fencing, water gap hardening, riparian planting/caging, road maintenance, and livestock grazing management. The livestock management portion of the project will be addressed in the current analysis. The Swamp Creek Restoration Project includes fence construction that will detach the Swamp Creek floodplain from the remainder of the Upper Swamp Pasture. Completion of this fence construction is imminent. For purposes of this document, the streamside portion of the Upper Swamp Pasture is not considered a separate pasture. It is instead referred to as the Swamp Meadow portion of the Upper Swamp Pasture. Although, with completion of this fence, there will be an ability to control livestock use along this portion of Swamp Creek as if a separate pasture existed.

The Catchfly Pasture of the Swamp Creek Allotment is noted here because of the presence of Spalding's catchfly. There are no condition and trend plots located within this pasture although field observations and photos indicate the range to be in satisfactory condition with a vigorous bluebunch wheatgrass plant community. Past and current management since the formation of this pasture has included late fall grazing. Areas of the pasture that contain Spalding's catchfly populations are showing little use by livestock.

Existing conditions reflect grazing of the Swamp Creek Allotment over the last 15 years at a stocking level that is 78 percent of the 5045 head-months currently authorized in the four permits issued for this allotment. One of the permittees has elected to not stock the allotment for 3 of every 4 years. The remaining permittees distribute livestock among the pastures. Consequently, existing conditions may not exhibit the impacts of livestock grazing that would be associated with grazing the full permitted numbers (842 cattle for 5045 head-month). If the permittee had decided to stock the allotment according to his permit, the cattle would have reached utilization standards early in the Little Elk, Elk Creek, and Dorrance Pastures. At 78 percent stocking level, utilization standards are readily met in regular years, but must be closely monitored in dry years.

Alternative 1 – Range Condition

This alternative eliminates livestock grazing from the JCRAA. Grazing by big game would continue. The changes in range condition described here are expected to occur within the timeframe of 10 to 20 years. Timeframes for changes in range condition are influenced by climate, precipitation, and big game use. Evaluations of condition and trend are not particularly useful unless observed over a period of at least 10 years.

Al-Cunningham- This alternative would allow an area that is in satisfactory range condition to maintain that condition over time. Isolated areas of unsatisfactory range conditions associated with historic homesteading along Joseph Creek would continue to exist. The annual non-native grass species populating these areas would not convert to native perennial grasses without direct restoration techniques such as drilling and re-seeding. This assumption is based on the observation that homesteading occurred prior to establishment of the National Forest in 1907, and annual grasses still persist in these previously cultivated areas.

Cougar Creek Allotment – This alternative would allow the pastures that are currently in satisfactory range condition to maintain that condition over time. Unsatisfactory range conditions in the Sumac Pasture would convert to satisfactory range conditions.

Crow Creek Allotment – This alternative would allow the pastures that are currently in satisfactory range condition to maintain that condition over time. Some of the unsatisfactory conditions in the South Crow and Doe Gulch Pastures would improve. Areas where perennial plant communities have been converted to annual communities within these pastures (approximately 30 percent of the pastures) would persist, and satisfactory range would not be achieved without direct restoration techniques such as drilling and reseeding.

Davis Creek Allotment – Eliminating livestock grazing from this allotment would accelerate the current rate of improvement for range condition. Satisfactory conditions may be achieved in 5 to 10 years.

Dobbins Allotment – This alternative would allow an area that is in satisfactory range condition to maintain that condition over time.

Elk Mountain Allotment - This alternative would allow an area that is in satisfactory range condition to maintain that condition over time.

Fine Allotment – This alternative would allow an area that is in satisfactory range condition to maintain that condition over time.

Hunting Camp / Table Mountain Allotments – This alternative would allow an area that is in satisfactory range condition to maintain that condition over time. Isolated areas of unsatisfactory range conditions associated with historic homesteading along Joseph Creek would continue to exist. The annual non-native grass species populating these areas would not convert to native perennial grasses without direct restoration techniques such as drilling and re-seeding.

Joseph Creek Allotment - This alternative would allow an area that is in satisfactory range condition to maintain that condition over time.

Swamp Creek Allotment – This alternative would allow the pastures that are currently in satisfactory range condition to maintain that condition over time.

In the Upper Swamp and Bennett Pastures, removing livestock grazing would allow the riparian vegetation to recover at a natural rate. Shrub density and diversity would increase over the next 10 years on the meadow section of Swamp Creek with continuation of the Swamp Creek Restoration Project. The influence of livestock grazing on existing and planted riparian shrubs would be removed. Existing shrubs would recover at a natural rate. Based on the recovery of shrubs observed within livestock exclosures on Elk Creek, existing shrub density would double in 5 years. Shrub diversity would continue to be introduced by plantings from the Swamp Creek Restoration Project. Livestock would not be present, and these planted shrubs would be caged to reduce browse by big game. Within 10 years, these shrubs would no longer need the caging protection from wildlife.

Alternative 2 – Range Condition

This alternative would authorize continuation of current grazing systems, although changes would be made with the Crow Creek Allotment to ensure protection of Spalding's catchfly populations. The changes in range condition described here are expected to occur within the timeframe of 10 to 20 years. Timeframes for changes in range condition are influenced by climate, precipitation, and livestock and big game use. Evaluations of condition and trend are not particularly useful unless observed over a period of at least 10 years.

Al-Cunningham Allotment – This allotment would continue to have range conditions similar to the existing condition previously described. Range condition would remain satisfactory.

Cougar Creek Allotment – For the pastures currently in satisfactory range condition, they would remain in that condition. The Sumac Pasture currently exhibits unsatisfactory range condition. Forest Plan utilization standards would dictate that allowable utilization

be reduced. These standards would remain in effect until satisfactory range condition was noted.

Crow Creek Allotment – This allotment would be managed to minimize impacts to Spalding's catchfly in the North Crow, South Crow, and Doe Gulch Pastures. Protections for the plant during the critical period of growth (mid May through August) would include fencing, caging, herding, or avoiding grazing during this period. Forest Plan utilization standards for unsatisfactory range condition would be implemented (no more than 35 percent utilization of upland grasses) in the South Crow and Doe Gulch Pastures. Portions of these pastures with residual perennial native grasses may be on an upward trend within 10 years; however portions of these pastures that have converted to annual vegetation (approximately 30 percent) would not. Without direct restoration efforts, such as drilling and re-seeding, this annual vegetation will persist whether the pastures are grazed or not.

Davis Creek Allotment – Due to changes in management over the past three years, continuation of the current grazing schedule is expected to result in an upward trend and satisfactory range conditions within 10 years. Because of the change in grazing systems, new C&T plots would be established for monitoring range condition trend, and new key areas would be established for managing livestock utilization.

Dobbins Allotment - Range conditions within this allotment would remain in satisfactory condition as previously described for the existing condition.

Elk Mountain Allotment – Range conditions within this allotment would remain in satisfactory condition as previously described for the existing condition.

Fine Allotment - Range conditions within this allotment would remain in satisfactory condition as previously described for the existing condition.

Hunting Camp / Table Mountain Allotment – Range conditions within this allotment would remain in satisfactory condition as previously described for the existing condition.

Joseph Creek Allotment - Range conditions within this allotment would remain in satisfactory condition as previously described for the existing condition.

Swamp Creek Allotment – Pastures that currently exhibit satisfactory range conditions would remain in satisfactory condition. If the full number of permitted livestock used this allotment on a regular basis, some pastures would receive more use than in the recent past. If utilization and key area monitoring indicated a problem, Annual Operating Instructions would be used to reduce livestock numbers and/or shorten seasons of use for the pastures of concern.

The Meadow portion of the Upper Swamp Pasture and the Bennett Pasture would exhibit changes caused by the Swamp Creek Restoration Project. These pastures would be grazed according to Forest Plan allowable utilization standards for unsatisfactory riparian range condition (less than 35 percent utilization of grasses and less than 30 percent utilization of shrubs). Before these standards are exceeded, livestock would be removed. In addition, planted shrubs from the Swamp Creek Restoration Project would be caged and protected

from ungulate grazing. Cattle would not be allowed to access steelhead redds in Swamp Creek, so grazing of these pastures would begin only after July 1. This level of grazing would allow for recovery of riparian shrubs to a satisfactory condition, although the timeframe would be influenced by climatic conditions, wild ungulate grazing, and high streamflow events.

Cumulative Effects - Elk numbers are at approximately 83 percent of the management objective for the Chesnimnus Big Game Management Unit and 78 percent of the management objective for the Sled Springs Big Game Management Unit. The JCRAA contains a portion of each of these big game units. Elk populations are currently being managed through changes in hunting regulations and could increase to management objectives. While deer populations are more sensitive to variations from predation and harsh climatic conditions, deer populations could increase as well. Considering that forage conditions throughout the JCRAA are generally satisfactory, increases in deer and elk use could occur and still allow for continuation of satisfactory range conditions. If elk and deer populations reached management objective population levels over a long period, any potential decline in forage condition would be avoided because key area and utilization monitoring would indicate a need to reduce livestock numbers and/or seasons of use. These changes would be implemented through the Annual Operating Instructions.

The Blue Mountain Land Exchange is a foreseeable future action that would bring private lands within and adjacent to the Al-Cunningham Allotment into the National Forest System. The current permittee may elect to continue using the permit; however the adjacent private lands that are currently outside of the permitted area and the non-waived private lands within the allotment boundary would become subject to Forest Plan standards and guidelines. The area has been cultivated for hayfields in the past, and riparian shrubs are sparse along Joseph Creek.

Prescribed fire blocks within the JCRAA have been identified with the Hungry Bob, Lone Dog, Wapiti, and Haypen Vegetation Management Projects as well as the Fire Ridge Fuels Reduction Project. The Baldwin Vegetation Management Project includes prescribed fire blocks within the JCRAA and is a foreseeable future action. Some of the burning is prescribed for spring and some is prescribed for fall. Underburning occurs in blocks approximately 500 to 1000 acres in size, using existing fuel breaks such as roads or ridgelines to control the fire's spread. The objective of these projects is to reduce fuel loadings within conifer stands. However, to minimize ground disturbance that would result from constructing fireline, existing control features such as roads and ridgelines are used to bound the prescription area, resulting in the burning of intervening rangeland. Bunchgrasses respond to burning with improved vigor which attracts an increase in big game and livestock use (Johnson 1998). The additional use can damage long-term bunchgrass vigor. This effect has been mitigated within the prescribed burning projects by implementing a review process where burned areas are reviewed by the fuels specialist and range manager to allow a rest from livestock grazing for one growing season where necessary to prevent impacts to bunchgrass health.

Alternative 3 – Range Condition

This alternative authorizes the continuation of grazing at current stocking levels for each allotment, but allows flexibility in how livestock are managed among pastures in the allotments, provided that resource conditions are maintained as described. Changes in stocking would occur with the Swamp Creek Allotment. As described for Alternative 2, the changes in range condition described below would occur within the timeframe of 10 to 20 years.

Al-Cunningham Allotment – This allotment would continue to have range conditions in satisfactory condition. The grazing season for each pasture would span from April to October, whereas, Alternative 2 gives specific grazing seasons for each pasture. As a result, greater flexibility would be provided for the upcoming changes in ownership expected with the Blue Mountain Land Exchange. Greater opportunities for rest and rotation would be made available for the Al-Cunningham Allotment and for adjoining allotments such as the Fine or Crow Creek Allotments. Depending on whether the current permit is extended, the allotment could be used for grass-banking or tribal horse-grazing during a period that extends from April to October. Because overall stocking would not increase beyond the current stocking level for this allotment, range conditions would continue to be maintained in satisfactory condition.

Cougar Allotment – The unsatisfactory range condition in the Sumac Pasture would be addressed by applying Forest Plan utilization standards for unsatisfactory range condition (up to 35 percent utilization allowed). This measure would cause range condition to improve in this pasture. This alternative also allows greater flexibility in moving livestock from the Sumac Pasture to another allotment or pasture such as the Dorrance Pasture of the Swamp Creek Allotment. In the Cougar and Peavine Pastures, the C&T plots that indicated unsatisfactory range condition do not represent conditions in the remainder of the pasture. Grazing management changes would not be implemented unless key area monitoring indicated a need for change in the future. Several new key areas would be established and monitored to ensure adequate residual (50%) forage remains for winter elk feed in identified elk concentration areas on the allotment.

Crow Creek Allotment – The unsatisfactory conditions in this allotment would be addressed by a staged approach. As described in Alternative 2, Forest Plan allowable utilization standards for rangeland that is in unsatisfactory condition (less than 35 percent for grasses and less than 30 percent for shrubs) would be applied to the South Crow and Doe Gulch Pastures. If rangeland condition around the Spalding's catchfly occurrences was found not to be improving through the methods identified for monitoring of Spalding's catchfly (Page 53), grazing would be eliminated from these pastures until such a trend developed. An indirect effect of eliminating livestock grazing from the pastures may occur if the landowner decides to fence the waived private land within these pastures and manage those private parcels without the influence of the federal permit. However, these livestock may also be permitted to graze the Al-Cunningham Allotment after the Blue Mountain Land Exchange moves private land into federal management. Portions of the South Crow and Doe Gulch Pastures would remain in unsatisfactory condition indefinitely because the conversion from annual species would not occur without direct restoration such as drilling and seeding.

Davis Creek Allotment – This allotment would continue to improve from a mixture of pastures

having satisfactory and unsatisfactory conditions to a set of pastures all with satisfactory conditions. The recent changes made by splitting one pasture into three pastures and reducing numbers by half will continue to contribute to improved range condition in this allotment. Satisfactory conditions would be achieved within 10 years.

Dobbins Allotment – This allotment would remain in satisfactory condition. The allotment would be managed the same as Alternative 2.

Elk Mountain Allotment - This allotment would remain in satisfactory condition. The allotment would be managed the same as Alternative 2.

Fine Allotment – This allotment would remain in satisfactory condition. Greater flexibility in the grazing season would occur for each individual pasture than described for Alternative 2. If the Dorrance Pasture of Swamp Creek Allotment or the Al-Cunningham Allotment becomes available, this alternative allows for ready movement of livestock from pastures that may need rest or rotation to maintain satisfactory range condition.

Hunting Camp and Table Mountain Allotments – This alternative would allow areas of satisfactory condition on the two allotments to maintain that condition over time. Isolated areas of unsatisfactory range condition would not improve without active restoration as described for Alternative 2. A new key area would be established to reflect utilization in elk over-wintering areas and to ensure 50% residual feed remains.

Joseph Creek Allotment - This allotment would remain in satisfactory condition. The allotment would be managed the same as Alternative 2.

Swamp Creek Allotment - Pastures currently in satisfactory range condition would remain so under this alternative. Unsatisfactory range conditions in the Bennett and Swamp Meadow portion of the Upper Swamp Pasture would have an accelerated rate of recovery from Alternative 2 because Alternative 3 differs from Alternative 2 by adopting a monitoring program that guides annual decisions about grazing management systems. By monitoring shrub utilization and streambank stability on an annual basis, decisions can be made each year on when to authorize grazing and for how many head-months. Alternative 3 bases decisions to adjust livestock grazing numbers and timing on an evaluation of riparian recovery, rather than on Forest Plan allowable utilization standards. Similar evaluation of riparian recovery would be used to guide livestock grazing authorized for the Bennett Pasture. While the Swamp Creek floodplain is not fenced from the remainder of Bennett Pasture, the pasture offers opportunities for managing cattle through herding and maintenance of upland water sources.

The planted shrubs from the Swamp Creek Restoration Project would persist as described for Alternative 2 because they would be caged from livestock and big game use. While Alternative 3 would provide for a faster rate of recovery for riparian shrubs along the Meadow Segment of Swamp Creek than Alternative 2, the rate of recovery is also based on factors such as climate, wild ungulate use, and high streamflow events.

Cumulative Effects – Cumulative effects would be the same as those described for Alternative 2 with the exception that utilization standards would be established for big-game winter

concentration areas. These standards, and the associated monitoring, would provide a greater level of assurance than under Alternative 2 that forage would be available for over-wintering big-game. Increases in big-game numbers would be accounted for by ensuring that the 21,323 acres of big-game concentration areas have at least 50 percent of the plant material retained for big-game use. Under current grazing systems, an estimated 50 to 60 percent of the plant material for key species remains on site on October 1. Enstating the requirement for 50 percent plant material with Alternative 3 prevents a future adaptation to the current livestock grazing program from creating impacts to wintering big game. However, it does not necessarily induce a need to reduce livestock grazing below current stocking levels.

Issue 7 – Range Condition

Key Issue - Grazing as proposed for the JCRAA may not adequately provide for long-term range health in the 5 pastures which were identified as having unsatisfactory range condition.

Table 11 - Comparison of Issue 7 Indicators by Alternative

Indicator	Alternative 1	Alternative 2	Alternative 3
Range condition in 10-20 years			
Sumac Pasture	Satisfactory	Satisfactory	Satisfactory
Doe Gulch Pasture	Satisfactory	Unsatisfactory	Unsatisfactory
South Crow Pasture	Satisfactory	Unsatisfactory	Unsatisfactory
Allowable Shrub Utilization in the Meadow Segment of Swamp Creek			
Bennett Pasture	Wildlife use	Less than 30 percent	Determined by monitoring
Swamp Meadow Portion of the Upper Swamp Pasture	Wildlife use	Less than 30 percent	Determined by monitoring

As shown above, Alternative 1 resolves the range condition issue because no livestock grazing would be authorized, and the five pastures currently exhibiting unsatisfactory range condition would recover at a natural rate. Alternatives 2 and 3 have a similar rate of recovery for the Sumac Pasture. Alternative 3 introduces a staged approach to improvement of range condition in the Doe Gulch and South Crow Pastures. If range condition does not improve, livestock grazing would be eliminated altogether. Alternative 1 has the greatest protection of riparian shrubs in the Meadow Segment of Swamp Creek because only wildlife related herbivery would occur. Alternative 2 enstates Forest Plan Standards and Guidelines of less than 30 percent utilization. Alternative 3 recognizes that current utilization measurement methods are course and subject to differences among individuals. The utilization is instead determined by a monitoring program consisting of photo points and annual site visits.

Existing Conditions – Noxious Weeds

At present, many low priority (state listed C) noxious weed species, such as Canada thistle, St. Johnswort and bull thistle exist throughout the project area. These lower priority noxious weeds tend to be less persistent than the high priority weeds, and generally give way to desirable vegetative species over time. In addition, the mitigations used to prevent the spread and establishment of high priority noxious weeds are effective in deterring lower priority noxious weed species. Many times low priority weeds are treated in conjunction with high priority weeds.

Known high-priority noxious weed sites within the JCRAA include yellow star thistle, diffuse and spotted knapweed, Scotch thistle, tansy ragwort, white top, and meadow hawkweed. These species are rated as high priority weeds because they are invasive, persistent, and prolific reproducers. They displace desirable vegetation, and presently occur in infestations at scales that are feasible to treat. Refer to Table 12 for a list of these sites and their treatment strategies, and status of populations and methods.

Table 12 – Known Priority Noxious Weeds Within the JCRAA

Site no.	Species	Allotment	Action	Date Reported	Last Treatment	Site Status 2004
2-0001	Scotch Thistle	Davis Cr./Swamp Cr	Monitor	7/93	6/01	No plants
2-0011	White Top	Cougar	Monitor	6/92	7/93	No plants
2-0016	Diffuse Knapweed	Joseph Cr/Cougar/Swamp Cr/Crow Cr/Davis	Treat	12/95	7/03	Declining pop
2-0017	Diffuse Knapweed	Swamp Creek	Treat	8/92	7/03	Declining pop
2-0019	Spotted Knapweed	Swamp Creek	Treat	5/94	7/03	Stable
2-0020	Diffuse Knapweed	Fine/Joseph Cr./Cougar	Treat	8/92	7/03	Declining
2-0029	Diffuse Knapweed	Swamp Cr/Davis	Treat	8/93	8/03	Stable
2-0030	Scotch Thistle	Davis Cr	Treat	11/93	8/03	Stable
2-0032	Scotch Thistle	Swamp Cr/Hunting Camp/Table Mt/Cougar	Treat	9/93	6/03	Declining
2-0033	Diffuse Knapweed	Al Cunningham Cougar/Hunting Camp/Table Mt	Treat	6/95	7/03	Stable
2-0034	Tansy Ragwort	Davis	Monitor	8/93	9/98	No plants
2-0056	Yellow Starthistle	Hunting Camp	Treat	7/99	7/03	Declining
2-0064	Scotch Thistle	Table Mt	Treat	5/01	7/03	Declining
2-0067	Yellow Starthistle	Cougar	Monitor	6/92	7/93	No plants
2-0073	Meadow Hawkweed	Cougar	Treat	7/03	7/03	Stable

Primary mechanisms of dispersal appear to be a combination of vectors. These include vehicles, recreationists, logging equipment, wind, birds, wildlife, livestock, and water. The diffuse and spotted knapweed populations are primarily distributed along open roads and

are clearly introduced and spread by motorized vehicles. The scotch thistle populations appear to have originated on adjacent private lands, whether from logging operations or from ranching. The source of other weeds is not known, but some of the introduction and spread could be attributed to livestock.

Within the Wild and Scenic River corridor, the Management Plan directs managers to annually monitor range conditions of late-season grasses, inventory and monitor the river corridor for noxious weeds and non- native grasses and prepare a map of concentrations. It also recommends every third year to evaluate the inventory to determine programs needed to reduce populations. It recommends aggressive action to reduce noxious weeds in the corridor so that natural communities are maintained. A review in 2003 indicated that low priority weeds do occur within this W&S river corridor but were limited to isolated locations which have been mapped and inventoried and are under a treatment strategy.

Alternative 1 – Noxious Weeds

Under the no-grazing alternative, the permittees would no longer play a role in the detection and management of noxious weeds, increasing the risk that weed populations would become well established prior to detection. Forest Service funds derived from grazing fees would not be available for noxious weed treatment. However, any role played in the spread of noxious weeds by livestock in the project area would cease.

Alternatives 2 and 3 – Noxious Weeds

Direct and Indirect Effects - Alternatives 2 and 3 may increase the chance of noxious weed spread by livestock within the analysis area, however permittees and Forest Service Range Management Personnel presence on allotments would assist in detection and control of noxious weeds. In addition, grazing fee funds would be available for noxious weed treatment under this alternative.

Prevention strategies currently in effect would continue under these alternatives. If livestock herds are moved to the JCRAA from known weed-infested pastures in Idaho, the herd must be confined on private land and fed hay for at least 3 days. The Wallowa County ordinance that prohibits import of hay and straw other than certified weed-free products assists in reducing the introduction of new weed populations. Prevention strategies are discussed at the annual operating meeting with the permittees, such as avoiding trailing through known weed populations and early detection of new infestations.

Cumulative Effects - Many of the noxious weed sites within the JCRAA are roadside populations of spotted or diffuse knapweed that were introduced and dispersed through recreation travel. The Upper Joseph Creek Watershed Analysis identified several roads to be closed to public travel. These closures would be foreseeable future actions within the JCRAA and would contribute to a reduction in weed spread from vehicles. These populations are under a treatment strategy. Until these populations are controlled, and further introduction is reduced through road closures, livestock use of these roads presents a risk of noxious weed spread. While livestock spread these weeds, the permittees also visit

the unroaded portions of the JCRAA on horseback and have plant identification skills. Newly discovered noxious weed populations would be reported to the Forest Service to address the treatment in a separate analysis.

Botanical Resources

Botanical resources refer to those plant species that are distinguished through listing either as Threatened or Endangered through the Endangered Species Act or Sensitive through the Pacific Northwest Regional Forester's Sensitive Species list.

Existing Conditions – Threatened or Endangered

Threatened or Endangered plant species with the potential to be found on Wallowa Valley Ranger District are water howellia, Ute's ladies' tresses, Howell's spectacular thelopody, MacFarlane's four-o'clock, and Spalding's catchfly. All five species are listed as Threatened. Habitat descriptions were assembled from professional experience and available literature including the *Section 7 Guidelines – Snake River Basin Office* (USFWS 1997) for managing listed plant species. After review of potential habitat within the analysis area, it was determined that no habitat for water howellia, Ute's ladies' tresses, or Howell's spectacular thelopody occurs within the analysis area. Potential habitat for the remaining two species exists, and known occurrences of Spalding's catchfly occur within the JCRAA.

MacFarlane's Four-o'clock - This species grows in canyon grassland habitats between 1,000 and 3,200 feet in elevation, in the Imnaha, Snake, and Salmon River drainages of Oregon and Idaho. Populations have been found in many different non-forest plant associations, soil types, and on all aspects and slopes. The US Fish and Wildlife Service (USFWS) counts 12 populations over its range, with 5 occurring in the Hells Canyon National Recreation Area. No populations are known within the JCRAA.

There is potential habitat for MacFarlane's Four-o-clock in the project area. The Joseph Canyon environment, the known plant associations there, and the range of elevations are consistent with those of known MacFarlane's sites across its range. A habitat model was also used to indicate the potential for habitat within the JCRAA. The model was developed in cooperation between the Wallowa-Whitman National Forest and the Oregon Natural Heritage Program for the HCNRA Comprehensive Management Plan and was used to identify potential habitat within the JCRAA. This model stratified the landscape into potential habitat classes of no, medium, high, and very high potential habitat for MacFarlane's four-o-clock. Inventory of the high and very high potential habitat in the spring of 2004 resulted in the discovery of no MacFarlane's four-o'clock occurrences. Consequently, it is highly unlikely that any occurrences would be found within the JCRAA.

Spalding's catchfly is described below with respect to known occurrences and potential habitat within the JCRAA.

Spalding's Catchfly Known Populations - Seven occurrences (17 patches) of Spalding's catchfly are known from within the JCRAA. These occurrences range in size from 20 to 659 plants for a total of approximately 1181 plants on Forest Service managed land, and an additional 90 plants on private land. All of the occurrences occur in the vicinity of Fire Ridge and an unnamed ridgeline east of Crow Creek, internally referred to as Tommy's Ridge. Refer to

Figure 4. Frequently, the number of individuals observed will vary by the year (or time of year) in which the observation is made. Individual plant numbers reported can also vary some between observations because of different observers and because larger numbers are often the result of estimates rather than a specific count of individuals. The numbers given below represent the largest number of individuals recorded among a number of observations over the years. Because a number of individuals may be dormant, in any given year, the total population is likely under-represented.

Table 13: Site Locations of Documented Spalding's Catchfly Occurrences

Allotment	Pasture Name	State Element Occurrence #	W-W GIS #s	# Plants reported	Approx. EO Acreage	Grazing Seasons
Crow Creek	North Crow	EO 016	1266 & 1267	203	<3	Spring, with a Fall pass-through
Crow Creek	South Crow	EO 014	0519,1337,1338	100	<3	Spring, with a Fall pass-through
Crow Creek	Doe Gulch	EO 013 EO 014	0516,0517 0518	94 26	<3	Spring, with a Fall pass-through
Swamp Creek	Dorrance	EO 017	1268 & 1269	79	<1	Summer or fall
Swamp Creek	Dorrance	EO 019	1280	20	<1	Summer or fall
Swamp Creek	Catchfly	EO 020	1275 to 1279	659	<2	Fall

For information about the range condition of the pastures that have catchfly occurrences, refer to the previous section on range condition in this chapter.

On the Wallowa-Whitman National Forest, Spalding's catchfly is only known from two general locations within the Wallowa Valley Ranger District. The first location is within the JCRAA, and the second location is the vicinity of Clear Lake Ridge which is southeast of Enterprise. Spalding's catchfly is found in relatively mesic grassland sites with northwest to northeast facing aspects, or in flat areas. The plants often occur in microhabitats at the heads of draws, in small swales, or in depressions in ridge tops. The soils are deeper and seem to hold moisture longer than the surrounding areas.

In Wallowa County, occurrences have also been noted at the north end of Wallowa Lake and near the Joseph cemetery. There are highly credible but unofficially documented patches of healthy Spalding's catchfly on private land on the north end of the lateral moraine of the Lostine canyon. Several patches of Spalding's catchfly totaling over 1000 plants were discovered on The Nature Conservancy land on the eastern edge of the Zumwalt prairie. Other patches of Spalding's catchfly might occur elsewhere on the Zumwalt Prairie, but no survey work has been done on this vast area of private land.

Spalding's catchfly has been found at widely scattered sites throughout northeastern Oregon, western Idaho, eastern Washington, western Montana, and southern British Columbia. These sites are in remnant Palouse prairie or canyon grasslands (Oregon Natural Heritage Program 1998, Washington Natural Heritage Program 1998).

In northeastern Oregon, the species is typically found in grasslands dominated by Idaho fescue. Depending on soil and moisture characteristics, some sites have few or no shrubs or trees present, whereas other sites may have large shrub thickets. Scattered individuals of Ponderosa pine or Douglas-fir may be found in or adjacent to this habitat. Some populations occur in relatively open stands of ponderosa pine (Gamon 1991, USDA 1997).

Spalding's Catchfly Potential Habitat – Approximately 30% of the JCRAA has been surveyed for the presence of rare plants. Because all of the terrain within the JCRAA has not been surveyed, professional judgment, District records, and a habitat model were used to indicate the potential for habitat within the JCRAA.

The Wallowa-Whitman National Forest botany program completed a cooperative project with the Oregon Natural Heritage Program to model potential habitat for Spalding's catchfly for the HCNRA Comprehensive Management Plan. Attributes from documented sites throughout the plant's range were used to identify and weight parameters of vegetation, elevation, slope, and aspect (Murray 2001). This model was used to identify potential habitat within the JCRAA. It stratified the landscape into potential habitat classes of no, medium, high, and very high potential habitat for Spalding's catchfly. All known occurrences correspond to areas depicted as being very high or high potential habitat by the model.

The habitat model is good at predicting habitat suitability, but not necessarily occupancy as plants rarely occupy all potential habitat. This model is probably most accurate at predicting where poor habitat potential exists. A random test of a roughly similar modeling effort for a Great Smokey Mountain endemic plant found their model to be highly accurate at predicting areas of species absence. Less than 20% of the test plots in modeled suitable habitat contained the target species, likely because of population processes (localized extinction or colonization) not explained by the model (Boetsch et al 2003).

As described in the range condition portion of this chapter, rangeland capability was modeled. This model was assumed to indicate where cattle are more likely to graze. Where capable rangeland intersects with potential habitat, the potential for livestock grazing to affect Spalding's catchfly was anticipated to be high. Refer to Table 14 for a list of modeled habitat and capable habitat intersections by pasture. Combining the two models somewhat alters the accuracy of each model, in that it under-represents potential areas of concern. Professional judgment about plant associations and livestock movement in the area was used to temper the model results so that logical blocks of 'risk areas' could be established. These risk areas are displayed in Figure 4. A total of 10,662 acres fall within Spalding's catchfly risk areas.

Table 14 – Potential Habitat for Spalding's Catchfly and for Capable Lands

Allotment and Pasture	Grazing Season	Total Area (acres)	Moderate Potential (acres)	Moderate Potential and Capable (acres)	High Potential (acres)	High Potential and Capable (acres)	Very High Potential (acres)	Very High Potential and Capable (acres)
Al-Cunningham								
South Alford	Spring Fall	603	65	2.18	23	2.18	38	.56
Sumac	Spring Fall	243	55	0	31	0	16	0
North Alford	Spring or fall	542	13	0.34	7	0.03	0	0
Shoot Canyon	Spring or fall	634	128	0	51	0.10	44	0.33
Cougar Creek								
Trap Canyon	Spring or summer	724	123	0.02	66	0.07	45	0.28
Breeding Pasture	Spring or summer	693	9	0	4	0	1	0
Sumac	Spring or summer	1273	182	0.31	93	0.78	247	8.68
Hilton Corner	Summer or fall	383	0	0	1	0.22	5	0.08
Boner	Summer or fall	769	4	0	1	0	243	0
Cougar	Summer or fall	5046	549	11.11	253	6.64	588	86.92
Peavine	Summer or fall	4602	54	3.30	102	8.82	274	43.05
Baldwin	Summer	2700	58	.20	26	9.79	122	30.9
Muddy	Summer or fall	2162	49	0.10	62	0.70	502	8.55
Crow Creek								
North Crow	Spring Fall	386	22	16.34	98	81.93	50	45.58
South Crow	Spring Fall	116	10	0.02	3	0	51	1.57
Crow Creek	Summer	62	0	0	1	0	0	0
Special Use	Spring Fall	609	0	0	0	0	45	1.99
Doe Gulch	Fall	242	0	0.68	0	0.54	0	4.91
Road	Summer	158	4	0	15	0	81	0
Davis Creek								
Hillside	Summer	393	45	2.21	29	2.34	23	2.91
Elk Creek east and west	Spring or summer	1345	0	0	0	0	222	38.83
Starvation Springs	Summer	625	2	0.05	6	0.05	35	7.82
Davis Creek west, east, south	Summer	4168	154	5.15	200	13.18	414	39.43
Bennett	Summer	516	37	1.49	33	1.047	24	1.65
Dobbins								
Dobbins	Spring, Summer, and Fall	1615	0	0	0	0	27	0.87
Elk Mountain								
Homestead	Spring or summer	166	0	0	0	0	0	0
Fine								
Westside	Spring, summer, or fall	279	2	0	0	0	0	0
Home Place	Spring, summer, or fall	207	0	0	0	0	0	0

Allotment and Pasture	Grazing Season	Total Area (acres)	Moderate Potential (acres)	Moderate Potential and Capable (acres)	High Potential (acres)	High Potential and Capable (acres)	Very High Potential (acres)	Very High Potential and Capable (acres)
Peavine #1	Spring, summer, or fall	158	0	0	0	0	0	0
Peavine # 2	Spring, summer, or fall	108	0	0	0	0	0	0
Peavine # 3	Spring, summer, or fall	110	0	0	0	0	0	0
Peavine # 4	Spring, summer, or fall	653	4	0	4	0	9	0.96
Hunting Camp / Table Mountain								
Tamarack	Summer	3329	804	2.01	172	6.70	388	7.86
Kirkland	Summer	6515	461	0.86	68	1.33	11	4.78
Holding Pasture	Summer	384	81	2.18	40	4.01	76	5.91
Wilder	Spring and fall	1680	154	0	93	.28	54	0
Joseph Breaks	Spring and fall	4319	1066	0.41	416	0	299	0
Horse Pasture	Summer	360	56	0	18	.06	13	0
Thorn Hollow	Spring or summer	1542	545	4.33	210	2.81	192	4.49
Horse Pasture Ridge	Summer	1443	472	0	40	0	148	.81
Corral Springs	Summer	2628	170	1.21	93	2.39	161	8.99
Table Mountain	Summer	2763	332	1.93	51	1.58	147	7.17
Dog Fight	Fall	334	8	0	48	2.38	9	0
Joseph Creek								
Joseph Creek	Spring and fall	1571	78	0.18	51	1.03	10	.41
Swamp Creek								
Lower Swamp	Spring	1327	355	0.05	79	0.02	51	0
Baker Gulch	Spring	1199	276	0	72	0.42	40	0
Red Fir	Spring	586	103	0	47	0	24	0
Lower Davis	Spring	2836	640	.12	149	.11	146	5.02
Barney Flat	Spring	1475	316	0	88	0	148	0
Miller Spring	Summer or fall	2023	302	0.21	88	1.39	157	0.32
Beef Pasture	Spring, summer, or fall	2161	717	2.10	189	.84	178	0
Swamp Creek	Summer or fall	183	2	0.36	8	0.03	0	0
Upper Davis	Spring and summer	2733	597	3.61	199	8.31	160	10.11
Little Elk Creek	Summer and fall	8921	378	10.34	398	24.81	1784	303.09
Elk Creek	Fall	3478	17	4.43	57	10.93	287	42.92
Catchfly	Fall		0	0	0	0	0	0
Dorrance	Summer and Fall	1748	13	6.27	50	8.79	227	87.51
Holding Pasture	Fall	45	2	1.98	1	1.35	5	4.97
Horse Pasture	Incidental	15	0	0	1	0	0	0
Upper Swamp	Summer or fall	1344	287	5.81	66	1.05	20	1.14
Snake Canyon	Spring	1130	337	0	57	0	62	0
Bennett	Summer or fall	1210	134	3.87	84	6.05	35	3.38
Buck	Spring	2076	310	0	96	0	25	0

Reserve for Figure 4 – Spalding's Catchfly Risk Areas

Alternative 1 – Threatened or Endangered Species

MacFarlane's Four-o'clock – There would be no effect to this species from livestock grazing as no populations were located within areas modeled as high or very high potential habitat, and it is highly unlikely that this species occurs within the JCRAA.

Spalding's Catchfly Known Populations and Potential Habitat **-** Under this alternative there would be no direct effects to the known or un-located Spalding's catchfly and its potential habitat from livestock and its management. Other ongoing activities would continue as at present.

Upland range vegetation and soils currently identified in unsatisfactory condition would be expected to improve as domestic livestock grazing is removed from the area. Rate of improvement may accelerate on sites such as in the North Crow Pasture of the Crow Creek Allotment, as more plant material would be left on site rather than being consumed, and soils would be less compacted or displaced by livestock. Discontinuing grazing is not expected to lead to rapid improvement or much improvement on range sites that have been converted to annual sites due to homesteading/grazing activities. However, some level of improvement would be expected during a ten-year period.

Indirect effects would also lessen. Overall there would be less herbivory on the grassland habitats of this species. There may be better wildlife dispersal and less fence-line trailing and areas of concentrated ground disturbance with the removal of livestock fences. In the short term there would be little change in species composition and thus competitive interactions as recovery is often slow in this arid environment. With less herbivore pressure, over the long term the rangeland would tend toward a composition of species being more palatable, and this could include plants like Spalding's catchfly. The rate of change is expected to be slightly faster with no livestock grazing than with improved grazing management (under the two action alternatives), but the rate of change and the extent of change as that affects Spalding's catchfly can not be quantified.

Under the no-grazing alternative, the permittees and permit administrators would play a markedly decreased role in the detection and management of noxious weeds thus increasing the chances that new weed populations could become well established prior to detection. Treatment of known sites could continue, although Forest Service funds derived from grazing fees would not be available for noxious weed treatment. Any role (seed vectors or ground disturbance) played in the spread of noxious weeds by livestock in the project area would cease.

Potential weed spread from other vectors (wildlife, human activities, wind) would continue. Overall, the chances of noxious weeds indirectly or cumulative affecting known or potential Spalding's catchfly populations or potential habitat might be slightly less than or equal to the two action alternatives, but this cannot be quantified.

Alternative 2 – Threatened or Endangered Species

MacFarlane's Four-o'clock – There would be no effect to this species as no populations were located within areas modeled as high or very high potential habitat, and it is highly unlikely that this species occurs within the JCRAA.

Spalding's Catchfly Known Populations – Known populations of Spalding's catchfly occur in the Crow Creek and Swamp Creek Allotments.

In the Crow Creek Allotment, the North Crow, South Crow, and Doe Gulch Pastures contain known occurrences of Spalding's catchfly. The pastures in this allotment are being used in the early spring or late fall. Reproduction of Spalding's catchfly is by seed only as the plant does not possess rhizomes or other means of vegetative reproduction. Spalding's catchfly seed can germinate in the fall but seems to mainly germinate in the spring. With spring germination, it can grow for two months, at which time the seedlings go dormant. When cooler temperatures and rains come with the autumn, growth again commences (Lesica 1988 a). Because of this, seedlings are rarely observed in the summer. Mature Spalding's catchfly plants are observed in the summer and generally flower from mid-July through August (Lesica 1995), although sometimes as late as September (Kagan 1989). Among the sites adjacent to the Crow Creek drainage, growth appears to commence in mid May, as site visits in late April have not detected shoot production. Senescence is observed by mid September. Therefore, the critical growth period for populations within the JCRAA is mid-May through August. The potential for direct herbivory of Spalding's catchfly in this allotment is very low because livestock would not be present during the critical growth period for adult plants, and seedlings may be present, but do not present much biomass to entice herbivory.

With respect to trampling by livestock, adult catchfly plants present in the summer would not be exposed to livestock and there is little threat from trampling when livestock pass through the pastures in the fall. However, seedlings in the South Crow and Doe Gulch Pastures are at moderate risk to trampling because the topography, habitat, fences, and ponds constrict livestock movement near the vicinity of the Spalding's catchfly occurrences. Spalding's catchfly sites near fence lines and near pasture cross-fence gates or water sources face the most threat from trampling.

The potential for indirect effects in these pastures is moderate to high, primarily relating to secondary wildlife herbivory on residual range and based on the range condition. Based on professional judgment, the range condition in South Crow and Doe Gulch is unsatisfactory. The flat topography of the ridge top in these pastures retains vernal moisture. This in combination with historical heavy spring use, subsequent repeated spring grazing, and constriction of livestock movement by pasture fences tends to maintain the habitat in a degraded annual grass condition. This degraded range condition puts more competitive pressures (from annual species) on Spalding's catchfly and makes it more susceptible to herbivores in the summer. That is, Spalding's catchfly is more desirable as forage than most of the vegetation components in poor condition range, and the species dominating poor condition range do not obscure Spalding's catchfly from wildlife herbivores in summer. In Doe Gulch, this condition is further exacerbated by the livestock pond in the draw, just down slope from the east fence-line and Spalding's catchfly sites. The pond causes cattle and wildlife to spend even more time milling about this part of the pasture, adding to trampling and grazing effects to Spalding's catchfly and the associated vegetation.

Professional judgment rates the North Crow Pasture in better condition than South Crow and Doe Gulch. This is likely because it has more area for better cattle dispersal, and perhaps better soils. Indirect effects of wildlife herbivory in North Crow Pasture would be low to moderate. The grass meadows are in better condition, thus providing more available forage for wildlife, thus taking pressure off of Spalding's catchfly as well as providing more biomass to obscure Spalding's catchfly from herbivores. The topography and range structures here also do not constrict cattle movement so much that it concentrates cattle movements.

In the Swamp Creek Allotment, Spalding's catchfly occur in the Dorrance and Catchfly Pastures. The potential for direct effects to Spalding's catchfly from herbivory in this allotment is moderate to low. The Catchfly Pasture is being used in the fall only. The Dorrance Pasture is used in the summer and fall. The summer use is in June. This is in the critical growth period for the Crow Creek populations as a whole, but to date no impacts from cattle grazing have been observed at the part of the Dorrance Pasture where Spalding's catchfly sites reside. This is likely due to the lack of natural or developed water near this part of the pasture. Thus cattle spend very little time here and when they are just grazing while passing through (rather than lingering) there is a much smaller chance that they will affect the Spalding's catchfly plants, either through direct herbivory or trampling. Also the range is in good condition here, so there is less pressure on the Spalding's catchfly as potential forage and the robust grasses help obscure the Spalding's catchfly from herbivores, regardless of season of use.

The potential for indirect effects in the Dorrance and Catchfly Pastures is low, both because of the season of use already discussed and because the range in both pastures is in good (or better) condition. Noxious weed monitoring indicates that the two noxious weed sites within the Dorrance Pasture are under control, and pose only a small threat of spreading into Spalding's catchfly areas.

In order to reduce the potential for effects to known Spalding's catchfly occurrences, Alternative 2 adopts the following protections:

- In the North Crow, South Crow, and Doe Gulch Pastures, protect Spalding's catchfly populations between-mid-May and late-August with fencing, caging, herding and/or avoid grazing during this period.
- In the Catchfly and Dorrance Pastures, review Spalding's catchfly each year. If trampling or herbivory is occurring, fence, cage, herd, divide the pasture through fencing, or avoid grazing during the critical growth period (mid-May through late-August).
- In the North Crow, South Crow, Doe Gulch, Catchfly, and Dorrance Pastures, place salt so that livestock will not be encouraged to move toward the known populations of Spalding's catchfly.
- Manage the North Crow, South Crow, and Doe Gulch Pastures in a manner that improves range condition to good with a static or upward trend.
- Reduce allowable utilization in the South Crow, and Doe Gulch Pastures to provide for improving range conditions.
- Manage the Catchfly and Dorrance Pastures in a manner that maintains ecological

condition of good or excellent with a static or upward trend.

Effectiveness monitoring would ensure that the protective measures are working as designed. Consistent site visits, with field-notes and photos, capture site conditions and record management needs. These kinds of observations have been proven as useful at forwarding knowledge of the rare plant MacFarlane's four-o'clock in Idaho. Fencing and caging have proven very effective in protecting from grazing, both common species like aspen and MacFarlane's four-o'clock plants at West Creek near Pittsburg Landing in Idaho. Assuming fence maintenance is consistent, it is expected that fencing would also work well at protecting Spalding's catchfly. Altering the season of use, and resting and deferring pasture use has been employed to affect changes in range condition for a long time and is an accepted range management practice. Salting is very effective at manipulating livestock locations as can be witnessed at any historic salt-site. Active herding/riding techniques also have the potential to be very effective.

Spalding's Catchfly Potential Habitat - Relative to Spalding's catchfly *potential* habitat, this discussion focuses on the intersection of four factors: potential catchfly habitat, capable rangeland, existing inventory status, and season of livestock use. As previously descrived, the intersection of high potential habitat and capable rangeland predicts areas where the catchfly populations are more likely to occur and where livestock grazing is likely to be more concentrated. The capability model results were tempered somewhat with professional experience, as the model appears to occasionally under-represent where cattle will be. Consequently, risk area perimeters were drawn to enclose the areas of highest risk to Spalding's catchfly. These areas were then assigned a risk level depending on (1) whether inventory has been conducted in the area which would tend to discount the existence of the plant and (2) whether livestock are scheduled to use the area during the critical growth period.

The composite level of risk falls within a spectrum of high to low. The greatest potential for effects would be where summer grazing is planned in areas where little inventory has occurred and the area contains high or very high potential habitat, and especially high in those areas also modeled as capable range. The lowest potential for effects would be in those pastures that have no or very little modeled potential habitat within the capable rangeland, regardless of the season of grazing. Risk areas are identified in Figure 4. Portions of the JCRAA not within a risk area could be assumed to be at the low end of the composite risk level.

Alternative 2 would complete inventory in 3032 acres of the risk areas. If any populations were found in these risk areas, protections would be implemented as described for the currently known populations on Tommy's Ridge and Fire Ridge. Effects to these populations would be as previously described.

Pastures containing some rare plant surveys are considered to be at a lower risk of posing a threat to Spalding's catchfly than pastures with no survey information. Negative survey results (for the presence of Spalding's catchfly) provide a reasonable level of confidence that the species is not in the survey area. Actions outside areas of potential habitat would have almost no effect to Spalding's catchfly or its habitat because of the low likelihood that the species would be found outside areas predicted by the model.

Surveys are designed to detect the presence of a species, not prove they are absent - a landscape is never surveyed at a level that looks at every square yard of potential habitat. Survey design integrates the amount of potential habitat for a given species with potential impacts from a given action. The inventories are conducted in such a way that the potential for the surveyor to intersect rare plant patches is commensurate with the perceived level of risk that the management action would intersect those potential rare plant patches. Given this perspective, survey results from properly designed and executed inventories provide a reasonably accurate characterization of the presence or absence of the species in question.

Roughly 30 percent of the JCRAA has been inventoried in the past, mostly for timber and fuels management projects, although some of the routes were designed to specifically locate Spalding's catchfly. A map of these inventory routes is contained in the Biological Assessment. About 80 percent of the surveys are appropriate to use for the analysis of effects of Alternative 2. The other 20 percent either were not conducted at the appropriate time of year to detect Spalding's catchfly or the survey route may not have been intensive enough to detect Spalding's catchfly.

Alternative 2 would complete inventories on 3032 acres of the Spalding's catchfly risk areas in the summer of 2004. In the remaining 7630 acres of risk areas, inventory would not be initiated by this analysis. These uninventoried areas have a moderate to high probability of containing habitat as determined by the model, and they experience some degree of grazing during the critical growth period for Spalding's catchfly. Analysis of this alternative assumes the presence of Spalding's catchfly in these 7630 acres of uninventoried risk area. These uninventoried areas include risk areas 1 through 9 on Figure 4 within the Hunting Camp and Table Mountain Allotments and risk areas 12 through 17 in the Davis Creek, Swamp Creek, Elk Mountain, and Crow Creek Allotments.

While the Davis Creek Allotment exhibits some areas of unsatisfactory range condition, recent changes in grazing systems are expected to initiate an upward trend in range condition. All of the remaining pastures that occur within these uninventoried risk areas exhibit satisfactory range condition. Because these assessments of range condition are completed on a pasture-wide basis, they do not account for isolated concentrations of livestock use around watering sites or near fences. These concentration areas comprise approximately 10 to 15 percent of the area within these pastures. Catchfly occurrences near areas of livestock concentration may have already been eliminated through the pattern of use over time. However, if any catchfly occurrences persisted in these livestock concentration areas, they would likely be surrounded by discrete areas of poor range condition. This degraded range condition puts competitive pressures (from annual species) on Spalding's catchfly and makes it more susceptible to herbivores in the summer. That is, Spalding's catchfly is more desirable as forage than most of the vegetation components in poor condition range, and the species dominating poor condition range do not obscure Spalding's catchfly from summer wildlife herbivores.

Other than areas of livestock concentration, range condition throughout these pastures is satisfactory (except for the Davis Creek Allotment as noted above). For catchfly occurrences that might exist throughout these uninventoried risk areas, the satisfactory range condition reduces the risk of direct herbivory and trampling by livestock or other

herbivores. Adequate palatable forage species help obscure the Spalding's catchfly from herbivores. Even when some livestock consumption of catchfly plants occurred, the plant can apparently endure these conditions for a long period because of its very deep taproot, propensity for dormancy, and long lived lifecycle. Therefore, except for livestock concentration areas, effects on Spalding's catchfly would be due to incidental herbivory and a low risk of trampling effects. However, because of the risks presented by the livestock concentration areas and the fact that inventory would not locate and protect any residual occurrences of Spalding's catchfly in these livestock concentration areas, a determination of *May Affect, Likely to Adversely Affect* would be appropriate.

Cumulative Effects - With respect to cumulative effects, other activities and actions within the JCRAA have potential to overlap with the activities under Alternative 2 and contribute to cumulative effects as described below.

Due to the non-forested nature of the habitat for Spalding's catchfly, logging does not occur in areas where the species grows. Therefore, these activities have a negligible cumulative effect to the species. There is no timber harvest in Spalding's catchfly habitat, however, logging roads, and often log decks/landings were constructed in or through non-forested habitats in the past and have contributed to a loss of habitat through conversion.

Most of the known Spalding's catchfly sites in the JCRAA are on gentle hillsides or ridge tops. This kind of terrain is susceptible to off-route travel of All-Terrain-Vehicle / Off Highway Vehicle (ATV/OHV) use. Off-route travel is not currently prohibited (with the exception of specific hunting season closures), and is documented to be on the increase across the Wallowa Valley Ranger District, including many areas within the JCRAA, especially across the general swath of terrain between Robert's Butte and Hunting Camp Ridge, and around Coyote campground and the Chesnimnus Creek drainage to the east. Both FS personnel as well as ODF&W personnel have reported this use increase. The known occurrences of Spalding's catchfly are all within pastures enclosed by fencing away from roads, so the risk of ATVs crossing a site from existing routes is small and would only happen during fence maintenance or cattle moving activities. However, there is potential for ATVs to impact un-located sites and potential habitat in larger pastures with ample access points. Noxious weeds can be transported along ATV trails just as easily as vehicular roads. Thus off-road motorized recreation could be contributing to cumulative effects to this species through weed transport or conversion of habitat (or plants) to trail, but the degree of this impact is not currently quantifiable. ATV use is expected to increase over the next 10 years.

There are no roads in or near the Tommy's Ridge Spalding's catchfly sites on the east side of Crow Creek. The Doe gulch road stays in the bottomland and is not in Spalding's catchfly habitat. There are at least two old roads, barely evident on the ground and still on Forest maps that intersect habitat and known sites along Fire Ridge on the west side of Crow Creek. It is highly likely that Spalding's catchfly plants were impacted when these roads were created, and thus has contributed to cumulative effects to this species. However, neither of these roads is currently used and they have been growing over for several years. So, currently roads should be contributing almost no cumulative effects to known Spalding's catchfly sites, but may still be impacting un-located site and potential habitat elsewhere in the JCRAA. A review of the map of potential habitat areas shows

quite a number of roads bisecting this terrain, but the contribution of roads to impacts to potential habitat is difficult to quantify.

There are very few developed recreational trails in potential Spalding's catchfly habitat within the JCRAA and maintenance is light and confined to the current trail prism. The trails that do exist are not designed nor maintained for ATV use. There is one developed campground in the JCRAA and surveys have not located Spalding's catchfly at that site (Geer 2000). Therefore developed camping & trail use likely has minimal cumulative effects to the species, although at some level, any access to wild-lands enables the user to go off-trail whether by foot or by livestock.

The trailed areas receive very light backpacking and livestock packing use with the majority of dispersed camping use occurring during deer and elk hunting seasons in the fall. There are a lot of dispersed campsites in the JCRAA, though most of these are along open roads and tend to be used annually (during hunting season or holidays), such that impact levels have been fairly consistent over the years. So these potential camping impacts (habitat alteration of plant crushing) should not be contributing much to cumulative effect, over the level established historically. In the long term, societal demographics may bring more recreationists to this part of the Forest and impacts could increase. The degree of impacts to potential Spalding's catchfly habitat, radiating from the actual dispersed camps themselves is not clear and cannot be quantified.

Knapweed and yellow starthistle patches occur near the Spalding's catchfly sites on Fire Ridge. They have been under an integrated noxious weed treatment strategy by the district since 1994 and are believed to be under control, based on observations made by District weed treatment personnel. Thus these known weed sites pose only a small threat to the Spalding's catchfly habitat and sites, so their contribution to cumulative effects would be negligible. Current and future noxious weed management projects are planned and analyzed on a site-specific basis and would protect any known Spalding's catchfly occurrences.

However, there is a serious threat of new noxious weed species colonizing potential Spalding's catchfly habitat in the JCRAA. On state, private, BLM, and tribal lands north of the analysis area, occurrences of yellow starthistle, Common Cuprina, (Porter 2003 / others) were reported during weed surveys in the 2003 field season. Livestock, wildlife, humans, and wind could all transport seeds of these species into the analysis area. Weedy species, especially noxious weeds, once established out-compete desirable vegetation/rare plants for space and resources often displacing the desirable species. They also tend to destabilize the hydrologic functioning of the soil by reducing plant density and plant root depth and density. This degrades the habitat for beneficial soil organisms that contribute to native plant health. These actions would further unravel the ability of potential or occupied habitat to support Spalding's catchfly. Parts of this analysis area are highly roaded while other areas are virtually unroaded. Roads are a documented path for weed spread. Detecting new noxious weeds sites across this many acres is very difficult because of its size and undulating topography. To date, Forest Service efforts at controlling small noxious weed infestations have been successful but treatment options are limited, and the potential for new weed populations to overwhelm our ability to contain them is palpable. Funding for treating noxious weeds has not kept up with their potential to spread, and political and procedural obstacles have increasingly hampered efforts to treat known noxious weed sites.

Thus it is highly probable that over the long term, future noxious weed invasion will contribute toward cumulative effects (habitat loss & localized occurrence extirpation) to Spalding's catchfly, although the imminent threats are small.

Prescribed fire projects are planned and analyzed on a site-specific basis and would account for (protect from burning or line construction) any known Spalding's catchfly occurrences in the design of the project. Foreseeable future prescribed fire activities include the Hungry Bob, Lone Dog, Wapiti, Haypen, and Baldwin Vegetation Management Projects along with the Fire Ridge Fuels Reduction Project. Although not conclusive, fire appears to have the potential to enhance Spalding's catchfly habitat (Lesica 1992, Hill, Gray & Glenn 2003 *Draft Conservation Strategy For Spalding's Catchfly*). Although predicting what the historical fire regime would have been in the grasslands containing Spalding's catchfly is difficult, it is highly likely that wildfire periodically occurred in this terrain (Weddel 2001)– at least until homesteader livestock management and propensity for fire suppression altered the historical wildfire regime. Were fire to be prescribed around Spalding's catchfly sites or habitat it would be applied in such a way as to minimize the chance for directly burning the plants through seasonal design constraints. It would not be applied where analysis suggests that the range condition could allow weedy species to respond more heartily to the burning than Spalding's catchfly. Thus prescribed fire activities likely contribute negligibly to potential cumulative effects to this species.

Most of the grassland habitat within the JCRAA is bisected with timbered stands from which fire could have emanated after lighting or human ignition. Thus it is likely that historically a mosaic of grasslands burned with the timbered stands. A large part of the Joseph Canyon burned in a wildfire during the fire season of 1986 as well as before then. These areas contain potential Spalding's catchfly habitat but no known occurrences. Wildfires generally occur during the late summer months when Spalding's catchfly is in flower or setting seed. Therefore wildfire probably did directly impact some individuals over time. However, Spalding's catchfly plants are long-lived, deeply rooted, and often dormant during the summer, so individuals or patches as a whole would have been able to cope with mosaic wildfire on a periodic basis. In the future, wildfire may also affect populations of invasive non-native species. Over the long term, wildfire in concert with undesirable species could play an undeterminable role in cumulative effect to Spalding's catchfly.

Wildland fire suppression actions could impact Spalding's catchfly or habitat via line construction, fire retardant drops, mop-up operations, or post fire seeding. Obviously, fire-line construction and mop-up operations could dig-up and kill plants and disrupt habitat. Fire-lines are also good paths for weed invasions that would displace desirable species. Firefighting equipment is also frequently driven off-road to support suppression efforts. These vehicles could also dislodge or crush plants. Good situational awareness provided by the District in the Wildland Fire Escape Situation Analysis and by District Resource Advisors should minimize these potential effects. Fire retardant is actually a crude form of fertilizer. It is not known how Spalding' catchfly would respond to retardant fertilization. However most plant species in arid western grasslands have evolved under a low-nutrient (relatively) environment and are not adept at quickly responding to a pulse of chemical nutrients. Most exotic weedy species have evolved to respond much more quickly and often have the advantage or native species in these situations. Any impacts to Spalding's catchfly from fire suppression would be dealt with during Fire Emergency Consultation and

subsequent restoration plans. This should minimize but not eliminate its potential cumulative effect.

Potential habitat for Spalding's catchfly exists on public and private land within the JCRAA, although the number of acres of private land is small. Since most private lands tend to be managed intensively, these areas may no longer provide optimal habitat for Spalding's catchfly. The single known Spalding's catchfly occurrence on private land on the north end of Fire Ridge is in rangeland with good condition but appears to be declining based on observation and comments on the occurrence report form. The landowner is currently coordinating with USFWS on a management plan for this occurrence and the surrounding area. Under the Blue Mountain Land Exchange proposal, the Forest Service would acquire parcels along Joseph Creek. These lands would be managed in a way that improves range condition and protects Spalding's catchfly if it is found on these parcels. Thus acquiring land into the public domain might increase opportunities for improving management for Spalding's catchfly. But there is no reason why private landowners could not do the same if they chose to. Overall the contribution of private rangeland management to possible cumulative effects to Spalding's catchfly varies by individual landowner and would be difficult to determine with the amount of information currently available.

The effects of future State and local government actions would not add cumulatively to the effects described above to Spalding's catchfly. State and local government actions are limited to state and county road maintenance. Though there are county roads within the JCRAA, the road maintenance is restricted to the existing road prism. There are no county roads intersecting currently known Spalding's catchfly sites.

Tribal lands do not exist within the action area. Tribal actions include the potential for some future horse grazing, as would be allowed under Treaty rights. The number of permitted horses would be half as many as the previous livestock permit authorized for cattle crazing. Horses have the potential to impact landscape vegetation because of their less efficient digestive system and high mobility, but it is not known if they exhibit more or less preference for ingesting Spalding's catchfly, although they appear to not be interested in it. The use of an allotment for horse grazing would only occur after a separate analysis, and inventory and protective measures would be applied at that time. Thus tribal actions would not contribute measurably to potential cumulative effects to Spalding's catchfly.

Alternative 3 – Threatened or Endangered Species

MacFarlane's Four-o'clock – There would be no effect to this species as no populations were located within areas modeled as high or very high potential habitat and the likelihood of this species occurring within the JCRAA is highly unlikely.

Spalding's Catchfly Known Populations – Relative to known Spalding's catchfly occurrences, Alternative 3 proposes to carry out the same actions as Alternative 2. The improvement of range condition within the Crow Creek Allotment would be addressed through an adaptive approach. If the constraints in grazing season and stocking prescribed with Alternative 2 do not result in an improving trend, livestock grazing of the South Crow and Doe Gulch Pastures would be deferred until such a trend developed. Refer to the range condition

section of this chapter. Improved range condition in the South Crow and Doe Gulch Pastures would decrease the livestock grazing pressure on Spalding's catchfly occurrences because the satisfactory range condition acts to reduce the level of risk to direct herbivory and trampling by livestock or other herbivores. Adequate palatable forage species help obscure the Spalding's catchfly from herbivores.

Spalding's Catchfly Potential Habitat – The Effects Analysis for Alternative 3 is the same as Alternative 2 with the following exceptions:

Alternative 3 would complete inventories for Spalding's catchfly over an area ranging from 5922 to 10,662 acres over a period of 3 to 6 years. The inventory would be staged as follows. Risk areas 10 and 11 would be inventoried in the Summer of 2004 and any found occurrences would be protected as prescribed for the known occurrences on Tommy's Ridge and Fire Ridge. Risk areas 1, 6, 7, 8, and 9 would be inventoried within the next 3 years. The results of inventory would be evaluated at that point, and in conjunction with inventory that is occurring on the Hells Canyon National Recreation Area, conclusions about the validity of the Spalding's catchfly habitat model would be made. A determination on whether to proceed with inventory would be made based on the number and distribution of Spalding's catchfly occurrences found during this initial inventory. If a decision to proceed with inventory was made, risk areas 2, 3, 4, and 5 would be inventoried. Again, the results of the inventory would be evaluated to determine the need for continued inventory. If a decision to proceed with inventory was made, risk areas 12 through 17 would be inventoried. As described for Alternative 2, these inventories would either (1) affirm that the likelihood of Spalding's catchfly occurrences within the risk area is very low or (2) identify the locations of occurrences. If any occurrences were found, they would be protected as described for the Tommy's Ridge and Fire Ridge populations. By increasing the amount of risk area that is inventoried, then potential effects to currently undiscovered catchfly occurrences would be reduced below the level described for Alternative 2.

Alternative 3 proposes to use somewhat different techniques relative to rangeland management as a whole. In essence, it proposes more flexibility in terms of pasture grazing season, while still staying within the overall permit requirements and abiding by the standards and guidelines. This may shorten recovery time for degraded areas and hasten the achievement of improving trends relative to Alternative 2. To the degree this occurs, it would intrinsically improve the habitat around any known or potential Spalding's catchfly to a greater degree than Alternative 2.

Alternative 3 also assumes that at any time, tribal assertion of treaty rights may occur, and areas previously grazed by cattle would be grazed by horses. A conversion of numbers (roughly 1 horse for every two cows) would occur, and utilization standards would be the same as for current cattle grazing. While the preference for Spalding's catchfly by horses is not known, the plant's sticky glandular qualities are dissimilar from forage normally preferred by horses. Therefore, it is likely that so long as range conditions are maintained over time, the impact of horses on Spalding's catchfly would be similar to that of cattle as previously described.

Due to the risk to Spalding's catchfly that would continue to exist; a determination of May Affect, Likely to Adversely Affect is warranted for this alternative; however, the level of

risk to yet undiscovered occurrences would be reduced within 6 years. At this point inventories would either be completed or the model used to predict the risk areas would be verified to the point that further inventory would not be necessary.

Consultation with the US Fish and Wildlife Service on this determination of effect has been initiated. All steps of the consultation process taken to this date are consistent with Section 7 of the Endangered Species Act. Concurrence would be necessary before a decision to proceed with implementing Alternative 3 could be made.

Cumulative Effects - The contribution of past, present, and foreseeable future actions to cumulative effects would be the same as those described for Alternative 2. However, the overlap of those effects with respect to timing and location would integrate differently for Alternative 3. Alternative 3 provides a greater level of protection for currently undiscovered Spalding's catchfly populations by completing inventories on 7640 more acres of risk areas than does Alternative 2. Within 3 to 6 years, the influence of livestock grazing on Spalding's catchfly subsistence and reproduction would be greatly reduced because any found occurrences would be protected with the same measures prescribed for the currently known populations on Fire Ridge and Tommy's Ridge. The cumulative effects of Alternative 3 along with past, present, and foreseeable future actions would be considerably less than Alternative 2 because of the diminished effect contributed by Alternative 3.

Issue 4 – Spalding's Catchfly

Key Issue - Authorizing livestock grazing as proposed may not adequately protect unknown Spalding's catchfly occurrences in unsurveyed portions of the analysis area.

Table 15 - Comparison of Issue 4 Indicators by Alternative

Indicator	Alternative 1	Alternative 2	Alternative 3
Spalding's catchfly risk areas subjected to livestock grazing impacts	0	10,662	10,662
Acres of risk areas that would be inventoried for the presence of Spalding's catchfly within 3 to 6 years	NA	3032	5922 to 10,662

As shown above, Alternative 1 resolves the Spalding's catchfly issue because no livestock grazing would be authorized, and none of the known occurrences or the potential occurrences in risk areas would be susceptible to livestock related herbivory or trampling. Further inventory, therefore, would be a moot point for the purposes of reducing livestock related impacts. Alternative 2 completes inventory for 3032 acres of risk areas, but does not include provisions for future inventory and protection of located occurrences of Spalding's catchfly. This approach leaves these potential occurrences at risk. Alternative 3 initiates at a minimum 5922 acres of inventory of risk areas. Based on an evaluation of the results from that inventory, a decision on whether to proceed with the inventory would be

made. Potentially, all of the 10,662 acres of risk area would be inventoried. Found occurrences would be protected.

Existing Conditions – Sensitive Species

A review was conducted to determine if there are any *known* rare plant populations or habitat within the Joseph Canyon Rangeland Analysis Area or any *potential habitat*. The Regional Forester's Sensitive Species List for Region 6 (1999) and the USFWS list referenced above were used. The Wallowa Mountain Zone records (Department Files, zone GIS system, and literature), and rare plant occurrence database were consulted. This review showed known occurrences of 4 species and potential habitat for an additional 13 species.

Table 16 - Sensitive species known from or with the potential to be found in the JCRAA

Plant Species	Allotments and Pastures Where Documented in JCRAA	Coarse Habitat Type [1]
Wallowa Mountain Ricegrass *Achnatherum wallowaensis*	Swamp Creek Allotment – Miller Spring, Little Elk, and Elk Creek Pastures Cougar Creek Allotment – Sumac, Breeding Pasture, Boner, and Hinton Corner Pastures Davis Creek Allotment – Elk Creek Pasture	L, G
Snake River Daisy *Erigeron disparipilus*	Hunting Camp Allotment – Kirkland, Holding, and Tamarack Pastures	L, G, RCB
Engelmann's Daisy *Erigeron engelmanni var. davisii*		L, G, RCB
Hazel's Prickly Phlox *Leptodactylon pungens ssp. hazeliae*	Table Mountain – Joseph Breaks Pasture	G, RCB
Crenulate Leaved Moonwort *Botrychium crenulatum*	None	F, R, MWM
Lance-Leaved Moonwort *Botrychium lanceolatum*	None	F, R, MWM
Common Moonwort *Botrychium lunaria*	None	F, R, MWM
Mingan Moonwort *Botrychium minganense*	None	R, MWM
Lewiston Mariposa Lily *Calochortus macrocarpus var. maculosus*	None	G, MWM
Back's Sedge *Carex backii*	None	CF, R
Porcupine Sedge *Carex hystericina*	None	MWM, R
Needleleaf Sedge *Carex stenophylla*	None	G, MWM
Clustered Lady Slipper *Cypripedium fasciculatum*	None	CF, R
Bank Monkey Flower *Mimulus clivicola*	None	L,G,MWM
Membrane-Leaved Monkey Flower *Mimulus hymenophyllus*	None	R, RCB
Least Phacelia *Phacelia minutissima*	None	L, MWM, G

[1.] Habitat: A=Alpine; CF = Coniferous Forest; G = Grassland; L = Lithosol; MWM = Moist and Wet Meadows; R = Riparian Areas; RCB = Rock Outcrops, Cliffs, and Bluffs.

Wallowa Mountain Ricegrass is a small perennial bunchgrass found from 3,400 to 5,400 feet in elevation. It occurs on shallow lithosolic substrates (or welded tuffs) in open, often "scabby" habitat within a broader matrix of ponderosa pine and bunchgrass stands. It prefers gentle slopes or level ground with soils containing high levels of weathered (often redish-orange) basalt gravel and rock. In Wallowa County, Oregon, this species is known from the vicinity of a place called Clear Lake Ridge, upper and lower Joseph watersheds, and on private land near Lostine. There are 13 known occurrences with 16 sites of Wallowa Mountain Ricegrass in the JCRAA. A draft Species Management Guide for this Ricegrass on the Wallowa-Whitman National Forest identified 5 occurrences that should receive specific attention to be managed to maintain the long-term viability of these populations as a whole, and 3 of these occurrences are within the JCRAA.

Two species will be considered here under the title of Engelmann's Daisy. Elsewhere across their range *Erigeron disparipilus* (Snake River Daisy – Owyhee Idaho to southeast Washington) and *Erigeron englamanii* var *davisii* (western Idaho to Wallowa Co.) are apparently distinct species, but in Wallowa County, they grow in the same areas and intergrade such that they cannot be differentiated. Both are uncommon and on the Region 6 Sensitive species list. This (these) small perennial species is known from the northeastern end of Wallowa County from both the Wallowa Valley Ranger District and the Hells Canyon National Recreation Area. It is found on dry stony ground and shallow soiled lithosolic sites, open slopes with sparse bunchgrass and scattered pine, and rimrocks, usually from 1000 to 5,500 ft in elevation. There are 7 known occurrences of this species within the JCRAA.

Hazel's Prickly Phlox is a species with a wide range throughout the west. However its subspecies hazelii is unique to the Snake River canyon and feeder canyons of Idaho and Oregon. This long-lived perennial, somewhat woody species, is found on basalt cliffs, talus-covered slopes, and steep slopes with sparse bunchgrass between 975 feet and 2,000 feet in elevation. It is reported with Sandberg's bluegrass, bluebunch wheatgrass, antelope bitterbrush, netleaf hackberry, and rabbitbrush. The white flowers on this plant support evening pollinators such as nocturnal moths, although it also blooms during the day. Seedling establishment is noted as very uncommon and has not been observed at any of the known occurrences. It is currently known from Hells Canyon Dam and the Snake River Canyon to Joseph Canyon. There is one known occurrence of this species within the JCRAA.

The remaining species listed in Table 16 are not known to occur within the JCRAA, but the potential exists for these species to occur. Refer to the Biological Assessment/Evaluation for specific information on the habitats associated with these species.

Alternative 1 – Sensitive Species

Under this alternative there would be no direct effects to the known or un-located Wallowa Mountain ricegrass, Hazel's Prickly Phlox, and Engelmann's Daisy and their potential habitat from livestock and its management. Other ongoing activities would continue as at present.

Upland range vegetation and soils currently in unsatisfactory condition would be expected to improve as domestic livestock grazing is removed from the area. Rate of improvement may accelerate on sites such as in the Crow Creek Pasture of the Crow Creek allotment as more plant material would be left on site rather than being consumed, and soils would be less compacted or displaced by livestock. Discontinuing grazing is not expected to lead to rapid improvement or much improvement on range sites that have been converted to annual sites due to homesteading/grazing activities. However, some level of improvement would be expected over a ten-year period.

Many aspects of potential indirect effects would also lessen. Overall there would be less herbivore pressure on the grassland habitats of this species. There maybe better wildlife dispersal and less fence-line trailing and areas of concentrated ground disturbance with the removal of livestock fences. In the short term there would be little change in species composition and thus competitive interactions as recovery is often slow in this arid environment. With less herbivore pressure, over the long term the rangeland would tend toward a composition of species being more palatable, and this could include plants like Wallowa Ricegrass, and Engelmann's Daisy. The rate of change is expected to be slightly faster with no livestock grazing than with improved grazing management (under the two action alternatives), but the rate of change and the extent of change as that affects Wallowa Mountain ricegrass, Hazel's Prickly Phlox, and Engelmann's Daisy cannot be quantified.

Under the no-grazing alternative, the permittees and permit administrators would play significantly decreased role in the detection and management of noxious weeds thus increasing the chances that new weed populations could become well established prior to detection. Treatment of known sites could continue, although at a potentially reduces level as budgets for this work correspondingly drop with the elimination of range management. Forest Service funds derived from grazing fees would not be available for noxious weed treatment. However, any role (seed vectors or ground disturbance) played in the spread of noxious weeds by livestock in the project area would cease.

Potential weed spread from other vectors (wildlife, human activities, wind) would continue. Thus overall the chances of noxious weeds directly, indirectly or cumulative affecting known or potential Wallowa Mountain ricegrass, Hazel's Prickly Phlox, and Engelmann's Daisy populations or potential habitat might be slightly less than or equal to the two action alternatives, but this cannot be quantified.

Livestock management would no longer contribute toward cumulative effects.

Alternative 2 - Sensitive Species

Wallowa Mountain Ricegrass Direct Effects - This species grows on harsh sites – often on very skeletal basaltic scabby areas characterized by small reddish basalt gravel over shallow basalt soils. Ricegrass habitat is not as productive as other grassland habitat types and was often used as salting locations or road locations. These salt-lick sites receive enough livestock and wildlife visitation that vegetation is denuded in a circle of about 50 feet around each. No known sites are currently known to be impacted by salting, but these

impacts were noted when this species was first being discovered on the District (early 1990s), and salting changes were made.

Wallowa Mountain ricegrass habitat is usually not as desirable as forage as the more productive bluebunch wheatgrass grasses surrounding these sites. Thus livestock do not spend as much time or energy grazing in these habitats as in the adjacent bluebunch wheatgrass stands. Sometimes trailing impacts are observed through Wallowa Mountain ricegrass patches as cattle travel to better grasslands or water/salt sources. Wallowa Mountain ricegrass is as palatable and provides about as much forage as Sandberg's bluegrass and so it is occasionally grazed. Late-season grazing would not affect this species as it will be dry and dormant by then. It is most susceptible to grazing early in the spring as it develops leaves and flowers earlier than adjacent bluebunch wheatgrass. This early green-up and leaf palatability make it susceptible to herbivory, though it does not provide as much biomass as other more desirable grasses and so is not often specifically selected for. Allotment and pastures with Spring grazing are listed in Table 4 in Chapter 2. Maze & Robson (1996) noted where the soil was especially thin and cattle grazing evidence was present, the Wallowa Mountain ricegrass plants tended to be smaller overall than was typical for the species. They speculated that microsite conditions and impacts from grazing were causing this smaller size. Although impacts from grazing are occasionally noted, extensive damage has not been noted during site visits to the majority of Wallowa Mountain ricegrass patches. Patches that receive very little use by cattle, either because they are in a pasture grazed later in the season or are in a part of the pasture not frequented by the herd, see very few grazing impacts. One livestock exclosure still remains from a 15-year old effort to observe grazing effects to this species. This exclosure is in a pasture grazed in the summer. While the exclosure was very small and may not have provided a true representation of differences between grazed and ungrazed occurrences for this species, it did show that only subtle visual differences could be observed between the exclosure and surrounding Wallowa Mountain ricegrass habitat. However, sometimes grazing timing, forage and water availability, or proximity to shade entice cattle through a Ricegrass site.

Four of twelve sites have incurred some level of herbivory and trampling as shown in Table 17.

Table 17 – Identified impacts from Grazing to Wallowa Mountain ricegrass

GIS #	Pop. #	Pasture	Allotment	Comments
0506	200	Sumac	Cougar Creek	(95*) Cattle Trailing impacts
0502	1,000	Boner	Cougar Creek	(90*) extensive cattle trailing, (02) less signs of cattle trailing
0258	1,000	Elk Crk.	Davis Creek	(91*) Grazing evidence
1040	150	Little Elk Crk.	Swamp Creek	(91*) Degrading site, actively grazed

Quantifying direct impacts at these sites is difficult. There is no trend monitoring at these

sites to indicate whether they are increasing or declining. The number of individuals impacted at each site has not been consistently determined. However, two of the populations are quite small, making them increasing vulnerable to problems related to genetic drift or stochastic events with a loss of individuals. The minimum viable number of individuals needed to perpetuate a given site, or a suite of sites in a population has not been determined. The consistency and duration of the reported impacts has not been determined. Maze & Robson (1996) noted that in most of the populations studied, seedlings were very rarely detected. Thus it would appear that this fairly long-lived perennial grass species rarely reproduces by seed. This would make it vulnerable to physical or competitive disturbances and slow to recover from them.

It does not appear that these sites have been impacted to the degree that they have been extirpated. On the other hand this Ricegrass is a Wallowa County endemic with a very limited range and a limited number of known occurrences. For populations that are small or vulnerable, each individual may be important for short and long-term viability. Intrinsically, impacted sites might be at risk of not being able to contribute sufficiently to the viability of the species. There is no conservation strategy that designates the number of occurrences or individuals that need to be protected to be reasonably assured that the species will be able to perpetuate under a given management regime. Regardless, the mitigation measures employed by this plan will minimize potential impacts in the future.

Wallowa Mountain Ricegrass Indirect and Cumulative Effects - The most likely potential indirect effect to Wallowa Mountain ricegrass would be from changes in grassland species composition associated with livestock use or other disturbances. Noxious weed invasion is a constant background threat, though no Wallowa Mountain ricegrass sites are currently known to have adjacent noxious weed sites. Its habitat is actually more prone to invasion by annual weedy grasses (and forbs) such as ventinata and cheatgrass. Where the range is in improving or good condition overall, there will still be isolated pockets of disturbed ground from livestock herds. This ground disturbance facilitates the spread of these competing annuals, which can move onto Wallowa Mountain ricegrass sites. Though a relative threat, it cannot be quantified at this time. Other potential threats to Wallowa Mountain ricegrass may result from this and other ongoing actions in areas where undiscovered populations may exist.

The Joseph watershed has historically experienced grazing at various levels by deer and elk, followed by cattle, sheep, and horses. Nez Perce Indians grazed thousands of horses as early as the 1730s. (Upper Joseph Community Watershed Assessment report 2003) In the latter half of the 19th century, Euro-American settlers began grazing livestock. During this time, millions of sheep and thousands of cattle ranged as long as weather, water, and forage conditions permitted, and much of the accessible range was severely damaged by overgrazing. Heavy impacts began to lessen in the early 1900s when the Forest Service began to regulate numbers of livestock use. Sheep and cattle permits peaked in the 1920s. Due to a lack of historical reference conditions, it is not possible to determine whether grazing has eliminated (or enhanced) patches of Wallowa Mountain ricegrass in the JCRAA. However, it is highly likely that cattle, horse, and sheep grazing have historically caused some impacts to the species, and its habitat. It is possible that any decline in Wallowa Mountain ricegrass populations resulting from Native American or homesteader grazing practices could have slowed in the middle or end of the last century. Improvements

in range management since that time could have helped Wallowa Mountain ricegrass persist in the sites known today, although there is no specific trend monitoring at any known sites to indicate population growth or decline. Nor are there any studies that directly tie Wallowa Mountain ricegrass occurrence vigor to standards and guidelines for managing other grassland species. It is also possible that Wallowa Mountain ricegrass was able to colonize some grassland habitats that were converted to a more harsh site by heavy historical grazing as it would have been more competitive on those sites after cessation of the intensive grazing regimes. However the extent of this scenario cannot be quantified.

Noxious weed management projects are planned and analyzed on a site-specific basis and would account for any known Wallowa Mountain ricegrass occurrences in the design of the project. Known weed sites are currently being controlled and pose only a small threat to Wallowa Mountain ricegrass, thus their contribution to cumulative effects would be negligible. The threat of new sites becoming established is still present. Thus it is highly probable that future noxious weed invasion may contribute toward cumulative effects to Wallowa Mountain ricegrass in the future but the degree of this threat is not highly predictable.

Wallowa Mountain ricegrass habitat is not impacted by timber harvest, though associated road and landing construction activities often were placed through its terrain. Contemporary planning procedures ensure that all aspects of vegetation management projects are designed to avoid these kinds of impacts. Thus they are no longer contributing to potential cumulative effects to this species.

Where this species often occurs, surrounding fuel levels are low. The interaction between it, wildfire or prescribed fire, is minimal because this perennial plant is not likely to be adversely affected by the low-intensity fire that would be sustained where fuel levels are so low. Fuels reduction projects such as the Hungry Bob, Wapiti, Bugcheck, Lone Dog, Baldwin, and Fire Ridge Vegetation Management are foreseeable future actions that include both spring and fall underburning components. It is not likely these plants would burn during spring burns and they would be dormant during fall burns. Fire-line construction would be the only potential threat. Line construction would dislodge and kill plants and disturb habitat. Line construction for prescribed fire can be designed and installed to avoid Wallowa Mountain ricegrass site impacts. Line construction during wildfire events is more difficult to direct. The threat of line construction for wildfire suppression is difficult to quantify. It is desirable to put line through areas of low fuel loading and sparse grasslands make good fuel breaks. Only through good resource advising and District data availability can this threat be mitigated during the development (and subsequent deployment) of the Wildfire Situation Analysis.

Most of the known Wallowa Mountain ricegrass sites in the JCRAA are on gentle hillsides or ridge tops. This kind of terrain is susceptible to off-route travel of Off-Highway Vehicle (OHV) use. These vehicles disrupt plants and soil where they travel often leading to the mortality of individual plants in their tails. Off-route travel is not currently prohibited (with the exception of specific hunting season closures), and is documented to be on the increase across the Wallowa Valley Ranger District. The potential for OHVs to impact Wallowa Mountain ricegrass sites is larger in pastures with roads bisecting numerous parts. These impacts are being noticed at Wallowa Mountain ricegrass sites in the Hunting Camp Allotment. Noxious weeds can be transported along OHV trails just as easily as

vehicular roads. Thus off-road motorized recreation could be contributing to cumulative effects to this species, but the contribution is not currently quantifiable. That is, the number of Wallowa Mountain ricegrass plants or the acres of Wallowa Mountain ricegrass habitat that is being lost to ORV impacts is not yet completely determined.

There are no official trails in known Wallowa Mountain ricegrass populations so trail maintenance and trail use would not contribute to cumulative effects. There is one developed campgrounds in the JCRAA and surveys have not located Wallowa Mountain ricegrass at that site. Therefore, developed camping has no measurable cumulative effect to the species, other than facilitating visits by recreationists that might then travel through Wallowa Mountain ricegrass sites. Wallowa Mountain ricegrass habitat tends not to be desirable dispersed camping areas, so it is unlikely this activity is contributing to cumulative effects any more than developed sites.

The potential for cumulative effects from Tribal and County activates would be the same as described for Spalding's catchfly discussed above.

Because inventories in all potential habitat for Wallowa Mountain ricegrass have not been completed, undiscovered populations of these species could exist in the analysis area and Alternate 2 could have direct (plant damage) and indirect (habitat alterations) effects to this species. The threat of grazing or trampling Wallowa Mountain ricegrass plants or parts in undiscovered populations could impact the viability of the plants and the occurrence. Therefore the loss of any individual to a small isolated patch would increase the risk of potential inbreeding depression. Also, the potential undiscovered patches could contain valuable adaptive traits not necessarily found in other populations evolving in the county. Although some potential exists for direct effects, the continuation of these effects would not occur throughout the JCRAA. The 3032 acres of botanical inventories proposed and designed to inventory Spalding's catchfly sites (see the Spalding's catchfly section) would also include areas of potential habitat for other Forest Service Sensitive species including Wallowa Mountain ricegrass. Through this effort, additional Wallowa Mountain ricegrass potential habitat would be surveyed. The results of this inventory work would be used to limit the risk and intensity of the potential effects. Protective measures would be implemented as needed through the Annual Operating Instructions.

Potential threats and impacts to Wallowa Mountain ricegrass have been identified here. Without a better way of quantifying these impacts it is difficult to identify enough cumulative effects to rise to the level of certain adverse effects. Also, the 3032 acres of additional survey, coupled with the ability to address impacts through the Annual Operating Instructions should be adequate to minimize adverse cumulative effect. Thus this evaluation determined that Alternative 2 May Impact Individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to populations or species of Wallowa Mountain ricegrass.

Hazel's Prickly Phlox Direct and Indirect Effects - The Hunting Camp potential Research Natural Area has reported but undocumented occurrences of this species. It is also known from the Wilder Pasture of the Table Mountain Allotment. This species is edible, but not palatable due to its unpleasant (extremely prickly) texture. Herbivory has almost never been observed on this species in the JCRAA. It is a woody species that grows in harsh sites within steep rocky terrain which is rarely used by grazing livestock. Thus the potential for

trampling impacts is very small and isolated to stock drive-ways that might intersect un-surveyed Prickly Phlox habitat. Because inventories in all potential habitat for Hazel's Prickly Phlox have not been completed, undiscovered populations of these species could exist in the analysis area.

Hazel's Prickly Phlox Cumulative Effects - This species is somewhat susceptible to fire because of its above ground woody nature, abundant fine leaves and poor budding ability, but most of the habitat and occurrences are situated in low fuel terrain. Prescribed fire would be unlikely to impact this species because of design criteria avoiding impacts. Wildfire suppression could impact this species with line construction. Good resource advising during the formation and implementation of the Wildfire Situation Analyses might minimize this threat. The greatest potential for impact to this species would be noxious weed invasion and where water developments, salting, or containment of livestock would concentrate the potential for mechanical damage from livestock. Because of its habitat and growth form it would not receive cumulative effects from logging, OHVs, recreational activities, or contemporary road-work. It is not known from any private land within the JCRAA. The potential for cumulative effects from Tribal and County activates would be the same as described for Spalding's catchfly discussed above. Because of these factors and the following mitigation measures, this evaluation determined that Alternative 2 May Impact Individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to populations or species of Hazel's Prickly Phlox.

Engelmann's Daisy Direct and Indirect Effects - This species is potentially more numerous than is currently known, judging by the available occurrence information. It is a grassland habitat generalist within a very restricted range, from approximately the breaks of the lower Grande Ronde River to the adjacent portions of the Snake River, including canyon tributaries. It is Sensitive in Oregon because of its very restricted range and because it has seldom been documented and collected. Also, its response to grazing has been unclear, and there have been taxonomic confusion between reports of *Erigeron Engelmanni* var. *davisii* and *E. disparipilus* (also listed as Sensitive).

Table 18 depicts a summary of the known occurrences and their condition. There are 10 occurrences (19 patches) of this species within the JCRAA. These occurrences are found in terrain currently encompassed by the Holding, Kirkland, and Tamarack Pastures of the Hunting Camp Allotment, and the Horse-Pasture Ridge of the Table Mountain Allotment.

Table 18 - Engelmann's Daisy and Noted Livestock Impacts within the JCRAA

GIS #	Pop #	Pasture	Allotment	Comments
007	0243	Kirkland	Hunting Camp	No impacts noted
008	0244	Kirkland	Hunting Camp	(00*) Cattle trampling
004	0247, 0249	(247)=Holding Pasture, (249)-Kirkland	Hunting Camp	(91*) extensive trampling, off-road travel threats, road reconstruction threats
003	0248	Tamarack and Kirkland	Hunting Camp	No impacts noted

GIS #	Pop #	Pasture	Allotment	Comments
005	0250-0254	Tamarack	Hunting Camp	(91*) Extensively grazed
Nr	2082, 0249, 2094	Tamarack	Hunting Camp	No impacts noted
006	0240	Tamarack	Hunting Camp	No impacts noted
Nr	1354	Kirkland	Hunting Camp	No impacts noted
Nr	0247, 2089, 2090, 2087	Holding	Hunting Camp	No impacts noted
Nr	2093, 2091 2092,	Horse Pasture Ridge	Table Mountain	No impacts noted

nr = not recorded
Comment (yr*) = year of the last observation

Engelmann's Daisy grows within a matrix of bluebunch wheatgrass habitat, but on somewhat more open, rocky or thinly soiled sites within these areas. Grazing of this plant within the analysis area has been noted at some sites and is likely attributed to both cows and wildlife. Observations indicated that it does not appear that ungulates select this species unless the timing and forage conditions are such that the cattle are being encouraged to utilize this species. Other members of this genus are seldom grazed. The potential for herbivory may increase in areas where the range condition is poor, or the season of use is later in the summer when the grasses are dryer than the daisy, such that Engelmann's daisy becomes more desirable as a forage species relative to the surrounding vegetation.

Engelmann's daisy is a prolific seed producer and most seeds have a small bristly papus that helps aid in wind or animal dispersion. Thus they are often able to respond well to disturbances such as wildfire or grazing. The greatest potential for impact to this species would be where water developments, salting, or containment of livestock concentrate use on known occurrences.

The greatest potential for impact to this species would be noxious weed invasion and where water developments, salting, or containment of livestock would concentrate the potential for mechanical damage from livestock. The greatest potential for noxious weed invasions comes from terrain to the north of the Forest and JCRAA boundary. Treatment of known noxious weed sites within the JCRAA has been effective (according to weed site monitoring reports) and has avoided known Engelmann's daisy occurrences.

Engelmann's Daisy Cumulative Effects - Cumulative effects to this species from prescribed fire or wildfire would be minimal as its critical growth period is late spring to early summer. Also this species is a perennial and tends to re-sprout after fire as fire generally burns very light in the low fuel condition of its habitat. The interaction of fire and grazing for this species has not been documented. Potential effects may be reduced in that grazing after prescribed burning is evaluated to determine if deferment of grazing for one growing season is needed. Because wildfires tend to burn at a higher intensity than prescribed fire, grazing after wildfire is usually deferred for two growing seasons. Wildfire suppression could impact this species with line construction. Good resource advising during the formation and implementation of the Wildfire Situation Analyses might minimize this threat.

Because of its habitat and growth form it would not receive cumulative effects from logging. Road (and very little trail) building has occurred in its habitat historically but new construction projects are planned to avoid impacts to Engelmann's daisy occurrences. Road and trail maintenance is confined to existing route prisms and would not contribute to cumulative effects.

Some of its habitat is potentially being impacted by off road recreational vehicles and this is contributing to cumulative effects to this species. Most of the known Engelmann's daisy sites in the JCRAA are on hillsides or ridge tops. This kind of terrain is susceptible to OHV use. These vehicles disrupt plants and soil where they travel, often leading to the mortality of individual plants in their tails. Off-route travel is not currently prohibited within the JCRAA (with the exception of specific hunting season closures). Observations of an increase in OHV use have been reported by the public, Wallowa Valley Ranger District employees, and ODFW biologists. The potential for OHVs to impact Engelmann's daisy sites is larger in pastures with roads bisecting numerous parts. These impacts are being noticed at Engelmann's daisy sites in the Hunting Camp Allotment. Noxious weeds can be transported along OHV trails just as easily as vehicular roads. If finalized into regulations, the recent draft National OHV Policy may influence OHV travel by instructing districts to designate open routes for OHVs and eliminating all other off-road travel. Off-road motorized recreation could be contributing to cumulative effects to this species, but the contribution is not currently quantifiable and is subject to change from upcoming policy changes. That is, the number of Engelmann's daisy plants or the acres of Engelmann's Daisy habitat that is being lost to ORV impacts is not known. Most other recreational activities rarely intersect Engelmann's daisy sites or habitat.

The potential for cumulative effects from Tribal and County activities would be the same as described for Wallowa Mountain ricegrass discussed above.

As previously described, all potential habitat has not been inventoried, but the 3032 acres of inventory scheduled for Spalding's catchfly habitat would also include areas of potential habitat for this Sensitive species. If found, these occurrences would be protected through the Annual Operating Instructions, reducing the potential for direct, indirect, or cumulative effects.

Potential threats and impacts to Engelmann's daisy have been identified here. Without a better way of quantifying these impacts, it is difficult to identify enough cumulative effects to rise to the level of certain adverse effects. Also, the 3032 acres of additional survey, coupled with the ability to address impacts through the Annual Operating Instructions should be adequate to minimize adverse cumulative effect. Thus this evaluation determined that Alternative 2 May Impact Individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to populations or species of Engelmann's daisy.

Sensitive Species Potential Habitat - The following section describes direct, indirect, and cumulative effects on sensitive species having potential to occur in the JCRAA, but for which no occurrences of the species are known. This analysis assumes that although none of the species have been located after inventorying approximately 30 percent of the analysis

area, these species could occur in the uninventoried portions of the JCRAA. Due to lack of better information, the analysis assumes that the plants could occur in their potential habitat and identifies the effects that could be occurring to these species.

Membrane-leaved monkey flower habitat is narrowly restricted to seepy cliffs and very steep slopes with small seeps. As such, there is little potential for livestock to directly affect this species as they seldom spend time on very steep slopes, and they cannot rock climb onto the cliffs. Indirectly, upland water developments and habitat conditions (vegetative cover and composition as well as the degree of roading and compacted cattle trails) influencing landscape hydrology could influence the viability of membrane leaved monkey flower sites by disrupting their source of water, but this effect is likely small and it is not quantifiable. Other ongoing actions are not likely to intersect this species because of where it grows. Because of these factors, it is unlikely that there would be measurable effects (direct or cumulative) to this species from implementing either action alternative.

Of all the moonwort species that are Sensitive in Region 6, the following are potentially the most likely to be discovered within the JCRAA: **crenulate-leaved moonwort, lance-leaved moonwort, common moonwort, and Mingan moonwort**. These species inhabit small openings in mesic forest or meadow environments, including riparian areas and seeps. **Porcupine sedge** inhabits wet meadow, swamp, and riparian environments and will be discussed in this group as well. These areas historically and contemporarily receive a disproportionate amount of direct and indirect effects from livestock grazing (herbivory and trampling). Cattle seek mesic forest stands for shade and forage. Livestock seek riparian areas for forage, water, and a cooler climate in the summer. Thus they will tend to spend more time and energy in riparian areas than upland habitats. This attention to riparian areas can lead to direct effects (herbivory and trampling) and indirect effects (changes in species composition, competitive interactions, and hydrologic functions).

Many upland seeps have been converted to ponds or developed springs and troughs. Historically, this kind of site conversion likely directly impacted some number of these species and their habitat. Some seeps and springs remain undeveloped or unrecorded, however those in capable range areas are often impacted. Many riparian areas within the JCRAA have been altered by removal of beaver and the resultant changes in hydrology. There are also riparian areas where species composition has degraded resulting from historic overgrazing, homesteading, and logging practices. These factors likely have contributed to the cumulative impacts to these species over time. Parts of Swamp Creek, Elk Creek, Sumac Creek, and Peavine Creek exhibit these conditions and likely are low potential habitat for these species. However, portions of these same stream reaches are in a restoration phase, including exclosures or strict control on livestock access. In more remote areas, in relatively higher elevations such as in the north and northwest part of the JCRAA, many drainages still retain segments that do provide potential habitat for these species. These areas are within active grazing allotments.

Riparian habitats also have the greatest potential to recover the most quickly. Improving range and natural resource management over the last 3 decades may have allowed many of these species to persist in patchy pieces of refugia. Porcupine sedge is a prolific seed producer and the moonworts reproduce by spores, so they could be hanging on at some level across the landscape or responding to shifts and pulses in the disturbance regime imparted by livestock management.

Contemporary utilization standards have likely helped improve conditions for some of these species to some degree. There is no study directly linking stubble height levels or percent utilization levels established for graminoid health to some level of health and vigor of the rare plants being discussed here. Stubble height monitoring is simply a trigger mechanism designed to indicate when to move the livestock to a different area, it is not an ecological measurement. Stubble height recordings from key areas and other areas are also an average of the conditions in the pasture. It does not mean that there is that level of uniform utilization across the pasture – there will be areas with more and less utilization.

Timber management actions have had site-specific surveys and analysis and/or have buffered riparian areas, thus reducing their contribution to potential cumulative effects. The same could be said for prescribed fire activities. Most of the riparian areas within the JCRAA have reacted as much to historic fire suppression (from active suppression efforts and livestock fuel modifications) as from the wildfire events themselves. A contribution to potential cumulative effects from wildfire can not be calculated.

Traditional recreation activities generally have little interaction with riparian areas. Except for Swamp Creek, there are few trails in the riparian area. Trail maintenance is restricted to the current trail prism. No new trails are expected to be built in any foreseeable future. OHV use is increasing and many of the new user created routes bisect riparian areas, thus potentially causing cumulative impacts to this habitat and species. The degree of impact is not currently known.

Noxious weed invasion poses a threat of cumulative effects similar to that previously discussed for other sensitive species.

Because not all potential habitat for these species has been inventoried, undiscovered populations of these species could exist in the analysis area, and the action alternatives could have direct (plant damage) and indirect (habitat alterations) effects to this species. The threat of grazing or trampling plants or parts in undiscovered populations could impact the viability of the plants and their occurrences. Therefore, the loss of any individual to a small isolated patch would increase the risk of potential inbreeding depression. Also, the potential undiscovered patches could contain valuable adaptive traits not necessarily found in other populations evolving in the county. Although some potential exists for direct effects, the continuation of these effects would not occur throughout the JCRAA. The 3032 acres of botanical inventories proposed and designed to inventory Spalding's catchfly sites will also include areas of potential habitat for other Forest Service Sensitive species including those being discussed here. Through this effort, additional Sensitive plant habitat will be surveyed. The results of this inventory work would be used to limit the risk and intensity of the potential effects. Protective measures would be determined on a site specific basis and implemented as needed through the Annual Operating Plans. Thus the potential for effects, direct, indirect, or cumulative should be reduced.

Bank monkey flower and least phacelia are attractive yet diminutive annuals that inhabit small microsites in grassland and sometimes meadow terrain. Often these gravely, sandy or silty sites contain some ephemeral moisture but not to the degree that they would constitute a seep or riparian area. This ephemeral moisture makes them more vulnerable to spring grazing than summer or later. These sites stay green longer and the moist soil is

easily displaced by hoof action. Most known sites of these species are small and widely scattered across the landscape.

They flower early to mid spring, though individual sites may vary widely in their phonologic expression in a given year. Patch sizes are usually not very large. Little is known about the biology of these species, especially its seed bank ecology. As annuals, it is not uncommon for some patches to "disappear" for a number of seasons, only to return when annual climatic conditions align such that they favor seed germination. These species are too small and unapparent to be available as forage species, and cattle do not seem to choose to eat them (though historically sheep could have had some level of impact). Because of their habitat attributes, they are susceptible to trampling, especially in the spring if livestock cross their habitat en route to forage on the adjacent bunchgrass or if they stop to see what is green in the vernal moist spots.

Except for roads and landings, historical timber management actions did not have an effect on these species. Current vegetation management projects are planned to avoid impacts. The same can be said for prescribed fire activities. The effects of wildfire on these species are unknown.

As previously described, off road vehicle use is increasing within the JCRAA and is not regulated except for during parts of deer and elk hunting seasons. However, the draft National OHV policy may result in future reductions in the extent of OHV use throughout the landscape.. OHV use is contributing to potential cumulative effects to these species. However the degree to which OHVs are intersecting and disturbing these plants or habitat has not been determined.

Noxious weed invasion is and will be a potential threat as discussed for the species above. The effects of State, private and tribal actions are the same as that discussed for Wallowa Mountain ricegrass.

As previously described, all potential habitat has not been inventoried, but the 3032 acres of inventory scheduled for Spalding's catchfly habitat would also include areas of potential habitat for these Sensitive species. If found, these occurrences would be protected through the Annual Operating Instructions, reducing the potential for direct, indirect, or cumulative effects.

Clustered lady slipper and **Beck's sedge** are both rare generalists that inhabit mid to late seral conifer stands with moderate canopy cover. Livestock spend much less time grazing in timbered stands then they do grasslands, but they do tend to congregate under shady conifers at the edge of these grasslands, and near water sources. These concentrated areas of livestock use impact the understory vegetation. Clustered lady slipper is not known to be particularly palatable, but it is susceptible to trampling. Beck's sedge is very palatable. Cattle will graze the plant when it is in a patch as has been observed on the Pine and LaGrande Ranger Districts, but it is not known to what degree they seek it out if better forage is available. Historic timber harvest likely did contribute to cumulative effects to this species but contemporary land management prescriptions protect these plants with site-specific inventories and analysis. Beck's sedge is more likely to respond favorably to thinning activities and prescribed or wildfire. Clustered lady slipper does not respond well to fire or large changes in canopy cover. However, due to the lack of historical

reference populations, the degree of these impacts to these species cannot be determined. OHV use and noxious weed invasions also pose a threat to these species as discussed above. Because of its palatability, Beck's sedge is more likely to be impacted by grazing pressure than clustered lady slipper.

As previously described, all potential habitat has not been inventoried, but the 3032 acres of inventory scheduled for Spalding's catchfly habitat would also include areas of potential habitat for these Sensitive species. If found, these occurrences would be protected through the Annual Operating Instructions, reducing the potential for direct, indirect, or cumulative effects.

Lewiston mariposa lily and **needleleaf sedge** are both species with an affinity to grassland habitats and sometimes, small stringer meadows. Both are palatable to livestock and the mariposa lily is highly desirable. It is quite possible that intensive historic levels of herbivory reduced the ability of populations of these species to set seed and persist widely across their landscape. However, due to the lack of historical reference populations the degree of these impacts to these species cannot be determined. Both are long-lived perennial species. Although susceptible to herbivory, the tough roots of the needleleaf sedge, and the deep bulb of the mariposa lily may help enable them to cope to some degree with trampling, (if these impacts are not too extreme or constant). Contemporary management actions are likely better for these species (to the extent they maintain healthy grasslands as a whole), but the degree of their response to improved range management has not been quantified. Nor are there any studies linking a particular grassland stubble height or percent utilization standard to a level of vigor in these species.

The bulbs and strong rhizomes of these two species also provide a way for these species to accommodate wild fire or prescribed fire. Fire suppression actions could impact these species if the fire lines pass through a site. Again, the only way to mitigate this impact (the level of which is not currently quantifiable) is to carefully plan and implement fire suppression action with good resource advising and resource identification in the Wildfire Situation Analysis.

Except for historic road building and log deck locating, timber management actions likely have not impacted these species or their habitat. New projects are planned to avoid impacts to these species.

Increasing off route OHV use is also a threat. OHV trails displace vegetation in their paths. Currently, no known occurrences of these species have been ridden through. There are no known occurrences of these sensitive species around any developed recreation facility. Dispersed recreation could have impacts from campers trampling habitat or plants. Most of this impact would occur during hunting season when hunting camps are erected across the forest. These camps are almost always along and adjacent to open roads, so the scope of these potential impacts is limited, but not currently quantifiable.

Noxious weed invasions pose the largest threat to these species through loss of or altered habitat, altered competitive interactions, or actual extirpation of individuals by these weeds. Currently the known noxious weed patches being treated have kept these weeds from impacting known sites of these sensitive species. But future threats, especially from yellow starthistle, of weed invasions are credible but not yet quantifiable.

As previously described, all potential habitat has not been inventoried, but the 3032 acres of inventory scheduled for Spalding's catchfly habitat would also include areas of potential habitat for Sensitive species. If found, these occurrences would be protected through the Annual Operating Instructions, reducing the potential for direct, indirect, or cumulative effects.

Refer to the Botanical Biological Evaluation for further information regarding Sensitive species. The Forest Plan (Page 4-30) requires that all actions and programs be reviewed to determine their potential effects on threatened, endangered, and sensitive species. This evaluation has been prepared and therefore complies with the Forest Plan.

Alternative 3 - Sensitive Species

Wallowa Mountain ricegrass – Alternative 3 would demonstrate the same type of effects to Wallowa Mountain ricegrass as described for Alternative 2. However, the extent of these effects would be reduced through an increase in the area inventoried for the presence of the plant. Alternative 3 provides for 5922 to 10,662 acres of inventory for Spalding's catchfly, the location of which would also intersect with some potential habitat for Wallowa Mountain ricegrass. As described in the mitigation and monitoring section on Pages 49-53, Alternative 3 would adopt mitigations and monitoring specifically for Wallowa Mountain ricegrass. Salt placement would avoid known occurrences, permittees would be assisted with identification skills for this plant, and representative populations of ricegrass would be visited every five years with indicator populations being reviewed every year.

Alternative 3 proposed to use somewhat different techniques relative to rangeland management as a whole, offering greater flexibility in managing for resource concerns. For example, if inventories identified additional Wallowa Mountain ricegrass occurrences, changes in pasture use could be identified with the permittee to protect the species without initiating a permit action. Annual Operating Instructions could be used to change pasture use to provide protections to newly discovered issues. However, this improvement in responding to resource concerns would not be easily measured relative to Alternative 2 and does not make Alternative 3 different enough with respect to Wallowa Mountain ricegrass to change the determination of effect. Therefore, this alternative May Impact Individuals or habitat, but will not likely contribute to a trend toward federal listing or cause a loss of viability to populations or species of Wallowa Mountain ricegrass.

Hazel's Prickly Phlox - The difference in effects between Alternatives 2 and 3 would be the same as described for Wallowa Mountain ricegrass.

Engelmann's Daisy - The difference in effects between Alternatives 2 and 3 would be the same as described for Wallowa Mountain ricegrass.

Sensitive Species Potential Habitat – The difference in effects between Alternatives 2 and 3 would be the same as described for Wallowa Mountain ricegrass.

Aquatic Resources

The JCRAA is located north of Enterprise, Oregon within the Lower and Upper Joseph Creek Watersheds. The headwaters of Joseph Creek originate from spring-fed tributaries. Major tributaries include Chesnimnus Creek, Crow Creek, Elk Creek, Davis Creek, and Swamp Creek. Joseph Creek is a tributary of the Grande Ronde River, which flows into the Snake River. The JCRAA contains all or portions of 15 subwatersheds. Refer to Figure 5.

Table 19 - Joseph Creek Subwatershed Information

Upper Joseph Creek Subwatersheds	USGS HUC 17060106	Acres (total)	Acres (FS)	Allotment Acres (FS)	Allotment Acres (Other)	Stream Lengths within Allotments (miles)*
Lower Crow Creek	26A	6,283	2,605	2,576	1,577	5.78
Elk Creek	26B	16,769	9,705	9,705	2,051	15.94
Middle Crow	26C	12,520	0	0	251	0.96
Lower Chesnimnus	26E	13,663	952	833	0	0.08
Peavine Creek	26M	15,976	15,107	8,174	0	6.68
Lower Joseph Creek Subwatersheds						
Broady Creek	02D	13,552	10,255	4,744	0	5.18
Joseph Creek – Mile 14	02H	20,467	5,663	5,663	0	7.43
Peavine Creek	02I	8,097	7,718	7,718	0	9.98
Joseph Creek – Mile 27	02J	6,680	3,522	3,522	632	4.94
Lower Swamp Creek	02K	17,075	14,933	14,933	1,902	19.44
Davis Creek	02L	10,705	7,662	7,662	1,037	12.11
Upper Swamp Creek	02M	20,854	2	0	894	0.03
Joseph Creek – Mile 34	02N	6,494	6,223	6,233	263	6.29
Cougar Creek	02O	6,885	6,719	6,719	165	8.73
Joseph Creek – Mile 41	02P	11,148	9,647	9,647	663	8.78

*Miles of perennial and intermittent streams within allotments

The Joseph Creek Watershed drains 352,669 acres or 551 square miles. All water drains into the Grande Ronde River. The length of Joseph Creek from its confluence with Crow Creek and Chesnimnus Creek to its confluence with the Grande Ronde River is 49 miles.

Elevation within the Joseph Creek Watershed ranges from a high of 5,420 feet and the headwaters of Chesnimnus Creek to a low of 920 feet at the confluence with the Grande Ronde River. Elevation within the analysis area ranges between 1880 and 5200 feet.

Elevational changes affect the hydrology within the Joseph Watershed. Air temperatures vary with elevation. Low elevation areas have relatively mild winters (20-40°F) and hot summers (>85°F). Cooler summers and more severe winters occur at the higher elevations. Average annual precipitation also varies with elevation. Low elevations range from 12-17 inches while higher elevations range from 30-45 inches. Approximately 90 percent of precipitation falls from September through June. At the lower elevations precipitation falls as rain, while higher elevations are mixed with snow and rain.

Reserve for Figure 5

In general, the subwatersheds within the Joseph Creek Watershed can be divided into those with and those without a dominance of conifer vegetation. Runoff patterns within ecosystems dominated by open grassland prairie, peak relatively early in the year while conifer dominated slopes deliver water during May and into June.

Although few systematic hydrologic measurements have been recorded, a USGS gauging station was in operation at Chico (two miles downstream of Crow Creek confluence) from July 1931 to September 1933. From this limited data, a snowmelt and spring rain hydrograph was developed. Peak flows generally occur in March, April, or May with low flows from June through February.

A stream survey of Joseph Creek during July 1991 measured the discharge at the mouth to be 55 cfs. Flows in the lower part of the Joseph Creek Watershed are dependent on the runoff from the upper watershed, spring-fed tributaries, and intense spring/summer rain storms (2-3 inches/hour). Because the valley floor is narrow (50-300 feet), there is limited water storage available in floodplains.

Observations of the interaction of precipitation and streamflow indicate that this watershed is "flashy"; streamflow can rise and drop quickly. A late spring rain can cause streamflow change within 24 hours. This varies by subwatershed, with differences in soil moisture, thickness of soils, topography, forest canopy, size of storm, condition of stream/floodplain, and past management.

The draft *Upper Joseph Watershed Assessment* (USDA 2004) and *Lower Joseph Watershed Assessment* (USDA 2001) provide more information discussing hydrology and geology and soils of the Joseph Creek watershed.

Existing Conditions – Soil Productivity

The Joseph Creek Watershed is a gently sloping dissected plateau. Columbia River basalts form a plateau in the upper watershed, which drains into Joseph Creek Canyon. The basalt is generally thick bedded, fine grained, massive, and hard (Upper Joseph Watershed Assessment draft 2004). Locally there are interbeds of ash, old soil profiles, and sedimentary rocks. Volcanic vents, which were intruded through the basalt plateau, now exist as buttes, including Elk Mountain, Roberts, Greenwood, Haskins, and Findley Buttes.

Soil type is influenced by area geology and landform, surface deposits of windblown (loess and volcanic ash), and colluvial materials. Primary landforms include plateau tops, mountain slopes, and dissected canyons. Soils are variable with surface textures ranging from very fine to coarse, with coarse rock fragment ranging from less than five to greater than 85 percent. Soils are generally deeper on north and east slopes (capable of supporting conifer stands) and more shallow on south and west facing slopes (capable of supporting mainly grasslands).

Principal soil types are "residual soils," (soils formed from local bedrock in place) and "ash" or "mixed" soils, derived from volcanic ash, or a mixture of volcanic ash, fine-textured windblown loess and colluvial surface deposits over bedrock or pre-existing residual soils.

Soil erosion depends on rock type from which soils are derived, soil properties (such as soil texture and rock content), vegetative cover, and slope. Potential soil erosion hazard (loss of soil by surface run-off) is rated from slight to high.

Residual soils are shallow to moderately deep, well drained, medium textured loams and silt loams, with variable rock content ranging from zero to greater than 35 percent. Soil erosion hazard for residual soils is rated low for slopes less than 30 percent and moderate for slopes greater than 30 percent.

Volcanic ash and mixed soils tend to be shallow to moderately deep, well drained, fine to medium textured silt loams and loams, with rock content from zero to greater than 35 percent. Occurrence and depth tends to be greater on north and east slopes, gently sloping ridge tops, alluvial fans, and stream terraces. Depth tends to be shallower or absent on south and west slopes, and steep-sloped canyons. Soils with volcanic ash are highly productive, but have higher soil erosion hazard ratings than residual soils because of their low bulk density and high detachability. Surface soil erosion hazard for ash or mixed soils is rated slight to moderate for slopes less than 30 percent and moderate to severe for slopes greater than 30 percent.

Creeks entering Joseph Creek form deep alluvial fans. Alluvial fans generally consist of stratified, deep, well-drained, very stony soils. Alluvial terraces have been formed primarily from alluvial deposition due to valley constraints. These terraces are gently sloping with very deep, well drained, fine to very coarse textured loam and fine sandy loam soils. Potential soil erosion hazard rating for alluvial fan and terrace soils is low to high depending on slope, vegetative cover, and carbonate concentration.

The hazard of mass movement (movement of soil which occurs below the surface) is rated low for slopes less than 30 percent and moderate for slopes.

Livestock grazing affects soil productivity through herbivory and soil displacement and compaction. Herbivory of the vegetation reduces above ground biomass which is needed for soil organic matter, soil surface protection in storms, to hold sediment, to reduce the surface soil temperatures, and to provide sites for water infiltration.

In affected areas, soil displacement and compaction by hoof action leads to the dislodging of plants, loss of soil productivity, and changes in soil structure. Dislodging and trampling of vegetation damages not only the above ground biomass but may also damage or reduce the amount of below ground biomass necessary to bind soil. Compaction changes the soil structure, decreasing available refugia for soil organisms and reducing the rate of water/nutrient infiltration and percolation.

Evidence of reduced soil productivity due to a history of livestock grazing occurs throughout the analysis area, within each allotment. The most affected sites include livestock trails in the uplands and along stream bottoms, springs, salting areas, and developed water sites.

Alternative 1 – Soil Productivity

Under this Alternative, no livestock would compact or cause displacement of soils, so no increase in grazing related detrimental soil conditions would occur beyond what currently exists.

The absence of livestock will have the indirect effect of allowing sites (livestock trails in the uplands and along stream bottoms, springs, salting areas, developed water sites) where soils are presently compacted to start recovering. Without the continued disturbance of livestock grazing, groundcover will increase, soil bulk densities will begin to decrease, and biomass production will increase, although it may take 20-30 years before the recovery process is completed. Soil damage may also improve over time through natural processes including freeze/thaw cycles, wet/dry cycles and vegetative growth. This natural recovery process occurs most readily in the surface 6 inches of soil. The amount of natural recovery, and the total amount of time for soil damage to recover to acceptable levels depends on the extent, depth, and degree of soil damage. As these changes occur, infiltration rates will increase and surface erosion will decrease.

On most of the allotments, the benefits of eliminating livestock use will be minor when compared to the effects of historic overgrazing and other past and current management activities. By eliminating livestock, soil recovery in certain areas (livestock trails in the uplands and along stream bottoms, springs, salting areas, developed water sites) will recover at a faster rate (beginning within 10 years), whereas with current management detrimental soil conditions will be maintained. These areas are usually discontinuous and comprise of a very small proportion of the allotments. Soil compaction and erosion will continue in the analysis area even in the absence of livestock grazing. These ongoing impacts result from roads, vegetation management, and recreation and occur at a greater intensity than those resulting from grazing.

Alternative 2 – Soil Productivity

Continued livestock grazing will cause soil compaction and displacement within the allotments to persist. The areas most susceptible to compaction and erosion are those where livestock use is concentrated or season long. Activities from livestock that cause detrimental soil conditions include trailing in uplands and along stream bottoms, and hoof action around springs, water developments, and salting areas. These areas are particularly sensitive when soils are wet. Although the degree of soil compaction and displacement caused by livestock varies across the analysis area, it is generally less severe in areas with heavy timber and most severe in areas that provide easy access to cattle (low gradient, open areas and meadows).

Root biomass can also be affected by vegetation damage or removal. Less energy is available for root maintenance while the plant is focusing its energy on regrowth of leaves. Loss of root biomass reduces soil stability leading to increased soil erosion.

The effective ground cover would not increase and could potentially decrease from the current condition under this alternative. Decreases in effective ground cover would come about through the continued herbivory and displacement of soil and plants and accelerated erosion and declining soil productivity.

In this alternative, herbivory and soil displacement by cattle would continue under current management strategies. Percent utilization, the period of use, and the number of cattle on the allotment would remain the same, perpetuating the current quantity and quality of effective ground cover.

Refer to the Watershed Cumulative Effects section in this chapter for cumulative effects.

This alternative is consistent with the Wallowa-Whitman Forest Plan Standards and Guidelines for soil resources and Forest Service Manual Direction, Region 6 Supplement 2500-98-1, effective 4/1998. Any increase in detrimental soil conditions is expected to be limited in aerial extent (found in localized areas only) and size (generally in small, isolated conditions).

Alternative 3 – Soil Productivity

The effects to soil productivity from actions proposed under Alternative 3 would be essentially the same as Alternative 2. In the long term (10-20 years) this Alternative *could* improve watershed and aquatic conditions at a faster rate than Alternative 2, but not as fast as Alternative 1.

Existing Conditions – Biological Crusts

Biological soil crusts are a mosaic of living organisms composed of algae, lichens, mosses, liverworts, cyanobacteria, bacteria, and fungi. The composition of the crusts is related to soil and climatic factors.

Biological soil crusts have several important functions and roles in semi-arid and arid rangeland. They stabilize the soil and thus maintain water and air quality, fix carbon and atmospheric nitrogen, and make other nutrients more available for vascular plants.

Biological crusts are found throughout the analysis area, especially in areas protected from ungulate grazing, off road vehicles, and other soil surface disturbing activities. No quantifiable data is available on the distribution, density, diversity, or condition of crusts throughout the area. Biological crusts are important pioneer species, especially following fire. In addition, they provide surface stability and retention, are essential for nutrient cycling and availability, contribute to biological diversity, hold soil moisture (depending upon soil texture and crust composition), help reduce cheatgrass invasion, and are a visible indicator of surface disturbance and rangeland health. It has been noted that on trampled soils, the diversity and density of biological crust species diminishes.

Alternative 1 – Biological Crusts

Under this Alternative, there would be no livestock to compact or cause displacement of soils, so there would be no increase in grazing related detrimental effects to biological crusts beyond what currently exists. Biological crusts are dependent on soil and vegetative conditions, so as soil and ground cover recover, biological crusts will improve (may take up to 50 years for full recovery).

Alternatives 2 and 3 – Biological Crusts

Because no quantifiable data is available on the distribution and condition of biological crusts within the analysis area, the relationship with soil and vegetative conditions is used as an indicator of biological crust health. With continued livestock grazing causing soil compaction and displacement, the potential for increased or maintained detrimental biological crust conditions will persist.

Existing Conditions – Listed Fish Species

The analysis area includes portions of 15 subwatersheds all containing Snake River summer steelhead, which were listed in 1997 as threatened by National Oceanic and Atmospheric Administration – Fisheries. Summer steelhead spawn and rear in the main stem of Joseph Creek and its tributaries. Named tributary streams supporting steelhead on forest system lands within the analysis area include Davis Creek, Swamp Creek, Elk Creek, Little Elk Creek, Gould Gulch, Crow Creek, Cougar Creek, Sumac Creek, Peavine Creek, West Fork Peavine Creek (Chesnimnus Creek tributary), Tamarack Creek, Brushy Creek, Peavine Creek (Joseph Creek tributary), Lupine Creek, and West Fork Broady Creek. Refer to Figure 5. Spawning and rearing habitat includes rearing habitat that for many streams is not year-round due to lack of sufficient flow and water quality.

Historically, distributions of steelhead may have occurred further upstream in the channels that currently contain habitat, but due to the cumulative effects of intensive management such as logging, road construction, and grazing, less functional habitat is available. Current and historic habitat information provided by ODFW, the Nez Perce Tribe, and Forest Service records were used to determine the extent of habitat critical to the needs of summer steelhead.

A more extensive discussion of condition and trend of populations, life history characteristics, and production capabilities can be found in the *Joseph Creek Section 7 Watershed Assessments of Ongoing and Proposed Activities 1998.*

Redband trout are currently listed on the USDA Forest Service Region 6, Regional Foresters Sensitive Species List, and listed as vulnerable under the ODFW Sensitive Species list. Redband trout and steelhead trout exist in the same habitats throughout the watershed. At this time, it is impossible to distinguish the difference between redband and steelhead at young life stages. They often interbreed and are believed to be the same

species. Habitat requirements are similar to the steelhead.

Alternative 1 – Listed Fish Species

This alternative is the no grazing alternative. Although this alternative removes the action of livestock grazing on Forest land, the potential exists to increase grazing pressure and consequently higher disturbance on adjacent and interspersed private land. None of the subwatershed matrix indicator ratings would change as a result of implementing this alternative in the short term (0-10 years). All of the subwatershed matrix indicator ratings would be maintained, although conditions would have the opportunity to improve at a faster recovery rate. Subwatersheds would begin to move towards Functioning Appropriately in the long term (10-20 years). Table 20 displays the effects of the alternative to the habitat parameters. The ratings for Alternative 1 are based on a 10-20 year time frame before the effects are realized.

Alternatives 2 and 3 – Listed Fish Species

As analyzed in the Lower Grande Ronde Biological Assessment, the proposed actions 'may affect, but is not likely to adversely affect' listed Snake River steelhead. This is supported by the determination that the proposed actions would maintain or improve the environmental baseline of Matrix indicators for streams within the analysis area and would decrease the risk of aggregate and cumulative effects on population and/or habitat. A risk of direct effects from trampling of steelhead redds is identified, but the risk would be minimized through protection measures adopted for allotments containing steelhead habitat. Refer to the Biological Assessment in the analysis file for further information on direct and indirect, aggregate, and cumulative effects. Under Alternative 2, conditions would improve over time, mostly due to watershed improvement projects that have been implemented over the last five years. Actions under Alternative 3 may hasten the rate of improvement because it is more adaptive and provides the permittees with additional tools to better manage grazing, resulting in less of an effect on fish and other aquatic species.

NOAA - Fisheries and US Fish and Wildlife Service have reviewed the best available information and concur that this activity meets all the of the ESA requirements. Both agencies concur with the Wallowa-Whitman National Forest finding that authorizing grazing in the JCRAA 'may affect, but is not likely to adversely affect' listed Snake River steelhead trout.

Existing Conditions – Aquatic Habitat

Habitat is the most basic requirement for achieving or maintaining healthy fish populations. Viable, stable populations require abundant, high quality, and diverse habitats that satisfy requirements for all life stages. The most significant effects on fisheries from land management activities are indirect and cumulative. Proper riparian function will meet most habitat objectives for fish. In many streams, degradation of the RHCAs has decreased habitat diversity and complexity necessary to support strong

populations or mitigate effects from extreme temperatures, fires, floods, or other natural events. Healthy riparian areas require preserving water quality, diverse and complex vegetative communities, and stream channel morphology. Historic and current livestock grazing have negatively influenced these elements in localized sections of most streams in the analysis area where riparian areas are low gradient and easy to get to. These are typically Rosgen C or E type channel sections with wider floodplains and fine grained stream banks. These conditions can be seen in sections of Swamp Creek, Davis Creek, Elk Creek, Peavine Creek, Crow Creek, Cougar Creek, and Sumac Creek. As displayed in Table 20, many of the subwatersheds in the analysis area are "Functioning at Risk" for parameters that are sensitive to grazing systems.

Effects on current habitat indicators were evaluated as described in *Making Endangered Species Act Determinations of Effect for Individual or Grouped Actions at the Watershed Scale* (NMFS 1996). The rating criteria for each Matrix parameter is contained in the analysis file.

The habitat indicators have been evaluated and rated using available data provided by stream surveys, PFC surveys, water quality monitoring, habitat improvement monitoring, personal visits by local biologists, and professional judgment. Habitat indicators are rated "Functioning Appropriately", "Functioning at Risk", or "Functioning at Unacceptable Risk". Table 20 displays the rating for each indicator by subwatershed. A more intensive discussion of habitat matrix indicators can be found in the *Upper Joseph Watershed Assessment 2004 draft, Lower Joseph Watershed Assessment 2001, and Lower Grande Ronde Subbasin Biological Assessment 2001.*

Indicators that have a low risk of being affected by livestock grazing include Chemical Contamination, Physical Barriers, Large Woody Material, Pool Frequency and Quality, Off Channel Habitat, Refugia, Floodplain Connectivity, Increase in Drainage Network, Road Density and Location, and Disturbance History. Livestock use has a very low risk of noticeably affecting these indicators, unless allotments are seriously overgrazed.

The following indicators can be directly affected by livestock grazing and are the most sensitive to poor grazing management: Water Quality (temperature, sediment/substrate), Channel Morphology (width/depth ratio, streambank stability), Timing and Magnitude of Peak/Base Flows, and Riparian Reserves. These indicators are discussed in detail below.

Water Quality - Stream water temperature in the Joseph Creek Watershed is a limiting factor to summer steelhead production. Overall, stream water temperatures are above state water standards for steelhead (55 degrees for spawning through emergence, and 64 degrees for rearing). Some stream segments approach the lethal temperature of 75 degrees Fahrenheit during the month of July. Overall the rating for temperature in the analysis area is Functioning at Risk.

Sediment yield appears to be high in the upper reaches of the watershed, most likely the cumulative effect of past activities. Review of stream surveys and on-ground analysis of channels indicate that the majority of fine sediment comes from inchannel sources, the channel banks and bed. Thus there are direct ties of fine sediment sources to bank stability and riparian vegetation health. Poor bank stability and reduced riparian vegetation has

resulted from past timber harvest, channelization, livestock and elk grazing/browsing, and increased peak flows which have modified stream channels. Localized sediment problems exist throughout the analysis area. Of primary concern are those areas found in the interface between perennial and intermittent channels. These areas are often where springs are found, and the fine textured soils in the banks and stream beds are highly susceptible to trampling and trailing. Overall the rating for sediment/substrate in the analysis area is Functioning at Risk.

Channel Morphology - Data taken from stream surveys show that most streams are within Rosgen (1996) recommendations. Although most of the streams are within Rosgen guidelines, many tend to be on the high end of average. This indicator is Functioning at Risk for the analysis area.

Localized streambank instability exists throughout the analysis area, especially in headwater channels where fine-grained banks are highly erosive and in cattle gaps between riparian livestock exclosures. In some areas, unstable banks are the result of past management practices, resulting in stream downcutting and entrenchment. Portions of Crow, Davis, Swamp, and Elk Creeks are examples of this.

The primary result of unstable banks is increased sediment delivered to the stream. It has long been established that sediment is a detriment to water quality and salmonid habitat. “Livestock grazing, which may be the single greatest impactor to riparian areas, has contributed locally to streambank instability, channel cutting, sedimentation of fish spawning gravels and reduction of deciduous stream shade" (Forest Plan FEIS, 1990 pg S - 36). Most subwatersheds are within Forest Plan standards and guidelines for bank stability, although localized areas of bank instability are evident in Davis Creek, Swamp Creek, Crow Creek, Peavine Creek, Elk Creek, Little Elk Creek, Cougar Creek, and Sumac Creek. It is important to consider that even small areas of bank disturbance can contribute to downstream sedimentation. This indicator is Functioning at Risk for the analysis area.

Peak/Base Flows - There is no current hydrograph data available on the Joseph Creek Watershed. Based on site-specific observations throughout the watershed, Wallowa Mountain Zone hydrology personnel estimate that Joseph Creek Watershed overall rates as “Functioning at Risk” for changes in peak and base flows. This rating is based on the amount of downcutting observed in the upper portions of at least half of the intermittent streams. This erosion has been caused largely by management activities, such as road building, logging, and grazing in the Upper Joseph Creek Watershed.

All streams, except Swamp Creek and to a lesser extent Davis Creek, could be termed as "flashy". Water levels quickly rise and fall in response to rainstorms or snowmelt. Swamp Creek and Davis Creek appear to have high base flows, which remain relatively constant throughout the year. It is suspected that floodplains and extensive headwater meadows buffer these systems. The headwater meadows of both streams are under private ownership and are managed for agriculture and grazing. For all streams in the analysis area, flow quantity and timing have been altered.

Groundwater recharge occurs through infiltration and percolation of snowmelt and rainfall, and functioning floodplains and small wetlands. Aquifers in the fracture basalt play an

important role in providing perennial flow. Loss of floodplain function (especially in gullied channels) has resulted in an estimated loss of more than 30.0 acre feet of water storage and ground water recharge within the Lower Grande Ronde Subbasin (USDA Forest Service 1998, pages AQUA-HF/27).

Developed springs and constructed reservoirs have reduced summer and autumn flow in intermittent and small perennial streams by capturing water in the reservoir when ponds are not full, intercepting groundwater and advancing of the timing of groundwater flow, and increasing evaporation. Evaporation has been calculated to be approximately 6 acre feet, corresponding to approximately 3-12% of August flow (USDA Forest Service 1998, page AQUA-HF/27). Water developments (springs) and stock water reservoirs are a potential source of sediment to downstream channels if not maintained. There are currently 156 pond developments and 113 spring developments within the analysis area.

Indepth analysis of basin's hydrologic system can be found in the LGRSR (1998, pages AQUA-HF/1 to HF/64). Davis Creek, Swamp Creek, Elk Creek, Chesnimnus Creek, Peavine Creek (Chesnimnus Creek tributary), Cougar Creek, and Joseph Creek have been identified as having altered hydrologic function.

Timing of discharge in both watersheds appears to have shifted to one month earlier in the year. In addition, the quantity of water in the headwater channels is thought to be lower than historic (LGRSR 1998; Wallowa County-Nez Perce Salmon Recovery Plan 1993). These flow changes are attributed to dam construction, diversions, harvest and fire openings. Information regarding private water rights and instream water rights can be found in the LGRSR (USDA Forest Service 1998).

The extent of which land management activities have effected the function of ground water recharge and movement is not known, however, activities which alter soil condition (compaction, displacement, burning, or puddling), cut into slopes and intercept groundwater flow, or occur directly within upland wetlands, seeps, or springs have an effect on ground water routing and quantity. There is evidence to suggest that within the Joseph Watershed, ground water routing and quantity have been altered (Wallowa County-Nez Perce Salmon Recovery Plan 1993; USDA Forest Service 1998). This indicator is Functioning at Risk for the analysis area.

Riparian Reserves - Riparian reserves consist of vegetation that provides shade, LWM recruitment, habitat protection, and connectivity within drainage. Riparian reserves in the analysis area are generally in good condition, although sections of many of the streams show evidence of historic management activities, such as roads, grazing, and harvesting. These areas show riparian plant communities that are lacking completely, or are lacking the vigor, health, composition, and diversity to support riparian reserve values. Most of these areas have been included in riparian restoration projects. This usually consists of protecting the area with fencing and planting native trees and shrubs. This indicator is Functioning at Risk for the analysis area.

Table 20- Environmental baseline on habitat indicators for the analysis area subwatersheds

Pathways/Indicators	Environmental Baseline		
	Functioning Appropriately	Functioning At Risk	Functioning at Unacceptable Risk
Temperature	02D, 02I, 02O	02H, 02J, 02K, 02M, 02N, 26A, 26B, 26C	02L, 02P, 26E, 26M
Sediment/Substrate	02D, 02H, 02I, 02J, 02K, 02O, 02P, 02N, 26A, 26C, 26E	02K, 02L, 26B, 26M	02M
Chemical Contamination	All	None	None
Physical Barriers	None	All	None
Large Woody Material	02D, 02I, 02K, 02L, 26B, 26E, 26M	02O	02H, 02J, 02M, 02N, 02P, 26A, 26C
Pool Frequency and Quality	02D, 02I	None	02H, 02J, 02K, 02L 02M, 02N, 02O, 02P, 26A, 26B, 26C, 26E, 26M
Off Channel Habitat	02D, 02I, 02K, 02L, 02M, 02P, 26A, 26B, 26C, 26E, 26M	02H, 02J, 02N, 02O	None
Refugia	All	None	None
Bankfull Width/Depth Ratio	02D, 02H, 02I, 02M, 02O, 26B, 26M	02J, 02K, 02L, 02N, 02P, 26A, 26C, 26E	None
Bank Stability	02D, 02H, 02I, 02J, 02O, 26M	02K, 02L, 02M, 02N, 02P, 26A, 26B, 26C, 26E,	None
Floodplain Connectivity	All	None	None
Peak/Base Flows	02D, 02I, 02L, 02M, 020, 26A, 26C	02H, 02J, 02K, 02N, 02P, 26B, 26E, 26M	None
Drainage Network	02D, 02H, 02I, 02J, 02M, 02N	02K, 02L, 02O, 02P, 26A, 26B, 26C, 26E, 26M	None
Road Density	02H, 02I, 02J, 02M, 02N, 26E	02D, 02K, 02L, 02P, 26A, 26C	02O, 02P, 26B, 26M
Disturbance History	02D, 26A, 26B, 26E	02H, 02I, 02J, 02K, 02L, 02M, 02N, 02O, 02P, 26C, 26M	None
Riparian Reserves	02D, 02I, 02H, 02J, 02M, 02O, 26M	02K, 02L, 02N, 02P, 26A, 26B, 26C, 26E,	None
Disturbance Regime	02D, 02I	02H, 02J, 02K, 02L 02M, 02N, 02O, 02P, 26A, 26B, 26C, 26E, 26M	None

Matrix Indicator ratings were obtained from information in the Lower Grande Ronde Multi-Species Biological Assessment 2001, Upper Joseph Creek Watershed Assessment Draft 2002, Lower Joseph Creek Watershed Assessment 2001, and Joseph Creek Section 7 Watershed Assessments of Ongoing and Proposed Activities 1998

Clean Water Act - The Clean Water Act provides direction "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters". To carry out this law, the State of Oregon has established state water quality standards for factors such as water

temperature, sedimentation, habitat modification and pH, and an anti-degradation policy to protect water quality conditions. Under the anti-degradation policy in Section 303(d) water bodies that do not meet water quality standards are designated as "water quality limited".

Table 21 shows the 1998, 2002 ODEQ (Oregon State Department of Environmental Quality) 303(d) list of Water Quality Limited Streams and the reason for listing. A TMDL (Total Maximum Daily Load) assessment is currently being conducted by ODEQ. Information obtained through this analysis will allow land managers to write WQRP (Water Quality Restoration Plans), which when implemented will move water quality parameters towards desired goals and objectives. Water quality limitations have been identified for streams in the JCRAA for summer water temperature and sediment.

Table 21 - Water Quality Limited Streams ODEQ 303(d) List of 2002

Subwatersheds	Stream Name	Segment	Listed Parameter
Lower Chesnimnus	Chesnimnus Creek	Mouth to Headwaters	Sedimentation Summer Rearing Temperatures*
Lower and Middle Crow	Crow Creek	Mouth to Headwaters	Summer Rearing Temperatures*
Elk Creek	Elk Creek	Mouth to Headwaters	Sedimentation Summer Rearing Temperatures*
Peavine Creek	Peavine Creek	Mouth to East/West Confluence	Summer Rearing Temperatures*
Joseph Creek Mile 14, Mile 27, Mile 34, Mile 41	Joseph Creek	Washington Border to Crow/Elk Confluence	Summer Rearing Temperatures*

*State of Oregon DEQ Water Quality Standards state that there shall be no measurable increase in maximum water temperature that being less than 64°F in migration and rearing habitat and less than 55°F in spawning habitat. Upper lethal temperatures for steelhead are about 75°F, with preferred temperature range between 50-55°F.

Fine sediment has been identified as a concern in perennial tributaries. In Upper and Lower Joseph Watersheds, land management activities (roading, timber, and grazing) have introduced fine sediment into the channel. Fine sediment, silts, and sands, are being flushed through the system during flash flow events. Gravel is being stored behind large woody material, in bars, and on floodplains. Though embeddedness is high, stream channels are classified as skeletal with little soil being deposited on bars to act as a rooting medium for riparian vegetation. Much of the embeddedness may be a relic condition.

Summer water temperatures are a concern across the Upper and Lower Watersheds. Analysis in the Joseph Watershed Section 7 Consultation Package (1998) and Wallowa County-Nez Perce Salmon Recovery Plan (1994) found water temperatures to be elevated above environmental potential due to changes in the flow regimes (timing and hydrograph), timber harvest, soil compaction, riparian roads, loss of riparian shade and vegetation, and livestock grazing. Low elevation, high air temperatures, and early snowmelt patterns also lead to elevated stream water temperatures in the basin.

Alternative 1 – Aquatic Habitat

Water Quality – The elimination of livestock grazing would not have an impact on reducing water temperatures in the short term (0-10 years). Water temperatures for area streams are related to basin elevation, timing of peak flows, groundwater recharge, cold-water spring/seep influx, and the condition of the riparian vegetation. Based on current conditions, it may be 10-20 years before improvement in water temperature is noticed.

Livestock related sediment originating from bank trampling, livestock trails in the uplands and along stream bottoms, springs, and developed water sites would be significantly reduced. Sediment production associated with riparian areas (streambanks) and uplands are expected to gradually improve a small amount in the short term (0-10 years). As new flood plains are developed and upland headwaters and springs stabilize a more noticeable improvement will occur (10-20 years). Hillslope and road related sediment regimes would not change from the existing condition. Vegetation management and fuel reduction projects would still contribute to sediment contribution.

Channel Morphology – Heavy livestock grazing has created unstable banks along accessible stream reaches of larger streams in the analysis area, such as Crow, Elk, Swamp, and Davis Creeks. These conditions are most directly due to historic grazing practices and have been on the upward trend for the last 20 years due to intensive restoration projects and better grazing management. Some natural instability in streambanks is expected due to the hydrologic stream processes; however natural instability along the stream reaches of concern would not be expected to be higher than five to ten percent. Unstable steambanks are the primary source of sediment to the stream system related to livestock grazing activities in the analysis area. Riparian vegetation helps to stabilize banks, filter sediment, and provide cover and shade for aquatic species. With the elimination of livestock grazing, bank stability and riparian vegetation should improve. With the improvement of streambanks and vegetation corresponding progress in the physical attributes is also expected. Stream channels would narrow (width/depth ratios), floodplains would become more effective in reducing erosive, high energy events, local water tables would rise, and sediment transport efficiency would increase.

Peak/Base Flows – Runoff timing and quantity reflects the magnitude of disturbance in a watershed. Changes in vegetation, soil condition, floodplain function (capture and storage of water), and channel condition (safe release of water) all affect timing and magnitude of peak and base flows (McDonald et al 1991, Dunne and Leopold 1978). Historic management within the analysis area has altered the flow regime, shifting the timing of peak discharge one month earlier (Lower Joseph Watershed Assessment 2001). Implementation of this Alternative will help to alleviate conditions that affect hydrologic functionality: livestock related soil compaction and displacement, impairment to upland springs/seeps, and vegetation deterioration which is prevalent throughout the analysis area. Improvement will be slight overall though, when compared to other ongoing activities in the analysis area that also affect peak/base flows (roads, harvest, and recreation).

Riparian Reserves – This Alternative will provide the greatest recovery potential to riparian reserves. With the elimination of livestock herbivory and hoof damage, vegetation will

show improvement in health, diversity, and composition. In the long term (5-20 years) canopy cover (shade) will increase and large woody material will become more available. Other ongoing actions that affect riparian reserves (roads, recreation, and ungulate herbivory) will still occur within riparian areas.

Alternative 2 – Aquatic Habitat

This alternative reflects current livestock management strategies. Current management incorporates changes that have occurred in the last 5 years. These changes have the potential for improving overall water quality and fisheries habitat conditions within each of the allotments in the long term (10-40 years) and some of the effects of the management changes can already be seen in the short term (0-10 years). For many indicators though, it is still too early to tell if these changes in management will continue the recovery process or just maintain the current condition. Adherence to the monitoring plan will be imperative to determining if the changes are enough to improve conditions. None of the subwatershed matrix indicator ratings would change as a result of implementing this alternative. All of the subwatershed matrix indicator ratings would be maintained.

The effects analysis assumes that all fencing and water developments are maintained, all mitigation/protection measures will be followed, and the monitoring plan is implemented. A cause and effect analysis for livestock management is shown in Table 22. These relationships display potential effects that could occur to aquatic habitat as a result of livestock grazing. Site-specific application of these relationships is displayed in Table 26.

In general two areas of concern are associated with livestock grazing and aquatic habitat in the JCRAA: (1) short stream segments within most perennial streams and (2) water gaps between riparian exclosures. Within Swamp, Davis, Elk, Crow, Sumac, Cougar, Peavine (tributary to Chesnimnus), Joseph and Chesnimnus Creeks, areas of concern are typically found in short stream segments within low gradient sections that are grazed in summer with unimpeded stream access. These stream segments tend to be incised through deep fine-grained soils which are very susceptible to trampling and hoof sheer. This susceptibility, combined with the tendency of livestock to focus on riparian areas during the hotter months, results in a high potential for damage to banks. Grazing during the hotter season also tends to result in higher utilization of riparian deciduous vegetation.

Numerous riparian exclosures have been constructed along Davis and Elk Creeks to eliminate livestock access to riparian areas. The water gaps between exclosures allow livestock to access the streams for water. Use is concentrated in these water gaps because they severely limit the amount of stream accessible to livestock. They therefore tend to be in a degraded condition.

The function of intermittent streams and ephemeral drainages is also affected by livestock grazing. Virtually all intermittents and ephemeral draws within the analysis area have some level of trailing, trampling of streambanks, and grazing of deciduous vegetation. But these effects are concentrated where slopes are gentle, conifer cover is low, and live water is nearby. Like the areas of concern within perennial streams, these affected upland areas tend to be in short segments. They also can be long distances from any fish habitat.

Although there are areas of concern within essentially all perennial fish-bearing streams and their headwaters, the areas are localized and small in scale. Overall, grazing within the JCRAA is meeting Forest Plan standards and PacFish standards. By addressing the negative livestock effects within localized concern areas through restoration techniques (planting, fencing, woody material placement, water gap hardening), an improving trend is expected for all perennial stream systems within the JCRAA.

Water Quality - Stream water temperature in the Joseph Creek Watershed is a limiting factor to summer steelhead trout and other aquatic species. Chesnimnus, Crow, Elk, Peavine, and Joseph Creeks are on the 303(d) list for stream temperatures. Streamside vegetation is critical when it come to moderating the temperature of streams. Vegetation provides shade and cover, reducing stream water temperatures in the summer and moderating temperatures in the winter. Vegetation also helps to reduce the daily temperature fluctuation, providing for more consistent stream temperatures. Monitoring grass and shrub utilization is imperative to maintaining and improving water temperatures. Influx of cool groundwater and springs and seeps is also crucial to summer water temperatures.

As a result of the TMDL process, a Water Quality Restoration Plan will be developed for the Lower Grande Ronde Subbasin. Until then, ODEQ requires that conditions will be maintained or enhanced relative to parameters for which a 303(d) stream is listed. No increase in stream water temperatures is expected with the implementation of this alternative. The current condition would be maintained. Fenced reaches are providing streamside shading to regulate stream temperatures. Unfenced reaches would continue to experience livestock grazing of riparian vegetation within utilization standards.

Bank instability and deficient riparian vegetation in localized areas can contribute to instream sediment. Direct sediment input from bank sloughing occurs when livestock break down banks at watering sites and water gaps and trail along streambanks. Over utilization of vegetation reduces the ability of riparian vegetation to filter sediment before it enters stream channels. However, utilization monitoring within the JCRAA shows approximately 95 percent compliance on all monitoring sites within the last 9 years, so this effect is localized within the JCRAA.

Livestock grazing is also impacting the intermittent channels and headland springs and seeps throughout the analysis area. Bank trampling and trailing can be a chronic source of fine sediment and impede the establishment of riparian vegetation. Livestock trails following the bottom of ephemeral/intermittent channels are contributing to increased fine sediment levels above natural in specific locations such as some of the Peavine Creek tributaries. Stock ponds and troughs built within the stream channel are also a source of chronic sediment, especially when not maintained.

Chesnimnus and Elk Creeks are on the ODEQ 303(d) list of Water Quality Limited Streams for sedimentation. As a result of the TMDL process being conducted by ODEQ, a Water Quality Management Plan will be developed. Until then, ODEQ requires that conditions will be maintained or enhanced relative to parameters for which a 303(d) stream is listed. Implementation of this alternative, with adherence to the mitigation measures would maintain or enhance the current condition.

Table 22 - Cause Effect Analysis of Grazing Management

Grazing Causes: Matrix Indicators	Reduction in Vegetation due to trampling and browsing	Reduction in Soil productivity due to hoof action and trailing	Bank Trampling	Spring/Seep Disturbance and Nonfunctioning Water Developments
Increased Stream Temperatures in Summer, reduced in winter*	Vegetation provides shade which help to reduce summer water temperatures and maintain winter water temperatures.	Less infiltration, more overland flow which increases water temperature, less ground water recharge into streams at critical low flow periods	Bank instability causes increased w/d ratios which causes more surface area for increased stream temperatures	Interruption of spring/seep functionality causes more overland flow where temperatures can increase, instead of subsurface where water can stay cool.
Sediment from uplands and headwaters	Root biomass can also be affected by vegetation damage or removal. Less energy is available for root maintenance while the plant is focusing its energy on regrowth of leaves. Loss of root biomass reduces soil stability leading to increased soil erosion	Water riling down livestock trails collects displaced sediment	Trampling of fine grained headwater channel banks moves downstream into fish bearing channels	Major source of sediment
Instream Fine Sediment Substrate and suspended sediment	Vegetation filters sediment before reaching stream and collects for bank rebuilding; increase in instream sediment from water and wind erosion of exposed streambanks	Soil compaction affects ability of vegetation to establish, without sufficient ground cover soil erosion occurs	Increase in instream fine sediment	
Change in headwater Channel Morphology	Reduction in bank stability causing erosion of fine grained channel banks that is highly susceptible to entrenchment		Bank trampling causes water to move out of channel	
Channel Morphology* Measure: bank stability, w/d ratios	Bank stability is lessened due to decline in root mass; surface erosion and mass wasting of streambanks is higher due to loss of dense and species diverse vegetation that forms layers over the ground; less capability of withstanding flood events		Increased width/depth ratios from bank shearing	
Fish Habitat Measure: pools/mi., LWM, cover	Loss of overhead hiding cover; Loss of undercut banks (hiding cover) that need dense, deep rooted vegetation; browsing of seedling conifers and deciduous trees reduce future LWM recruitment (hiding cover and pool formation)	Soil compaction decreases vegetation composition and density because of restricted rooting depths, and water and nutrient cycling	Shearing of banks - loss of undercut banks; increase of sediment fills in pool habitat, alteration of pool riffle ratios	Increase of sediment fills in pool habitat, alteration of pool riffle ratios; increase in fine sediment affects spawning habitat and viability of redds.
Timing and Magnitude of Peak/Base Flows and Lowering of the Water Table	Increase in surface runoff – vegetation slows overland flow and aids in infiltration	Compaction decreases soil porosity, water infiltration and percolation which can increase overland flow and runoff and change timing and energy of water and lessen groundwater recharge	Causes intermittent channels to form further upstream than normal; downcut streams receive less late season flows	Due to less infiltration, more overland flow, less ground water recharge into streams, also timing of recharge

*Clean Water Act Requirements
Notes: Information from Platts, 1991.

Channel Morphology - Impacts to the biological, physical, and chemical processes of the riparian and channel system from livestock grazing activities have been documented by numerous research efforts (Platts 1991, Chaney et. al. 1993). Livestock can directly affect streambank stability by shearing streambanks through hoof action and indirectly through the loss of bank protecting vegetation. Unstable streambanks are found in Swamp Creek, Davis Creek, Elk Creek, and Crow Creek, primarily in low gradient, easily accessible sections, where late summer grazing typically occurs. Streambank instability is also high in areas between riparian exclosures (water gaps) where livestock are concentrated into small areas for watering purposes. For example, Elk Creek and Peavine Creek have long sections of riparian exclosure fencing with very small openings in between. Because of this, livestock that would normally be distributed throughout the length of the stream tend to congregate in the small sections where water is accessible, concentrating effects to these areas. The Wallowa-Whitman interpretation of PacFish states that 95 percent streambank stability is needed to prevent grazing activities from retarding or preventing attainment of Riparian Management Objectives. When considered for entire stream lengths, this standard is being met, with the exception of Swamp Creek. The Meadow Segment of Swamp Creek influences the average so that 95 percent stability is not being met. However, future management would contribute to an improving trend on that segment. Small stream reaches on other drainages also would not meet the 95-percent standard (for example, unfenced segments of Elk Creek). However, streambanks in the fenced portions are unaffected by livestock grazing and would cause the average stability to be consistent with Wallowa-Whitman interpretations of PacFish.

Changes in the vegetation component and streambank stability in turn influence channel morphology, timing and magnitude of peak/base flows, and aquatic habitat. Increased width to depth ratios caused by erosion of streambanks decreases the ability of a channel to process sediment. In addition, higher width to depth ratios tend to result in higher stream temperatures, through increased exposure to sun and ambient air temperatures.

Intermittent and ephemeral channels are important for the routing of storm flows, sediment, and nutrients to perennial channels. These channels may or may not have associated riparian vegetation. Grazing affects these systems through grazing of riparian vegetation, trailing along and within the channel, and chiseling/trampling of the stream banks. These effects reduce the armoring of the stream so that when storm water fills the channel, accelerated erosion occurs. Surface erosion and mass wasting of stream banks is natural when it is done in equilibrium with bank rebuilding processes. Accelerated erosion can erode the channel bed or banks resulting in lowering of the water table or gully formation. Lowered water tables and gully formation reduce site productivity and vegetation growth, as well as altering on-site and downstream hydrologic processes and functions. Headwater and intermittent channels in poor condition occur in many of the allotments, especially lower gradient, easily accessible sections. Capability modeling for livestock grazing showed approximately 17,860 areas as capable lands. Capable lands are the lower gradient, less vegetated portions of the watershed that are within 1/2-mile of water. It could be assumed that these areas coincide with headwater and intermittent channel degradation, which is about 19 percent of the JCRAA.

Peak/Base Flows - Livestock grazing is disturbing the hydrologic functionality of the

subwatersheds in the analysis area, which includes perennial channels, tributaries, headwaters, and connected seeps and springs. Types of disturbance include streambank trampling and shearing, reduction of riparian and upland vegetation, and degradation of soil productivity. These disturbances can result in changes in channel morphology (relationship of channel to floodplain and water table), and reduced capture and storage of water in the uplands (infiltration). With this alternative there would be no change to the current flow regime. Watershed recovery would continue at the current rate. In the short term (0-20 years), area hydrology, snowfall and melt patterns, and runoff timing and quantity would not change from present conditions.

No grazing system has been developed for upland seeps and springs that adequately protects the sites from hoof action and adjacent herbivory. During the hotter summer months, these upland water sources are favored by livestock and wildlife for resting, watering, and foraging. In addition, these sites are often developed for livestock watering which allows for better cattle distribution on the pasture. If the spring/seep is developed and fenced, soil, water and biotic habitat functions are generally not altered. Development of a pond alters the spring/seep site into pond habitat, which changes soil and water productivity. Seeps and springs occur throughout each of the allotments, with a large portion of them developed. There is no current assessment of the conditions of these water developments. It is estimated that 60 percent of the approximately 270 water developments are not functioning properly or are located directly in channels (M. Lucas, zone hydrologist 2002). Because of the quantity and quality of water developments, flow regimes have been altered. There is more overland flow as opposed to subsurface storage. This also relates to warmer water temperatures and increased fine sediment entering fish bearing streams. To reduce effects of altered flow regime a primary objective is to capture and store water in the upland soils and allow for the safe release of ground water into properly functioning channels. Implementation of this Alternative would continue the poor maintenance of upland water developments.

Riparian Reserves - The greatest damage to riparian reserves occurs in the late summer. Livestock tend to concentrate in riparian areas later in the growing season when upland forage has been cured and is less palatable. Available drinking water is also more limited as ponds and springs supplying troughs dry, making perennial streams even more attractive. Late summer grazing is harder to mange in riparian areas, increasing the need for more intensive monitoring. The level of herbivory in some segments of Swamp Creek, Davis Creek, Elk Creek, and Crow Creek affects the vigor, health, composition, and diversity of the riparian plant community. Other segments of these streams are fenced and experience no livestock herbivory. Implementation of this alternative with strict adherence to the mitigation/protection measures and monitoring plan could reduce the intensity of browsing, although shrub utilization measurements do not have an established protocol and can vary among observers. The rate of recovery (20-30 years) would be slower than Alternative 1.

Subwatershed and Allotment Specific Conditions - This section looks at the existing condition of each subwatershed in the analysis area and explores which ones are at most risk to grazing related activities. Matrix indicator ratings for each subwatershed in the analysis area are shown in Table 20. Based on the number of "Functioning at Risk" indicators, each subwatershed was assigned a rating of low, moderate, or high for the potential risk of

grazing related effects to the subwatershed. In order to understand where these potential risks could occur, each allotment occurring within a particular subwatershed was given that subwatershed's risk rating. Based on the occurrence of low, moderate, and high ratings, allotments were given a low, moderate, moderate-high, or high concern score. As shown in Table 25, allotments of concern with respect to aquatic habitat are Swamp Creek, Davis Creek, Al-Cunningham, Table Mountain, and Cougar. These allotments should receive a higher level of monitoring and be targeted for restoration efforts.

Part of the risk to grazing related activities is based on natural channel conditions within the JCRAA. Major tributaries have a drainage pattern consisting of long parallel drainages. Minor tributaries are short in length and provide quick flow to mainstem systems (a mix of dendritic and parallel drainage patterns).

Plateau tops are a mixture of biscuit scablands, rolling grasslands, and managed timberlands interspersed with steep, forested drainages. This tableland is generally stable and well drained due to the fractured Columbia River Basalt however, pockets of Mt. Mazama ash and clay soils are found. The ash and clay often form soft spots in plateau top roads.

The plateau tops are cut by ephemeral draws and swales, Rosgen Valley type I and II. Historic impacts and current use of draws and swales as wildlife and livestock travel are prevalent throughout the analysis area. Alteration of the vegetation and compaction of valley fill has changed the hydrology of these areas resulting in the conversion of many swales and ephemeral draws into intermittent channels or gullies. If this conversion is associated with wet meadows, wetlands, seeps, or springs, the sites may be dewatered, further altering the local hydrology, sediment regimes, and wildlife habitat. Plateau top erosion concerns center around Rosgen channel type B with fine-grained bank and bed material. Examples of converted systems are found in the headwaters of Sumac Creek, Cougar Creek, Cottonwood Creek, Crow, Davis, and Swamp Creeks (National Forest System Lands).

The Joseph River Canyon is a V-shaped stream-cut canyon formed by the convergence of Chesnimnus Creek, Crow Creek, and Elk Creek (Upper Joseph Creek watershed). Joseph Creek is a Rosgen Channel Type B or C (depending on reach) with moderate gradient and narrow floodplains formed where the channel gradient lessens and the valley widens. There are numerous small tributaries, most of which are intermittent or ephemeral in nature, which flow directly into Joseph Creek from the plateau tops.

Davis Creek and Swamp Creek both flow within broad alluvial bottoms, Rosgen Valley types II and VIII. These channels have well-developed floodplains (although functioning at less than desired levels), originally built and maintained with the influence of beavers. The channels are classified as a Rosgen Channel Type B, C, or E depending on reach characteristics. The channels enter Joseph Creek at very low angles forming long parallel drainage basins. Small, short tributaries (Rosgen A channel type) feed Davis and Swamp Creek in a trellis pattern.

The smaller Joseph Creek tributaries (Sumac Creek, Cougar Creek, Peavine Creek (Joseph Trib.), and Tamarack Creek) are framed by Rosgen Valley type II. These channels are incised within narrow colluvial and alluvial floodplains, now converted to terraces. These

tributaries (Rosgen A and B channel type) have dendritic channel patterns.

In the Upper Joseph Creek watershed, Rosgen Valley types II and VIII frame Chesnimnus, Crow, and Elk Creeks. These channels are incised into alluvial floodplains, many which have been converted to terraces. Originally built and maintained by the influence of beaver, flood flows of greater than the 25-50 year event are now needed to access these relic floodplains. The channels are classified as modified Rosgen Channel Type B or C depending on reach characteristics. Upper Joseph Creek channels provide flashy runoff and sediment into the mainstem of Joseph Creek.

Today, short channel segments within Swamp, Davis, Crow, Elk, Sumac, Cougar, Chesnimnus, and Joseph Creeks and many channel reaches exhibit reduced sinuousity, downcutting through fine grained valley soils (old beaver ponds and wetland meadows), the creation of terraces 2-3 feet above the current water level, altered width and depth ratios, skeletal riparian areas with few fines, conversion of riparian vegetation from diverse shrub communities to grass/forb communities, and changes in soil and water processes.

Table 27 provides an analysis of a streams' sensitivity to disturbance by using Rosgen channel type. Land mangers can use this information to better determine areas that need protection and where to focus restoration efforts. High protection areas would include Broady Creek, Little Elk Creek, Brushy Creek, Tamarack Creek, Peavine Creek and Lupine Creek. Except for Little Elk Creek, these streams are mostly inaccessible to livestock because of topography and vegetation and would not need further protections added. Streams that have a high recovery potential should be main priorities for restoration efforts and include Peavine, Swamp, Davis, Cougar, Sumac, and Joseph Creeks.

Recent or ongoing improvement projects to protect steelhead habitat and to improve water quality have been implemented since 1983. Table 23 displays the number of projects completed from 1983-1999. Table 24 shows projects accomplished from 2000-2003.

Refer to the later section entitled Watershed Cumulative Effects for the cumulative effects analysis on aquatic habitat.

This alternative is consistent with the Wallowa-Whitman National Forest Standards and Guidelines for Watershed (page 4-22). The goal is to maintain or enhance the unique and valuable characteristics of riparian areas and to maintain or improve water quality, stream flows, wildlife habitat, and fish habitat. With the mitigation and monitoring attached to Alternatives 2 and with current and proposed restoration projects, watershed improvement will occur.

Clean Water Act – This alternative is consistent with the Clean Water Act because there would be no additional effect to the parameters for which certain streams in the JCRAA were placed on the ODEQ 303(d) list.

Table 23 - Improvement Projects 1983-1999

Allotment	# of Riparian Exclosures (miles*)	# of Spring Exclosures (acres)	# of Pond Exclosures (acres)	Hand Placement of Large Wood - miles of stream
Al-Cunningham	-	1 (0.5)	-	-
Cougar Creek	11 (3.3)	11 (15.5)	9 (10)	11
Davis Creek	7 (4.6)	1 (3)	-	-
Hunting Camp	-	7 (6.5)	1 (0.75)	-
Swamp Creek	11 (2)	7 (4.4)	8 (5)	12
Table Mountain	-	2 (2)	1 (0.6)	-

***** Miles of stream excluded with exclosure fences

Table 24 - Improvement Projects 2000-2003

Allotment	Riparian Fence Exclosure (miles)	Spring Fence Exclosure (miles)	Pond Fence Exclosure (miles)	Trough/ spring box Installations	LWM Place-ment (miles)	Riparian Planting (miles)
2000						
Swamp Creek	0.17 new 0.60 redo	0.25	-	5	0.5	-
Cougar	0.15 new 6.9 redo	0.5	-	4	4.5	-
Davis Creek	2.5	-	-	-	-	-
Crow Creek	1.25	-	-	-	-	-
2001						
Swamp Creek	1.5	-	-	-	-	-
Cougar	1.0 redo	0.7	0.4	5	-	-
Davis Creek	1.25	0.1	-	-	-	0.5
2002						
Swamp Creek	7.3 new 2.5 redo	-	-	-	-	5.0
Cougar	-	0.1 new 0.15 redo	-	3	3.5	-
Table Mountain	-	0.2 redo	-	2	-	-
2003						
Swamp Creek	2.0	-	-	-	-	3.0

Table 25 - Matrix Indicators for Grazing Sensitive Parameters

Subwatershed	USGS HUC 17060106	Temperature	Sediment	Bank Stability	Width/Depth Ratio	Peak/Base Flow	Riparian Reserves	Potential Risk of Grazing Effects to Subwatershed
Lower Crow Creek	26A	FAR	FA	FAR	FAR	FA	FAR	Moderate
Elk Creek	26B	FAR	FAR	FAR	FAR	FA	FAR	High
Middle Crow	26C	FAR	FA	FAR	FA	FAR	FAR	Moderate
Lower Chesnimnus	26E	FAUR	FA	FAR	FAR	FAR	FAR	High
Peavine Creek	26M	FAUR	FAR	FA	FA	FAR	FA	Moderate
Broady Creek	02D	FA	FA	FA	FA	FA	FA	Low
Joseph Creek – Mile 14	02H	FAR	FA	FA	FA	FAR	FA	Low
Peavine Creek	02I	FA	FA	FA	FA	FA	FA	Low
Joseph Creek – Mile 27	02J	FAR	FA	FA	FAR	FAR	FA	Moderate
Lower Swamp Creek	02K	FAR	FAR	FAR	FAR	FAR	FAR	High
Davis Creek	02L	FAUR	FAR	FAR	FAR	FA	FAR	High
Upper Swamp Creek	02M	FAR	FAR	FAR	FA	FA	FA	Moderate
Joseph Creek – Mile 34	02N	FAR	FA	FAR	FAR	FAR	FAR	High
Cougar Creek	02O	FA	FA	FA	FA	FA	FA	Low
Joseph Creek – Mile 41	02P	FAUR	FA	FAR	FAR	FAR	FAR	High

FA – Functioning Appropriately
FAR – Functioning at Risk
FAUR – Functioning at Unacceptable Risk

Risk of Increased Grazing Effects to Subwatershed
Low – two or less indicators FAR
Mod – three to four indicators FAR or FAUR
High – five to six indicators FAR or FAUR

Table 26- Joseph Creek Allotments/Subwatershed Concern Analysis

Subwatershed	Allotment										
	Table Mtn.	**Joseph Creek**	**Swamp Creek**	**Davis Creek**	**Elk Mtn.**	**Dobbins**	**Crow Creek**	**Al – Cunn.**	**Fine**	**Cougar**	**Hunting Camp**
Lower Crow Creek			Mod			Mod	Mod				
Elk Creek			High	High	*	*	*				
Middle Crow						*					
Lower Chesnimnus							*			*	
Peavine Creek									Mod	Mod	
Broady Creek										Low	Low
Joseph Creek – Mile 14	*										Low
Peavine Creek (Joseph Trib.)	Low										Low
Joseph Creek – Mile 27	Mod	Mod	Mod								
Lower Swamp Creek	*		High	High							
Davis Creek			High	High							
Upper Swamp Creek				*							
Joseph Creek – Mile 34	High		High								
Cougar Creek	Low									Low	*
Joseph Creek – Mile 41			High				*	High	*	High	
Overall Allotment Rating	Mod-High	Mod	High	High	Low	Mod	Mod	High	Mod	Mod-High	Low

See Table 25 for the potential risk of grazing affects for each subwatershed. The risk rating for a particular subwatershed was attached to every allotment within that subwatershed. Allotments were then rated based on the occurance of high, moderate, low ratings.
*If acres (FS and private) within allotment comprise of less than 5% of total subwatershed acres, than it was not considered a major contributing factor

Table 27 - Management Interpretations by Stream Type (Rosgen, 1996 Table 8-1)

Sub watershed	Allotment(s)	Stream	Rosgen Stream Type	Sensitivity to Disturbance[a]	Recovery Potential[b]	Sediment Supply[c]	Streambank Erosion Potential	Vegetation Controlling Influence[d]
02H, J, N, P	Table Mtn. Joseph Creek Swamp Creek Cougar Al-Cunning	Joseph Creek	B3 C3	Low Moderate	Excellent Good	Low Moderate	Low Moderate	Moderate Very High
02D	Hunting Camp	West Fork Broady	A3	Very High	Very Poor	Very High	Very High	Negligible
02H	Hunting Camp	Brushy Creek Tamarack Creek	A3/4	Very High	Very Poor	Very High	Very High	Negligible
02I	Table Mtn. Hunting Camp	Peavine Creek Lupine Creek	A3/4	Very High	Very Poor	Very High	Very High	Negligible
02M	Swamp Creek Davis Creek	Upper Swamp Creek	B4 C4, E5	Moderate Very High	Excellent Good	Moderate Moderate-High	Low High-Very High	Moderate Very High
02K	Swamp Creek	Lower Swamp	B3 C3	Low Moderate	Excellent Good	Low Moderate	Low Moderate	Moderate Very High
02L	Swamp Creek Davis Creek	Davis Creek	B3 C3	Low Moderate	Excellent Good	Low Moderate	Low Moderate	Moderate Very High
02O	Table Mtn. Cougar	Cougar Creek	B3/4	Low-Moderate	Excellent	Low-moderate	Low	Moderate
02P	Al-Cunningham Cougar	Sumac Creek	B3/4	Low-Moderate	Excellent	Low-moderate	Low	Moderate
26A, C	Crow Creek Swamp Creek Dobbins	Crow Creek	C3/4	Moderate-Very High	Good	Moderate-high	Moderate-Very High	Very High
26B	Swamp Creek Davis Creek Elk Mountain Crow Creek	Elk Creek	C3/4	Moderate-Very High	Good	Moderate-high	Moderate-Very High	Very High
26B	Swamp Creek	Little Elk Creek	A4	Extreme	Very Poor	Very High	Very High	Negligible
26M	Cougar	Peavine Creek	B4	Moderate	Excellent	Moderate	Low	Moderate

(a) includes increases in streamflow magnitude and timing and/or sediment increases;
(b) assumes natural recovery once cause of instability is corrected;
(c) includes suspended and bedload from channel derived sources and/or from stream adjacent slopes;
(d) vegetation that influences width/depth ratio stability

Alternative 3 – Aquatic Habitat

In the short term (0-10 years), implementation of Alternative 3 would produce the same overall effects as Alternative 2. In the long term (10-20 years) this Alternative *could* improve watershed and aquatic conditions at a faster rate than Alternative 2 due to the opportunities for managing range condition through more adaptive grazing systems. The greatest difference in Alternative 3 is that it incorporates adaptive techniques for changes that may occur in resource conditions, issues, and agency direction throughout time. Potential changes that could occur include wildfire, drought, downward trends in forage conditions and Federal listing of additional species.

Alternative 3 also allows for the assertion of tribal treaty rights to graze livestock, if requested. Instead of cattle, horses may be pastured in one or more allotments, depending on the tribal need. Capacity conversions would allow one horse for every two cows. The impacts of horse grazing on aquatics are assumed to be similar to livestock since horses have the same capability for destabilizing streambanks through hoof action and consuming riparian vegetation. However, horses would be held to the same standards and guidelines as cattle, and the effects on aquatic resources is anticipated to be the same as previously described for cattle.

Objectives of the Swamp Creek Restoration Project would have a greater chance of being met because a monitoring protocol would be adopted. By developing a monitoring process for shrub utilization and relating that to streambank stability, restoration progress would be more effectively measured. Adjustments in grazing would be made if monitoring results indicated a decline in the restoration rate.

Table 28 - Effects to Sensitive Indicators by Alternative

	Alternative 1 **No Grazing**	**Alternative 2** **Current Grazing System**	**Alternative 3** **Adaptive Grazing System**
Water Quality -Temperature -Sediment/Substrate	+ on FS lands = or – private lands	=	= or + (depending on level or rate of change) + Swamp Creek Allotment
Channel Morphology -Width/Depth Ratio -Streambank Condition	+ on FS lands = or – private lands	=	= or + (depending on level or rate of change) + Swamp Creek Allotment
Peak/Base Flows	+	=	= or + (depending on level or rate of change) + Swamp Creek Allotment
Riparian Reserves	+ on FS lands = or – private lands	=	= or + (depending on level or rate of change) + Swamp Creek Allotment

Issue 1 – Joseph Creek

Key Issue - Authorizing livestock grazing within the Joseph Creek Wild and Scenic River may degrade water quality to the point that the Outstandingly Remarkable Values of 'Fish and Water Quality' and 'Wildlife' are neither protected nor enhanced.

Table 29 - Comparison of Issue 1 Indicators by Alternative

Indicator	Alternative 1	Alternative 2	Alternative 3
Percent streambank stability	95	95	95
Increase in maximum summer water temperature in 10 years	0	0	0
Increase in percent cobble embeddedness in 10 years	0	0	0
Decrease in percent stream shade in 10 yearsr	0	0	0
Allowable shrub utilization in WSR	Wildlife only	30	20
Allowable forage utilization in WSR	Wildlife only	55	50

All alternatives display a similar response to the indicators for Issue 1. Whether the Wild and Scenic corridor has livestock grazing or not, the current conditions would be maintained. Alternative 3 prepares for an adaptive management grazing system by specifying that no more than 20 percent shrub utilization and 50 percent forage utilization would be allowed. Alternative 2 provides for the current condition by specifying discreet grazing timing and stocking for the pastures that contain the Wild and Scenic River.

Issue 2 – Swamp Creek

Key Issue - Authorizing livestock grazing along Swamp Creek may degrade water quality before it reaches the Wild and Scenic River so that the Outstandingly Remarkable Value of 'Fish and Water Quality' is neither protected nor enhanced.

Table 30 - Comparison of Issue 2 Indicators by Alternative

Indicator	Alternative 1	Alternative 2	Alternative 3
Number of years before shrub density is doubled in the Meadow Segment of Swamp Creek			
Bennett Pasture	5	20+	10-15
Upper Swamp Pasture	5	20+	10-15
Number of years before shrub species diversity is doubled in the Meadow Segment of Swamp Creek			
Bennett Pasture	5	5	5
Upper Swamp Pasture	5	5	5
Anticipated streambank stability along the meadow section of Swamp Creek in 5 to 10 years.	95	75 to 85	85 to 95

Alternative 1 has the greatest rate of recovery for the Meadow Segment of Swamp Creek. Alternative 2 has the slowest rate because livestock use would be determined by Forest Plan guidelines for unsatisfactory range condition. This guideline is measured by greenline stubble height, which may not be the best indicator for determining when livestock use might be limiting riparian shrub recovery and streambank stabilization. Alternative 3 incorporates a monitoring protocol to ensure that grazing systems are not reducing the rate of recovery for riparian shrubs and streambank stability.

Alternative 1 – Watershed Cumulative Effects

The analysis area has a 'moderate' to 'high' risk of existing cumulative watershed effects based on past and ongoing activities. Implementation of Alternative 1 could reduce, in the long term (10-20 years), the risk of adverse cumulative watershed effects even when integrated with other ongoing activities.

Road maintenance, vegetation management and fuels reduction projects, recreation activities (including OHV use on open and closed roads), and restoration projects are ongoing activities that would still occur within the analysis area. The cumulative effect of historic landscape changes and ongoing activities is evident in the uplands, headwaters and main channel riparian zones within the analysis area:

- Changes in soil and water processes from past and current activities
- Downcutting through fine-grained valley soils from channel modifications and peak flows
- Altered channel bankfull width/depth ratios from past riparian harvest and ongoing grazing
- Altered streambank function from the loss of vegetation and direct livestock impacts
- Detrimental soil conditions (less than 15%) are found throughout the analysis area (*Lower Joseph Watershed Assessment, Lone Dog Vegetation Management Project Environmental Assessment, Wapiti Vegetation Management Project Environmental Assessment, Fire Ridge Fuels Reduction Decision Memo, Draft Baldwin Vegetation Management Project Environmental Assessment*).

Elimination of livestock grazing would initiate faster recovery of vegetation (1 to 10 years) and channel morphology (5-20 years) for sections of streams in poor condition. In the short term though, cumulative watershed effects would still be rated moderate to high.

Alternatives 2 and 3 – Watershed Cumulative Effects

The analysis area has a 'moderate to high' risk of existing cumulative watershed effects based on past and ongoing activities. Implementation of Alternative 2, the continuation of the current grazing program and Alternative 3, a more adaptive approach, would not noticeably increase the risk of adverse cumulative watershed effects when integrated with other ongoing activities. See Table 31 for the potential increased risk that livestock grazing would have to the existing cumulative condition. Livestock grazing, lack of adequate

maintenance of stock watering facilities, road maintenance, vegetation management and fuels reduction projects, recreation activities (including OHV use on open and closed roads), and restoration projects are activities that would continue to occur within the analysis area.

Continuation of livestock grazing would maintain the current recovery rate of vegetation (10-20 years) and channel morphology (10-30 years) in sections of degraded stream systems. In the short term and foreseeable long term, cumulative watershed effects would be rated moderate to high.

Acquisition of private land within the Al-Cunningham Allotment through the Blue Mountain Land Exchange would allow for restoration opportunities on a segment of Joseph Creek that has been cultivated in the past. Although, this land exchange proposal has not developed into a final decision.

Table 31 - Cumulative Effect Analysis for Alternatives 2 and 3

Subwatershed	USGS HUC 17060106	Cumulative Watershed Effects Existing Condition (1)	% Allotment Acres in subwatershed (FS only)	% Allotment Acres in subwatershed (FS & private)	Stream Lengths within Allotments (miles) (2)	Potential Risk of Grazing Effects to Subwatershed (See Table 25)	Potential Increased Risk to Cumulative Watershed Effects Alt. 2 & 3
Lower Crow Creek	26A	Moderate	41	66	5.78	Moderate	Moderate
Elk Creek	26B	Moderate	58	71	15.94	High	High
Middle Crow	26C	N/A	0	2	0.96	Moderate	Low-Mod
Lower Chesnimnus	26E	Low	6	6	0.08	High	Low-Mod
Peavine Creek	26M	Low	52	52	6.68	Moderate	Moderate
Broady Creek	02D	Moderate	35	35	5.18	Low	Low
Joseph Creek – Mile 14	02H	Moderate	28	28	7.43	Low	Low
Peavine Creek	02I	Low	95	95	9.98	Low	Low-Mod
Joseph Creek – Mile 27	02J	Moderate	53	62	4.94	Moderate	Moderate
Lower Swamp Creek	02K	Moderate	88	99	19.44	High	High
Davis Creek	02L	High	72	82	12.11	High	High
Upper Swamp Creek	02M	Mod-High	0	4	0.03	Moderate	Low-Mod
Joseph Creek – Mile 34	02N	Moderate	96	100	6.29	High	High
Cougar Creek	02O	High	98	100	8.73	Low	Low-Mod
Joseph Creek – Mile 41	02P	High	87	93	8.78	High	High

(1) Cumulative Watershed Effects Existing Condition incorporates Equivalent Clearcut Acres (ECA) calculations, risk from past harvest and fire, risk from roads, and other ongoing subwatershed activities into a single risk assessment. Primary effects from increased cumulative watershed effects are altered peak/base flows and increased sediment (*Lower Joseph Watershed Assessment, Lone Dog Vegetation Management EA*).
(2) Miles of perennial and intermittent streams within allotments

Scale	% allotment acres	Miles of stream	Potential Risk
Low	< 40	< 10	Low
Moderate	40 – 70	< 10	Mod
High	>70	> 10	High

Overall Increased Risk Rating	Composite Risk Ratings
Low	all low
Low-Mod	2 lows, 1 mod or high
Moderate	all moderate or 2 mod and 1 low
Mod-High	2 mod or low, 1 high
High	all high or 2 high and 1 mod or low

Wildlife Resources

Existing Conditions – Big Game

Rocky Mountain elk is a Forest Plan Management Indicator Species for quality of general forest habitat diversity, the interspersion of cover and forage areas, and the security of cover. Elk are present throughout the analysis area in the spring, summer, and fall and in some areas throughout the winter. Mule deer and white-tailed deer also occur throughout the analysis area. As a management indicator species, elk will be used in this analysis as an indicator for deer as well, unless otherwise noted.

Populations - Big game management on the Wallowa-Whitman NF is a cooperative effort between the Forest Service and the Oregon Department of Fish and Wildlife (ODFW) where the Forest Service manages habitat while ODFW manages populations. The agencies cooperate by managing big game according to pre-established Management Objectives for each big game management unit. The JCRAA includes portions of the Chesnimnus and Sled Springs Big Game Management Units. Table 32 displays actual counts versus management objectives for bull to cow ratios and calf to cow ratios.

Table 32 – Elk populations estimates and Management Objectives

Year	Elk Observed	Population	Bulls per 100 cows	Calves per 100 cows
Chesnimnus Unit				
Management Objective		**3500**	**10**	**45**
2003	2,324	2,900	8	28
2002	2,733	2,900	6	29
2001	2,123	2,400	7	21
2000	1,973	2,450	8	18
1999	2,084	2,600	7	25
1998	2,214	2,750	7	23
Sled Springs Unit				
Management Objective		**2,750**	**10**	**45**
2003	1,730	2,150	8	25
2002	1,686	2,100	8	28
2001	1,392	2,000	9	21
2000	1,469	2,100	10	21
1999	1,802	2,250	10	27
1998	1,661	2,100	6	23

Not only are bull to cow ratios below the Management Objectives, the presence of mature bulls is low. Less than 5 percent of the bulls in the Chesnimnus unit and 9 percent of the bulls in the Sled Springs unit are over 3 years old. This low rate of mature bulls, particularly in the past, is attributed to numbers of hunters, length of hunting seasons, including the rutting period in the hunting season, lack of restrictions of antler class in harvest, lack of hiding cover, and high open road densities in some areas (Wisdom and Thomas 1996, Irwin et al 1994, Schommer and Johnson 2003).

Calf to cow ratios are also below Management Objectives. Several ODFW biologists feel

predation by bears, cougars, and coyotes are the main reasons for poor calf survival. Another factor affecting the low calf survival is lack of hiding cover especially in riparian areas which contributes to increased predation. An ongoing three-year study by ODFW is investigating the potential causes of calf mortality in the Sled Springs and Wenaha Big Game Units.

Forage – Forage and grassland habitat comprises approximately 45% of the analysis area. For purposes of this analysis, forage areas include areas ranging from grasslands to forested stands with less than 40 percent canopy cover. Forage also generally applies to upland and riparian shrubs, particularly with respect to wintering deer. Shrubs such as ninebark, snowberry, seviceberry, elderberry and scouller's willow occur in the uplands. Refer to the Aquatics section of the chapter for information on riparian shrubs.

According to the Forest Plan, areas designated as Management Area 3 are to be managed to resolve conflicts between livestock and elk in favor of elk, within population levels established by Management Objectives (Page 4-62). Areas designated as Management Area 1W (Timber Emphasis within big-game winter range) are to be managed similar to Management Area 1 for commercial livestock forage production, but open road densities are to be managed at a lower density (Forest Plan Record of Decision, Page 12).

Recent livestock grazing systems have not created conflicts with elk. However, aerial surveys completed by ODFW have identified areas within the JCRAA that are heavily used by elk during the winter. If adequate forage within these areas is not maintained, conflicts could develop. Five separate elk winter concentration areas were identified for a total of approximately 21,300 acres within the JCRAA. Refer to Table 34 for a list of where these elk winter concentration areas occur by pasture. Many of the winter concentration areas overlay areas allocated as Management Area 3 or 1W. Table 33 displays by pasture the amount of area allocated to big-game winter range and the distribution of forage and forested area. Pastures that contain a good mix of forage and forested area and a high proportion of allocated winter range are particularly important for elk.

Table 33 – Area allocated to Management Areas 1W and 3 and Acres of Forage and Forestland by Pasture on Forest Service Lands

Allotment	Pasture	Pasture Area (acres)	MA 3 / 1W (acres)	% in MA-3 / 1W	Forage Area (acres)	Forested Area (acres)
Al-Cunningham	South Alford	601	275	46	285	316
	Sumac	239	226	95	215	24
	North Alford	392	367	94	187	205
	Shoot Canyon	547	508	93	395	152
Cougar	Trap Canyon	724	653	90	452	272
	Breeding Pasture	693	625	90	487	206
	Sumac	1273	858	67	608	665
	Hinton Corner/Boner	383	0	0	116	267
	Cougar	5045	2754	55	1972	3073
	Peavine	4602	0	0	1371	3231
	Baldwin	2700	81	3	601	2099
	Muddy	2162	209		1020	1142

Allotment	Pasture	Pasture Area (acres)	MA 3 / 1W (acres)	% in MA-3 / 1W	Forage Area (acres)	Forested Area (acres)
Crow Creek	North Crow Ck	386	386 [1W]	100	0	386
	South Crow Ck	99	91	92	6	93
	Crow Ck	62	62 [1W]	100	1	61
	Special Use	536	53 130 [1W]	34	304	231
	South Crow	99	99 [1W]	100	6	93
	Doe Gulch	188	139 [1W]	74	90	98
	Road Pasture	83	73 [1W]	88	14	69
Davis Creek	Hillside	393	0	0	133	260
	Elk Ck	823	0	0	330	493
	Starvation Springs	625	0	0	201	424
	Davis Creek	3468	5	0.2	1479	1989
	Davis Creek-Sheep	113	0	0	52	61
	West/Swamp Creek	36	36	100	18	18
	Bennett	516	0	0	253	262
Dobbins	Dobbins	345	154 [1W]	45	144	201
Elk Mountain	Homestead	0	0	0		
Fine	West	279	135	48	149	130
	Home Place	207	207	100	178	29
	Peavine #1	158	0	0	48	110
	Peavine #4	761	0	0	306	455
	Peavine #5	110	0	0	4	106
Hunting Camp / Table Mountain	Tamarack	3330	2477	74	2215	1115
	Kirkland	6515	1517	23	1800	4715
	Holding Pasture	384	337	88	200	184
	Vawter/Wilder	1680	514	31	1312	368
	Joseph Breaks	4319	2914	67	3293	1023
	Horse Pasture	361	264	73	76	285
	Thorn Hollow	1542	1297	84	1212	330
	Horse Pasture Ridge	1443	1109	77	1367	77
	Corral Springs	2628	702	27	922	1706
	Table Mountain	2763	1116	40	1337	1426
	Dog Fight	334	8	2	110	224
Joseph Creek	Joseph Creek	1342	453	34	974	368
Swamp Creek	Lower Swamp	1327	1243	94	1102	225
	Baker Gulch	1199	1138	95	887	312
	Barney Flat	1475	1151	78	1048	427
	Red Fir	586	548	94	368	218
	Lower Davis	2836	2473	87	2133	703
	Miller Spring	2023	609	30	848	1175
	Beef Pasture	2161	1977	91	1540	621
	Swamp Creek	183	178	97	46	137
	Upper Davis	2733	2263	83	1424	1309
	Little Elk Ck	8734	476 356 [1W]	10	3090	5644
	Elk Ck	3452	227 [1W]	7	930	2522
	Dorrance	1672	492 [1W]	29	601	1071
	Holding Pasture	35	23 [1W]	66	10	26
	Horse Pasture	15	15	100	4	11
	Upper Swamp	1344	584	43	560	784
	Snake Canyon	1130	1130	100	931	199
	Bennett	1210	14	1	517	693
	Buck	2076	1513	73	1534	542

Table 34 – Elk Winter Concentration Areas by Pasture

Allotment	Pasture	Current Season of Use	Acres Within Elk Winter Concentration Areas
Miller Ridge Area			
Swamp Creek	Lower Swamp	April-May	460
Swamp Creek	Baker Gulch	April-May	600
Swamp Creek	Barney Flat	April-May	295
Swamp Creek	Snake Canyon	April-May	620
Swamp Creek	Beef Pasture	April-May, June-August, or September-October	432
Swamp Creek	Miller Spring	June-August or September-October	200
Swamp Creek	Little Elk	June-October	520
Starvation Ridge Area			
Swamp Creek	Lower Davis	April-May	990
Swamp Creek	Upper Davis	June-August	820
Swamp Creek	Upper Swamp	June-August or September-October	400
Davis Creek	Davis Ck. East	April-May, June-August, or September-October	735
Table Mountain-Joseph Breaks Area			
Table Mountain	Joseph Breaks	April-May and September-December	3240
Table Mountain	Wilder	April-May and September-December	1175
Table Mountain	Thorn Hollow	April-May or June-August	1520
Table Mountain	Horse Pasture Ridge	June-August	1010
Hunting Camp Ridge Area			
Hunting Camp	Holding	June-August	384
Hunting Camp	Tamarack	June-August	1160
Hunting Camp	Kirkland	June-August	2280
Two Bit and Sumac Area			
Cougar	Cougar	July-August or September-October	3025
Cougar	Trap Canyon	April-May	507
Cougar	Sumac	April-May or June-August	700
Al-Cunningham.	Shoot Canyon	April-May or September-October	250

Habitat and Security - Indicators for the quality of elk habitat include amount of hiding cover, cover to forage ratio, number of security areas, and habitat effectiveness index. Hiding cover is defined as vegetation capable of hiding 90 percent of a standing elk from the view of a human at a distance of 200 feet or less. Hiding cover in the JCRAA is limited, primarily due to the ponderosa pine vegetation with limited undergrowth found throughout much of the area. Optimal forage to cover ratio is considered to be 60/40. The current forage to cover ratio is 46 percent forage, 47 percent cover, and 7 percent private land where information on conifer stands is limited. Assuming the private land mimics the mix of forage and cover on public land, the forage to cover ratio is approximately 50/50.

Security areas are defined as those blocks of cover that are at least 0.5 miles from an open road and are at least 250 acres in size (Hillis et al. 1991). The prevalence of security areas varies throughout the JCRAA. More open roads occur in gentle terrain; therefore, fewer security areas occur where the terrain is gentle. Habitat Effectiveness Index (HEI) for elk

is a measure of the interspersion and juxtaposition of habitat attributes including forage, cover, open road density, and disturbance factors (Thomas et al 1988). Values range from 0 to 100, with higher values being more beneficial to elk. Forest Plan direction is to maintain an HEI of at least 50 as a goal for those lands managed by the Forest Service. A HEI score of 57 was calculated for the JCRAA.

Open road densities and the corresponding human disturbance play a key role in determining whether elk will remain in an area (Leptich and Zager 1991). The Forest Plan states that open road densities will generally not exceed 2.5 miles of road per square mile in MA-1 and 1.5 miles per square in MA-3 and MA-1W. Approximately 49 percent of the analysis area is in Management Area 1, which has an existing open road density of 3.6 miles per square mile. Another 39 percent of the analysis area is Management Area 3 which has open road density of 0.7 miles per square mile. Management Area 1W has an open road density of 2.9 miles per square mile. Including all Management Areas, the open road density in the JCRAA is 2.2 miles per square mile.

Alternative 1 – Big Game

Forage - This alternative would increase forage plants within the analysis area without livestock grazing. Elk and cattle have a high overlap of preference for the same forage, without cattle there would be more available forage for elk, deer, and other wildlife species. Previous livestock grazing and fire suppression have both been important factors for increased canopy closure in parts of this analysis area and has likely reduced the quantity and quality of available forage within these habitats. A large portion of this analysis area is in Management Area 3 which is winter range for elk. Removing livestock would increase the amount of available forage within these areas. This could increase populations of wild ungulates, although there are other factors such as hunting, open road densities, hiding cover, and predation that would factor into survival.

Studies have confirmed that grazing by domestic livestock can provide a positive contribution to range management for elk if properly planned (Lyon and Christensen 2002, Anderson and Scherzinger 1974). Even though forage would increase in the short term (approximately 5 years) without livestock grazing, it may lose palatability and eventually quality.

This alternative would increase fine fuels from grasses and forbs. With the increase of fine fuels, wildfires and prescribed burns would carry through more of the area affected. Fire can improve forage quality although the effects last only 1 to 3 years. Forage conditions should remain relatively unchanged in the short to mid-term period (5-10years). Grazing by native ungulates, wildfire events, and the weather will have the greatest potential to affect forage values.

No grazing of livestock would reduce one of the vectors for introducing and spreading noxious weeds and other exotic invasive species.

Habitat and Security – Under this alternative, no livestock management activities would occur. Available hiding cover, especially in riparian areas, will not be reduced by livestock

activities. Over the next 5 to 20 years, some stands that are currently providing marginal cover will grow into hiding cover conditions, especially in the shrub layer in forested and riparian areas which is important for elk calves as well as for fawns.

Without livestock grazing, activities such as salting, moving livestock between pastures, and moving livestock off forest would not occur. This could reduce road travel and reduce human harassment to elk. This alternative will not change the HEI value or forage to cover ratios as they currently exist.

Refer to the Wildlife Specialist Report for information on effects to other species that use forage habitats.

Alternative 2 – Big Game

Forage – Livestock grazing can have both negative and positive effects on forage for elk depending upon season, duration, and intensity of use (Thomas et al 1988, Toweill and Thomas 2002). Elk and cattle often distribute themselves spatially in a manner that minimizes competition and may or may not restrict their grazing choices (Wisdom and Thomas 1996). Elk may respond to cattle grazing by moving into areas that cattle have not entered (Leege 1984, Wisdom and Thomas 1996). Based on undocumented field observations, elk will often move into a pasture shortly after the livestock leave, in order to take advantage of the succulent regrowth of vegetation, depending on the time of year (Krausman 1996, Toweill and Thomas 2002). Potential for competition is highest on winter and spring-fall ranges where either forage quantity or quality is limited and both ungulates share compressed habitats at low elevations. Potential for competition increases during late summer and fall on high-elevation summer ranges, especially in drought years (Wisdom and Thomas 1996). Competition can be high at a given time and place during one year and low or nonexistent in the place and time in subsequent years (Wisdom and Thomas 1996).

Elk and cattle often make similar dietary choices, as a result of this there is high dietary overlap (Wisdom and Thomas 1996). In the JCRAA, this overlap is discussed in the following paragraphs with respect to winter range and riparian vegetation.

Clark (1984) found there is potential for dietary competition when cattle graze cured bunchgrass on elk winter range areas during the summer and fall before the fall elk migration. Idaho fescue and bluebunch wheatgrass are two of the grass species preferred by elk in winter ranges (Thomas et al 1988) and comprise much of the winter range areas in the JCRAA.

Forage availability on winter ranges is best evaluated around October 1 for the key forage species. To allow ample forage for elk through the winter, approximately 50 to 60 percent of the plant material of key species in elk winter range should be available on October 1 (Schommer 2003, Wisdom 2003, Thomas et al 1988, Henjum 2003). If livestock grazing lowers forage availability below this, winter forage resources could be degraded, elk could move to other areas including private lands, or in extreme cases die-off could occur. South exposures and windswept ridges provide a major portion of winter forage consumed by elk

and deer. Forage inside forested stands is also important to elk where deep snow covers many of the open areas (Thomas et al 1988).

As shown in Table 10 in the Range section, utilization standards for allotments within the JCRAA are normally met. Current utilization standards for elk winter range are the upland utilization standards prescribed by the Forest Plan, which require retention of at least 45 percent of the residual plant material. Forest Plan designated winter range (Management Area 3 and 1W) tends to be located on steep canyon slopes which are more difficult for livestock access and don't normally experience the full extent of allowable livestock utilization, so current grazing systems likely retain higher than 45 percent of the plant material. The assumption is corroborated by ODFW biologist assumptions that the current grazing system is not limiting the availability of forage for over-wintering big game in the JCRAA.

Continuation of the current grazing system in the JCRAA would maintain the current balance between livestock and elk use. As described in the previous section on range condition, if elk and deer populations were to reach Management Objectives, livestock use would be adjusted to ensure that conflicts with big game did not arise in designated Big Game Winter Range (Management Area 3). Table 35 displays pastures within the Elk Winter Concentration Areas where livestock grazing would be authorized in the fall. These pastures would be the first location where a problem with range condition could arise if deer and elk populations increased to Management Objectives.

Table 35 – Fall Livestock Use of Pastures Within Elk Winter Concentration Areas

Allotment	Pasture	Season of use	Maximum Stocking (head-months)
Miller Ridge Area			
Swamp Creek	Little Elk	June-October	2500
Starvation Ridge Area			
Davis Creek	Davis Ck. East	April-May, June-August, or September-October	200
Davis Creek	Davis Ck West	April-May, June-August, or September-October	325
Table Mountain-Joseph Breaks Area			
Table Mountain	Joseph Breaks	April-May and September-December	300 spring 375 fall
Table Mountain	Wilder	April-May and September-December	300 spring 375 fall
Hunting Camp Ridge Area			
Hunting Camp	Kirkland	June-August	550
Two Bit and Sumac Area			
Cougar	Cougar	July-August or September-October	785
Al-Cunningham.	Shoot Canyon	April-May or September-October	100

Early summer grazing by livestock could improve elk forage over the winter period by removing decadent growth and allowing succulent new growth to occur. Numerous studies have demonstrated that using livestock grazing to remove dead herbate to prevent formation of wolf plants will improve the quality of forage regrowth (Thomas et al 1988). These benefits are noted, provided livestock grazing is not repeated at the same time every

year to the point that range condition is compromised (Anderson et al 1990, Krausman 1996, Cook 2002).

Competition between elk and cattle for forage resources also has potential to occur in riparian areas. Cattle have grass-dominated diets but will consume forbs and shrubs if green grass is unavailable or has cured and thus provides less available protein. Research indicates that cattle preference for forage will shift as stubble heights drop below 3 inches. When stubble height reaches 3 inches, it is too short to be pulled in by the tongue of cattle. At this time cattle will shift to more quickly eaten and less palatable forage. The forage preference will also change as vegetation dries. Even if stubble height is greater than 3 inches, their preference may shift to shrubs (Halls and Bryant 1995) if grasses are drying and loosing protein value. When other factors do not limit grazing distribution, distance from drinking water ultimately controls the limit of vegetation utilization. Cattle often heavily graze forage plants near water rather than traveling moderate to long distances to better forage. This pattern results in deterioration of forage resources near the water supply and under-utilization of forage at long distances from water. Elk use of riparian vegetation also increases in the late summer due to palatability and quality of forage available at this time (Coe et al 2001). Elk and cattle both select some of the same resources during that period (Coe et al 2001, Krausman 1996, Leege 1984, Toweill and Thomas 2002). At stubble heights below 3 inches and particularly at ¾ inch, livestock and elk together can quickly cause damage to the riparian ecosystem, often within a few days (Hall and Bryant 1995).

In some areas, palatable shrubs used by overwintering deer have been impacted from livestock grazing to the point that there is an evident browse line with regrowth and regeneration being inhibited. This competition would continue to occur in some locations with extension of the current grazing system. Historic livestock grazing is a contributing factor in the number of shrubs today. Because of past grazing, shrubs in some areas have been reduced by livestock and wild ungulates. The current situation allows for limited recovery of shrubs in some areas because the seed source is unavailable. Exclosure fencing and riparian pasture fencing along streams such as Davis Creek, Swamp Creek, Elk Creek, and Peavine Creek has reduced grazing pressure, and these areas are recovering. Utilization of riparian shrubs is limited to 30 percent. Shrubs in accessible stream reaches would continue to be grazed according to this standard.

Habitat and Security – Continuation of the current grazing system would continue to suppress the presence of understory shrub hiding cover, particularly in riparian areas. Reduction of hiding cover can affect the survival rate of elk calves and fawns from predators. Hiding cover is also a factor in hunting success because good hiding cover allows more avenues for escapement. Livestock have minimal effects on forested canopy closure, as this is not preferred or available browse.

Cumulative Effects – In addition to effects from livestock, effects on forage are also caused by wildfires, prescribed burning, the weather, and other species such as bighorn sheep. Since bighorn sheep occupy more rugged terrain than deer and elk or livestock, there is very little competition between the species and therefore no cumulative effect from livestock and deer and elk grazing. Wildfire and prescribed burning; however, can change the forage condition. Fire suppression has allowed for advanced succession of herbaceous plants,

shrubs and trees. This advanced succession has reduced the carrying capacity for elk, although livestock grazing has reduced some of this succession (Thomas et al 1988).

Changes in the historic fire regime have reduced forage values over much of the landscape by increasing forested areas. When wildfires occur, the fire intensity and extent are evaluated to determine if livestock grazing should be deferred because burned bunchgrasses need recovery time to maintain plant growth. This measure protects the forage resource from the increased utilization that follows post-fire green-up of grasses.

Prescribed burning has occurred and would occur in the future associated with the Hungry Bob, Wapiti, Bugcheck, and Lone Dog Vegetation Management Projects and the Fire Ridge Fuels Reduction Project. These projects are reducing the potential for, the extent, and intensity of wildfires. While these projects are focused on timber stands, they do burn intervening grasslands. Prescribed burning for enhancing grassland conditions often improves forage and dietary quality, although these effects typically are short-lived (Cook 2002, Leege 1968, Leege and Hickey 1971). Other studies have shown no increase in forage use, and fire may damage Idaho fescue if too hot, one of the species preferred by elk (Skovlin et al 1983). Other studies have results where burning does increase the protein content of grasses. The duration of forage enhancements is a function of the time required for the succession of plant growth to pre-fire conditions (Riggs et al 1996). In forested areas this can take decades, whereas in grassland it may be a year or less. The difficulty with prescribed fires that are conducted at such small scales is that benefits to elk tend to be spatially and temporally limited. The areas burned to produce or sustain population effects increases with the size of the herbivore population and density of the herd (Cook 2002).

Large-scale wildfires have the potential to alter cover patches so they no longer provide security for elk seeking to avoid humans or predators. The precise effects of such a fire would depend upon the magnitude, duration, and intensity of the wildfire. Within the Joseph Creek Allotment Analysis area forested and nonforested areas are interspersed throughout. Wildfires may encourage better quality forage for herbivores, but may reduce hiding cover.

Open road density is another major factor in elk remaining or leaving an area. Roads affect elk by removing plant production and by introducing a disturbance factor (vehicles), which reduces elk use adjacent to these roads (Thomas et al 1988, Toweill and Thomas 2001). Road closures have been the technique most frequently used to increase security for hunted elk populations. Reducing road density in most situations has improved the habitat effectiveness for elk during summer and may increase elk survival during hunting seasons (Leptich and Zager, 1991). Several vegetation projects have closed roads throughout this analysis area, which has reduced vehicular traffic in these areas. Currently the Forest Plan allows for nonselective outdoor activities to travel on these closed roads which reduces or negates the road closure values for wildlife.

One of the most significant trends in recent years is the growth of nonselective outdoor activities. These include hiking, cross country skiing and mountain biking, as well as activities that involve a variety of motorized off-highway vehicles (Bunnell et al 2002). OHV users are increasingly attracted to parcels of public lands where access is readily available, this in turn concentrates the use of OHV and the potential damage associated with that use (Toweill & Thomas 2002). Managing human activities to prevent elk

harassment on or displacement from crucial summer and winter ranges is a concern (Bunnell etal 2002), which is being addressed through a draft National OHV policy. It has been shown that these disturbances increased home range size, altered feeding patterns and affected reproductive performance (Bunnell etal 2002).

Long hunting seasons combined with high numbers and densities of hunters contribute to cumulative effects by harassing elk and reducing the number of mature bulls, which are important to the health of elk herds. Hunting tags have been reduced in the Chesnimnus and Sled Springs Big Game Management Units which reduces this pressure High predator numbers may have an additive effect, reducing calve and recruitment locally. Off-Highway Vehicle use can cause vulnerability of elk and deer during the archery hunting season and during deer hunting season by allowing hunters to transport their equipment far from standard roads and transport the dead prey relatively easily from areas and distances that would present barriers to those hunting on foot (Toweill & Thomas 2002). Winter activities such as snowmobiles, skiers or hikers will also impact elk on winter range by causing them to flee from human activities. This additional drain of energy may impact survival of elk (Thomas et al 1988).

One of the historic impacts from grazing is the perpetuation of noxious weeds and other exotic invasive species. Livestock grazing increases opportunities for the establishment and spread of exotic species through moving, feeding, and trailing. Where trampling of the soil crust churns the soil, weed seeds are better able to establish (Irwin et al 1994, Belsky and Blumenthal 1997, Sallabanks 2001, Vander Haegen 2001). Refer to the noxious weed section of the analysis for further discussion of the effects of livestock grazing on weed spread. Prevention strategies would be used to limit the invasion and spread of noxious weeds, and within the JCRAA, noxious weed presence consists of isolated populations that are under a treatment strategy. These populations are not limiting the availability of big-game forage.

Alternative 2 is consistent with the Forest Plan Standards and Guidelines related to big-game for all of the Management Areas in the JCRAA. The alternative avoids introducing conflicts with elk in big-game winter range.

Refer to the Wildlife Specialist Report for further information on effects to other species that use forage habitats.

Alternative 3 – Big Game

Alternative 3 allows for a broader grazing season within pastures while authorizing the same level of stocking for each pasture. The exception is the Swamp Creek Allotment where stocking would be decreased by 346 head for the entire allotment. Because of the increased grazing season for pastures, Alternative 3 adopts a specific mitigation for ensuring that adequate winter forage is available for elk in the winter concentration areas. In addition, monitoring points would be established to measure residual plant material before fall grazing concludes. Livestock would be removed from portions of pastures with elk winter concentration areas before the 50 percent of the plant material was consumed. This requirement would focus on species such as Idaho fescue or bluebunch wheatgrass,

ensuring that wintering elk have adequate forage for the upcoming winter.

Alternative 3 also has an adaptive approach for managing range condition. Where climatic, political, or biological concerns arise, the season of use for each pasture can be adjusted as long as resource protections and standards and guidelines are met. This system allows for a more rapid response to changing conditions that can be implemented through the Annual Operating Instructions. Overall improvements to range condition would be anticipated, and as a result, these improvements would be beneficial to elk. If deer and elk populations were to reach Management Objectives and increase the need for forage from the JCRAA, Alternative 3 would be less likely to result in reductions in livestock grazing as the systems are more adaptive to account for changes.

Cumulative effects for Alternative 3 are the same as for Alternative 2.

Issue 6 – Big Game

Key Issue - Authorizing fall livestock grazing in elk winter concentration areas known as the Miller Ridge Area, Starvation Ridge Area, Table Mountain - Joseph Breaks Area, Hunting Camp Ridge Area, and Two Bit - Sumac Areas may not provide enough winter range for big game.

Table 36 - Comparison of Issue 6 Indicators by Alternative

Indicator	Alternative 1	Alternative 2	Alternative 3
	Percent Plant Material Retained at the End of Fall Grazing		
Miller Ridge Area	100	45 or more	at least 50
Starvation Ridge Area	100	45 or more	at least 50
Table Mountain – Joseph Breaks Area	100	45 or more	at least 50
Hunting Camp Ridge Area	100	45 or more	at least 50
Two Bit – Sumac Area	100	45 or more	at least 50

As shown above, Alternative 1 resolves the big game issue because no livestock grazing would be authorized, and none of the big game winter concentration areas would have a reduction in winter forage from livestock use. Alternative 2 addresses Issue 6 by retaining the current grazing system and schedule for each pasture. This system has been shown over time to provide for adequate winter forage for existing elk and deer populations. Alternative 3 broadens the flexibility of the grazing schedule, but it also increases the level of monitoring that would occur on any pasture that contains elk winter concentration areas. Livestock would be removed before 50 percent of the plant material was removed from the winter concentration areas.

Existing Conditions – Riparian Habitat

Riparian areas constitute some of the richest and most valuable terrestrial wildlife habitats

because of their proximity to free water (Thomas et al 1979, Johnson et al 2001). These unique areas contribute to both species and structures diversity and as travel-ways between all other habitats on the landscape. Riparian areas occupy as little as 0.5 to 2 percent of the landscape and contain more species of plant, mammal, bird, and amphibian than the surrounding uplands (Johnson et al 2001, Thomas et al 1979). Of the 381 terrestrial species known to occur in the Blue Mountains, 285 (75%) are either directly dependent on riparian zones or utilize them more than other habitats (Thomas et al. 1979, Johnson et al 2001, USGS 1998).

Riparian habitats in the analysis area include open meadow stringers; springs, seeps, and bogs; created ponds; and deciduous and/or coniferous forest streams. Numerous small springs and seeps, ponds, moist meadows, and wetlands occur along ridge contours and larger creek headwaters. These springs are often less than 1/8th of an acre in size. They are important areas for providing wet microhabitats for amphibians, insects, and small mammals, while also providing forage and perhaps cover for larger wildlife. For many species dispersed habitats are "population source habitats" or the last refugia for survival. Currently, the majority of the sites (ponds and springs) are developed for livestock water and undeveloped sites are also used by cattle. Riparian zones, particularly along streams, serve as important connective corridors between forested habitats. Wildlife may use such riparian zones for cover while traveling across otherwise unforested areas. Some species, especially small mammals and birds, may use such routes in dispersal from their original habitats. Riparian zones provide cover and often provide food and water during such movements.

Refer to the aquatics resources section for information on how continuation of the current grazing system would be anticipated to affect riparian habitats.

Many hardwood plants have evolved with some browsing and for some shrub species seems to benefit their growth. Over consumption can inhibit growth and can cause mortality especially if shrubs are just establishing. Over grazing by large ungulates in a riparian hardwood plant community inhibits regeneration, resulting in a plant community with poorly represented classes of young and middle age shrubs. Riparian conditions in the Joseph Creek Analysis area vary according to whether these areas are accessible to ungulates. There are areas that due to past and current grazing of livestock have reduced or absent shrubs and vegetation or have minimal younger age classes. Browsing by native herbivores (elk and deer) has negatively affected local riparian vegetation as well. Forage competition between livestock (cattle) and elk appear to occur in moist riparian areas in late summer, as both species prefer this habitat (Leege 1984). In the JCRAA, this competition is limited to some stream segments where livestock access is not controlled by fencing.

Livestock and other ungulate grazing in riparian areas can cause loss or trampling of vegetation, accelerate bank erosion, and contaminate the water with feces and urine which may and has negatively impacted resident populations of herpetofauna (Homyack and Giuliano 2002, Bull and Hayes 2000). Vegetation structure is an important habitat component for reptiles and amphibians because it provides the site-specific conditions for temperature and moisture regulation. Studies have shown that it may take decades after periods of heavy grazing for vegetative components to again support amphibians and reptiles. Amphibians have low dispersal rates and are less mobile than some of the reptile

groups which further lengthens recovery time (Homyack and Giuliano 2002).

Amphibians and reptiles are largely dependent on surface water and riparian areas. Horizontal vegetation structure determines amphibian and reptile composition more often than vertical. The importance of ground litter (fallen logs, leaves), soil, and plant root structures is also important for the survival of amphibians and reptiles (Cooperrider et al 1986). Aquatic amphibians and snakes are one of the indicators of a healthy aquatic system, as they are very sensitive to pollution and loss of aquatic habitat (Cooperrider et al 1986). Therefore these species are vulnerable to change in riparian areas. The current population levels of amphibians and reptiles are not known, but many species have been noted.

The density of riparian vegetation in the all structural stages (overstory to the herbaceous layers) is extremely important for habitat requirements of small mammals such as Preble's shrew, reptiles, amphibians and breeding birds. Breeding birds and especially ones that are migratory tend to be habitat specialists. Willows are an important component of this vegetation, as these species tends to be rich and diverse in insect fauna. The abundance of insects supplies a rich food source for insectivorous fish, amphibians, reptiles, birds and small mammals (Ohmart 1996, Johnson et al 2001). Riparian reaches within exclosures have increased the structural diversity from overstory down to shrub and herbaceous layers. Riparian areas that are not protected and have grazing pressure lack this diversity, and this in turn reduces species diversity. This is especially common along the larger gentler sloped creeks that have greater livestock pressure. The occurrence of willow is absent or greatly reduced from unfenced riparian sections in the reaches where it normally occurred.

The elimination of beaver has had large impacts on riparian habitats throughout the West. Beavers influence small-order streams by altering water retention, creating and maintaining wetlands, modifying nutrient cycling and decomposition dynamics, influencing the timing, rate and volume of water and sediment movement downstream, through the creation of pools and backwaters generating new fish and wildlife habitats and sediment trapping capabilities (Ohmart 1996). Beavers have occurred in this analysis area, and are still present in some areas, although their numbers are greatly reduced. Other factors besides lack of vegetation due to grazing have reduced population of beavers, some of these being trapping earlier in the century, current recreational trapping, and roads (Lower Joseph Watershed Assessment 2001).

Refer to the Aquatics Resources section of this chapter for a description of improvement project that have been initiated in the JCRAA. Upland riparian protection fences consist of approximately 42 units, which exclose about 34 acres. Within the JCRAA, approximately 191 ponds have been developed from springs or for catchment, and 93 springs have either been developed for livestock use with troughs or protected.

Other wildlife habitat projects that have occurred in the area of this EIS/assessment area over the last 27+ years include: designation and protection of live and dead wildlife trees with signing, snag creation and artificial nest/roost structures and the designation of old growth forest habitat units. There have also been past and ongoing wildlife studies that encompass some of this analysis area. Some of these studies included a blue grouse study, Rocky Mountain bighorn sheep and a current study on bird and small mammal with the

effects of prescribed burning (Crawford and Pelren 1996, McIver et al ongoing, ODFW)

Alternative 1 – Riparian Habitat

The physical and biological aspects of in-stream riparian habitat is discussed in detail in the fisheries and hydrology section of the EA. Effects to terrestrial species will be discussed in this section.

Under the no grazing alternative, natural processes will continue to occur. Riparian vegetation will move into and out of the Historic Range of Variability over time as successive, vegetative communities move into climax conditions and stand replacement events occur. The most immediate effect of the removal of livestock grazing would be the regrowth of shrub and herbaceous layers within the riparian areas that are not currently fenced.

Removal of livestock grazing would improve riparian ecosystems. Livestock and especially cow/calf pairs prefer this habitat and could overgraze and browse and trample shrub and herbaceous components (Ames, 1977, Kauffman and Krueger 1984, Sedgwick and Knopf, 1987, Kauffman et al 2001). With removal of livestock the herbaceous, shrub and hardwoods would improve in growth and structure, although there may be local sites affected by wild ungulates. This growth would add to the vertical structural diversity, increase water storage capacity, reduce bank erosion, improve water temperatures and enlarge the size of riparian areas (Kauffman et al 2001, Kauffman and Krueger 1984). This increase of vegetation and structure will increase the species diversity of these areas, which includes avifauna, amphibians, reptiles, small mammals such as Preble's shrew and will increase hiding cover that does and elk cows prefer for fawning and calving (Wisdom and Thomas 2001, Toweill and Thomas 2002 Leege 1984).

The long-term effects of removing livestock grazing would be increased shrub vegetation and herbaceous diversity, return of hardwood trees including willow, cottonwood and aspen in some areas, larger riparian zones and eventually increasing wildlife specie diversity. Streamside vegetation is important in determining the structure and function of stream ecosystems. Riparian vegetation is also important as a source of food to stream organism, providing shade and maintaining stabilization of banks which prevents excessive sedimentation, and filtering our pollutants (Ohmart and Anderson 1986). Increased vegetation along riparian areas would increase avian nesting which includes flycatchers and other migratory birds, waterfowl, red-naped sapsuckers and other nonmigratory birds. It would also increase populations of amphibians, reptiles, small mammals and provide better cover for deer and fawns, elk cows and calves against predators (Weller 1996, Kauffman et al 2001, Gardner et al 1999).

Other effects of removal of cattle grazing could be the eventual return of beaver to these systems, which enriches habitat for many other wildlife species. However, there are other factors, such as trapping, that affect the return of beavers. A healthy instream environment is vital for aquatic life forms, as well as for various human needs (Kauffman and Krueger 1984). With removal of livestock, exclosure and pasture fencing could be removed lessening hazards to avifauna, wild ungulates and other wildlife species that

become entangled in the wires.

Alternative 2 – Riparian Habitat

This alternative maintains livestock grazing under the current grazing schedule. Cattle, especially cows with calves have a strong preference for riparian area (see existing conditions for further information of impacts). Riparian areas will continue to be impacted from this alternative especially in late summer when other sources of water can dry. Livestock grazing in riparian areas can reduce hiding cover, vertical diversity, bank stability, and possibly reduce prey base such as insects. This structure is important to many amphibians, reptiles and small mammals such as Preble's shrew. Exclosures built to protect parts of the stream corridors, ponds and springs would remain in place. Exclosures would continue to protect riparian habitats, but they could be breached on occasion, and the investment in the riparian habitat might be diminished or lost.

Riparian vegetation is an important habitat for many wildlife species for movement or dispersal, nesting, fawning and calving, foraging and cover. Refer to the aquatics resources section for a description of this alternative's impact of livestock grazing on aquatic habitat.

Livestock grazing practices that affect microclimates of forest floors may affect amphibians. For salamanders in particular, temperature and moisture conditions on the forest floors influence abundance and above ground activity (Heatwole, 1962, Heatwole and Lim 1961). Forest management and grazing activities that reduce canopy coverage, the density of understory vegetation, ground litter, surface moisture, and downed logs would negatively effect forest amphibians habitat anywhere from 3-20+ years depending on the amount of time for the areas to recover (Schommer 1999). A variety of conditions exist within the JCRAA depending on topography, vegetation, and fencing. Within exclosures, riparian vegetation is ungrazed by livestock. Within water gaps, livestock use is concentrated and the vegetation is highly altered.

Cumulative Effects - The healthy condition of some riparian zones in the analysis area has been reduced by past timber practices, road construction, livestock grazing, and wildfires (See Fisheries and Hydrologist Reports). Over browsing by native herbivores can have short term, negative effects on a local scale on riparian vegetation. Past livestock over grazing has occurred in many riparian areas. While some areas are fenced and have ample riparian vegetation, some areas continue to experience a lack of some riparian shrubs, which would continue under this alternative. Recreational activities, such as camping along streams, have had negative effects on some riparian areas. These impacts would include trampling of vegetation, disruption to animal migration, and possible harassment to wildlife use of the area.

The greatest threat to that portion of the riparian habitat that terrestrial species depend on under this alternative will continue to be large-scale wildfires. Although the size and intensity of wildfires cannot be predicted, fires are part of the ecosystem and can be assumed to influence future conditions. In many parts of the planning area, forested habitats adjacent to riparian zones are dense and overstocked. These dense stands increase the potential for wildfires to burn through riparian areas that historically were resistant to

large-scale wildfire. One of the most serious losses when this occurs is the loss of connecting habitat and travel corridors between various forest habitats. It can require decades for these riparian zones to recover and reach conditions necessary for many species to use them again. This can reduce or prevent the successful dispersal of juvenile animals and the movement of individuals necessary for healthy intra-specific genetic exchange.

Alternative 3 – Riparian Habitat

Effects of this alternative would be the same as Alternative 2 with some changes. The Swamp Creek Restoration project would achieve improved riparian conditions sooner than Alternative 2. Doubling of deciduous density and diversity would occur within 10 to 15 years instead of over 20 years. An increase in these shrubs would benefit wildlife species as described above. Alternative 3 also offers more flexibility in the period during which pastures are grazed. Where utilization of shrubs or riparian forage is noted to be above standards, the timing of grazing could be changed to reduce summertime browsing of shrubs.

Existing Conditions – Unique Habitats

Special habitats within the project area include cliffs, talus slopes, rock outcrops, wet meadows, scabs, and aspen stands. This discussion focuses on aspen stands because of the potential adverse effects that livestock grazing can have on this unique habitat. Refer to the Wildlife Specialist Report in the analysis file for discussion of effects on other unique habitats.

It is generally accepted that aspen stands in the Blue Mountains and northern Great Basin are in an ongoing state of decline (Wall et al 1999, Erickson et al 2002). Aspen stands in the Blue Mountains occur typically as isolated stands in the uplands where soil and moisture conditions are favorable, which often involve perched water tables, some riparian areas and stringers along stream corridors (Cobb and Vavra 2003, Johnson et al 2001). The aspen ecosystems are rich in number and species of wildlife, especially in comparison to associated conifer forest types (Debyle 1985). In the Blue Mountains, aspen stands are used by 73 vertebrate species for reproduction and 115 species for feeding, (Thomas et. al. 1979, Sallabanks et al 2003).

Unlike other deciduous tree species and conifers, aspen overstories do not persist for long periods of time (DeByle 1985, Johnson et al 2001). The majority of aspen trees bored in the Blue Mountains show the overstory trees to average 80-120 years old with the oldest trees being less than 200 years old. If this overstory dies out and root suckers are not able to reach above browse height, underground aspen clones that may be more than 1,000 years old can die in a few short years.

Within the JCRAA, there are seven known aspen stands. These stands typically occur as small units as little as one to five stems and less than one acre in size (Cobb and Vavra 2003). The majority of these known aspen stands are protected from livestock grazing by

fencing. Because of the small size of these stands, it is likely that additional stands occur within the JCRAA, but have not been inventoried or provided any protection from livestock grazing.

Alternative 1 – Unique Habitats

Livestock grazing would be eliminated under this alternative, reducing browsing and trampling to the unfenced known aspen stands and any uninventoried aspen stands that occur within the JCRAA. Wild ungulates would still contribute to browsing in all of the stands. Conifer encroachment and fire suppression would also continue to contribute to the decline of aspen survival. Refer to Alternative 2 for further description of those factors on aspen.

Alternatives 2 and 3 – Unique Habitats

Direct and Indirect Effects - Aspen stands have been and continue to be heavily impacted from livestock grazing, some of the stands have only a few stems left with very few (less than 10 stems) trees remaining. The aspen stands that have been fenced have shown improvement in stand vigor. These stands where browsing or trampling have been eliminated are regenerating new age classes of aspen. In the long term(10+ years) these aspen stands will provide a unique habitat to wildlife that is currently underrepresented from historical conditions.

Young aspen is nutritious and when abundant, will make up a substantial portion of livestock and wild ungulate diets (Cobb and Vavra 2003). Livestock grazing can occur during the peak of growing season for aspen and reduce the suckering growth of aspen (DeByle 1985). The effects of livestock and native ungulates grazing, browsing, and trampling limits the regeneration and could lead to the elimination of aspen stands if repeated overbrowsing occurs (Jones et al 1985, Cobb and Vavra 2003). Small aspen stands within grassland areas tend to be even more heavily affected as livestock use these areas for shade, which further affects these clones by compaction and erosion (DeByle 1985).

Cumulative Effects - The past and current cumulative effects of fire suppression, conifer invasion, and browsing by native and domestic ungulates has reduced aspen habitat to a few isolated clones consisting of a decadent overstory with little or no healthy reproduction occurring from either seeding or root suckering.

Although aspen are sensitive to fire because the bark is thin and green (Jones & DeByle 1985), aspen forest do not burn readily because the areas these stands inhabit will usually cause slow spread of fire (Jones & DeByle 1985). Studies of aspen stands show that occasional fires usually increase the sprouting of aspen which increases the size of the stands if protected from browsing. Fire suppression discourages aspen reproduction in two ways. If no disturbance occurs while roots are healthy enough to sprout, then the trees maintain apical dominance over the root system, suppressing suckering. Secondly, aspen seems to require a mineral seedbed for successful seedlings or promotion of suckering, elimination of fire might reduce the area available for seedling establishment and the

amount of solar radiation that reaches the ground (DeByle 1985, Wall et al 1999). Intense fires that kill aspen overstories will stimulate abundant suckering and even light fires stimulate suckering. If burning occurred yearly it could have a negative effect in destroying the aspen clones (DeByle 1985, Wall et al 1999). Natural fires in the Wallowas occur over a longer time span, so this would not be a major contributing factor in aspen decline as would grazing and conifer encroachment.

Conifer encroachment is another factor in causing reduction of aspen stands. Conifers compete for moisture and nutrients and increases their susceptibility to fire, by ladder effects which allows fire into the canopies and increases the intensity of fire (Jones & DeByle 1985).

Heavy grazing during the first half the 20th century caused long term changes in many of the aspen clones (DeByle 1985, Wall et al 1999). Herbivory by livestock, elk, and deer has been implicated as a primary factor in aspen decline (Wall, Vavra and Miller 1999). Past livestock grazing because of the numbers of animals grazed has caused major declines or extinction of many of the aspen clones.

Wild ungulates will seasonally use aspen stands primarily during fall and winter months. Deer browse can be heavy during fall and winter months as their average diets include 74% trees and shrubs, while during the summer months their diet is mainly herbaceous (DeByle 1985). Elk can further impact aspen by barking mature aspen stems. Barking is the process of gnawing or stripping the bark for food. Elk are the primary barkers, but rabbits, mice, voles and porcupine also contribute (DeByle 1985). Beavers may also impact aspen stands that reside within riparian zones by removing stems and this has occurred along Swamp Creek. Beaver use of aspen stems often stimulated suckering and regeneration within these areas. Insects and diseases also impact aspen clones although this usually is site specific (Schmitt 1996).

The cumulative effects of fire suppression, conifer invasion, and browsing by native ungulates will continue to have detrimental effects on aspen stands by reducing the clone size and even the loss of some stands. The majority of the aspen stands in the analysis area could be lost within the next 50 years, if they are not treated by active management such as fencing, prescribed fire, removal of conifers or naturally occurring fires.

Plant inventories are prescribed at different levels for Alternatives 2 and 3. Wildlife inventories associated with various proposals are conducted throughout the year. As these inventories identify remnant aspen stands, these stands would be inventoried and protected through fencing as funding allows. However, the threat from conifer encroachment and wildfire suppression may continue to cause these stands to decline. Forest Plan standards and guidelines state that no management actions would be authorized to detrimentally alter unique habitats (Page 4-46). This alternative would be consistent because eventual protection of aspen stands from livestock grazing would occur as stands are identified. However, the decline in aspen stands from lack of management actions (removing conifers) would continue.

Existing Conditions - Old Growth Associated Species

This section summarizes existing conditions for (1) old-growth and late and old structure and (2) management indicator species associated with old growth or snags and downed wood.

Old-Growth and Late and Old Structure - Designated old growth is 4 percent (3,261acres) of the analysis area, located in 28 separate blocks. The majority of the old growth areas occur in moist stream bottoms, drainage heads, north facing slopes and/or some plateau areas. Compared to the Historic Range of Variability, late and old structural stage stands are low in the cool/dry plant associations and just slightly low in the warm/dry plant associations.

Late and old successional stage habitat (LOS) is limited in the analysis area, with all of it within the multi-strata with large trees (MSLT) structural stage category. Completely missing is the single stratum with large tree (SSLT) component, which historically comprised as much as 15-55% of all LOS in the analysis area.

Historical timber harvest that focused on large tree removal played a major role in reducing the amount and distribution of old growth habitat and late and old structural stages. To a lesser degree, ongoing livestock grazing has also reduced the number of large trees and large snags. Grazing has reduced the competition of grass versus tree seedlings especially in ponderosa and mixed conifer stands. The increase in pine seedling competition reduces the growth of the trees which then increases the time for trees to reach a larger diameter.

Livestock and wild ungulates influence forests by selectively suppressing plant taxa and by accelerating the cycling of nutrients. This occurs when herbivores change the trajectory of succession, thereby changing the seral and climax vegetation. Secondly herbivores can suppress the forest's carrying capacity for fauna linked to shrubs in forest understories. For example predicting avifauna composition would be more difficult since many birds typically nest on the ground and in shrub canopies, rather than in forest overstories (Sallabanks 2001). The forest understory throughout old growth areas has been impacted from past and current grazing.

All of the old growth areas contain some riparian habitat (streams, springs and ephemeral draws) most of which has been impacted by grazing in the past and currently. Small meadows within old growth areas have also been impacted from grazing.

Management Indicator Species - Old growth management indicator species that reside in the analysis area are pileated woodpecker, northern goshawk, and some of the primary cavity excavators. All of the primary cavity excavators are associated with snags and downed wood. While American marten are an indicator of old growth, no American sightings have been recorded within nearly 50 miles of the analysis area (Verts and Carraway, 1998, Marshall et al., 1996). They are not reasonably expected to occur here perhaps because the forested land occurs as fragmented islands surrounded by grasslands.

Pileated woodpeckers are found throughout the JCRAA (Personal Observations, D. Knox, C. Miller, R. Anderson, J.Hohman, J. Martinez, S. Borgerding). Pileated woodpecker were

noted or sighted in the majority of old growth stands. These woodpeckers were selected as a management indicator species because they represent species dependent on large diameter snags and downed trees in mature and old growth forest in dense canopies. As previously described, ongoing grazing has contributed to intra-tree competition and the resulting delay in achieving larger diameter trees, which pileated woodpeckers prefer for nesting. (Thomas et al 1979, Sallabanks et al 2001).

Northern goshawks are present within the project area (Anderson 2000, Minta et al. 1993). There are more than 15 nesting records, 15 historic nesting locations and approximately 20 different territories overlapping within the analysis area. The northern portion of the analysis area had protocol level surveys to reconfirm occupancy and use of nest stands in spring/summer of 2000. No nests were located, although several aerial observations were noted. Goshawks build large stick nests below the upper canopy that are supported by limbs of one of the larger trees within a stand. Foraging occurs within forests with open understories and along small openings (Bull and Hohman 1994, Marshall 1992). Northern goshawks feed on birds and small mammals (Ehrlich et al 1988). Loss of nesting habitat for small birds or forage for small mammals in turn affects the nesting success of northern goshawk since these species make up their prey base (Cooperrider et al 1986). Past and current grazing has reduced the shrub and herbaceous layer of this analysis area, especially in riparian areas which reduces potential habitat for nesting birds and small mammals.

Primary cavity excavators are a good representative for all species dependent on snag and down tree habitats and therefore are management indicator species. Viable populations of primary excavators are essential for maintaining secondary cavity user populations. The primary excavators consist of

northern 3-toed woodpecker	yellow-bellied sapsucker	mountain chickadee
pileated woodpecker	Williamson's sapsucker	black-capped chickadee
black-backed woodpecker	hairy woodpecker	white-breasted nuthatch
northern flicker	downy woodpecker	red-breasted nuthatch
Lewis woodpecker	white-headed woodpecker	pygmy nuthatch

Approximately 3,315 acres within or adjacent to the analysis area were surveyed for snag levels in the last decade, resulting in an estimated 2.3 snags per acre. Desired densities for 100 percent of potential woodpecker habitat are 4 snags per acre.

Surveys for large woody debris have been completed in some of the analysis area. All units surveyed were warm/dry sites. Results from walk through survey counts were variable, dependent on slope and unit location. Pieces per acre varied from 0 to 12.9, with an average of 5.6 pieces per acre. Desired levels for warm/dray sites are 3 to 6 pieces per acre.

Past and current grazing has affected these habitats, by reduction of hardwoods in riparian areas and aspen stands. The loss of snags and recruits of additional deciduous trees will negatively affect populations of primary excavators most closely associated with this type of habitat (Krausman 1996, Johnson & O'Neil 2001, Cooperrider 1986).

All of the primary cavity excavators, and 179 additional species of wildlife are dependent on downed wood for cover, feeding and/or reproduction. Lack of down and woody material

varies due to previous wildfire, prescribed burning and timber management. Grazing by livestock and wildlife herbivores can contribute to availability of future dead and down material because removing grasses can increase survival of ponderosa pine seedlings, which in turn leads to competition of conifers and reduced tree growth rates.

Alternative 1 – Old Growth Associated Species

Old Growth and LOS – Under the no grazing alternative, vegetation including grasses, shrubs and forbs would increase in the understory and small openings within these old growth areas. Natural processes will continue to occur outside of HRV. Dense, multi-storied stands will continue to increase in density. Most stands will decline in vigor, and mortality will increase due to increased competition for water and insect activity. Second growth stands that have some LOS characteristics will take longer to move into old growth conditions because of competition for water and nutrients. Habitat for species most dependent on MSLT should remain stable until stand replacement events begin to occur. These species that would be affected include pileated woodpeckers, black-backed and three-toed woodpeckers, American marten, and goshawks. Species dependent upon SSLT habitat such as white-headed woodpeckers and flammulated owls will most likely continue to decrease.

Single story large tree common that commonly occurs in ponderosa pine forest types and occurs within this project area should improve with the no grazing alternative. Grazing especially heavy grazing of the past has contributed to pine seedlings becoming thick patches within these stands. Currently these are dense stands of pine which are prone to disease, insect infestations, and stand replacement fires. As grasses and forbs are allowed to grow they would out compete and reduce the number of pine seedlings and eventually allow for more of the open canopied, older pine stands, which avian species such as the white-headed woodpecker depend on (Sallabanks 2001, Blair and Servheen 1993). With continuity of understory vegetation, natural occurring fire would be able to carry through these stands in their normal patterns across the landscape (Sallabanks 2001). The increase of forbs and shrubs in the forest understory, should provide for better structural diversity and lead to wildlife specie diversity within many of the LOS and designated old growth areas.

The greatest threat to LOS habitat will be that from large scale or stand replacement wildfires, which could alter the remaining LOS stands so that they would not support the species dependent on that habitat type for the short to long term.

Management Indicator Species - Direct and indirect effects of the no grazing alternative on pileated woodpecker are minimal, since this species depend on snags and dead and down wood for foraging and nesting. Considering cumulative actions, current levels of snags would remain, in the short to mid term, with an increase in smaller diameter snags (for example, from competition). No livestock grazing would increase the fine fuels which would carry wildfires across more of the landscape. As the risk of wildfire increases, with higher fuel loads, much of the existing snags and logs could be consumed, or the surrounding habitat may not provide other habitat elements (such as larger snags for nesting) needed by these species. Also, consumption in a fire, or loss of growth by suppressed trees could have

a long-term effect on the number of large snags and log recruits. Removal of livestock grazing may reduce the number of tree seedlings, as grasses and shrubs may out compete tree seedlings, thus allowing for growth of larger trees in shorter time span (Sallabanks et al 2001). Pileated woodpeckers prefer larger size (>21" dbh) snags for nesting and roosting and downed wood to that is at least 4" diameter (Bull and Holthausen, 1993). Other primary excavators prefer burned areas, for example black-backed woodpeckers. Burned areas and no grazing could result in more ponderosa pine habitats, increasing habitat in the long term for such species as white-headed woodpeckers and bats. Habitat use and population numbers should not be altered by this alternative in the short to long (20+ years) term. If large fires or insect infestations occur it will alter habitat use by pileated woodpeckers both in the short and long term. Whether the effect is positive or negative to the species is difficult to predict.

Northern goshawks prefer stands that are mature or late seral stage with relatively high canopy closure for nesting and post-fledging areas (DeStefano et al. 1994, Martin et al. 1998, Reynolds et al. 1983). This alternative does not complete any activities within the analysis area that would maintain or increase LOS areas in the short to mid tern (5-20 years). Removal of livestock grazing does increase the shrub and herbaceous layer which in turn can increase small mammal and avian populations. This increase of species will benefit goshawks by providing more prey base. Habitat quality for goshawks will remain static in the short to mid term period. The potential to lose dense nesting stands to stand replacement wildfire will remain high. Over-all avian diversity should improve with this alternative; possibly increasing the abundance of potential prey species.

With respect to primary cavity excavators, this alternative would not impact forested primary excavators. Those species that prefer hardwood habitat would see increases in this type of vegetation, as there would be no grazing or browsing of seedlings. Hardwood habitats including aspen, cottonwood, and willow are important to several PCE's. Most of the sapsuckers, downy and hairy woodpeckers, northern flicker, blackcapped chickadees and white and red breasted nuthatches prefer these habitats for foraging and nesting. Livestock grazing is one of the major factors in reducing this habitat in the past. Under this alternative, these hardwood habitats would improve. As more of this habitat returns, it would provide for higher population levels of the PCE's that are closely associated with this type of habitat than what was available historically.

Past management activities, livestock grazing, fire suppression and particularly timber harvest and planting site prep have reduced the number and distribution of snags and down woody debris across the landscape. Firewood cutting along roads has further reduced these habitat components. Future management activities and firewood cutting will continue to affect levels of these habitat components. The greatest threat to primary cavity excavators under this alternative is the risk of stand replacement wildfires, which may alter preferred habitats over large areas, making them unsuitable for many species. There is potential that such an event would have a long-term negative effect to snag habitat by consuming snags and large woody debris and altering the micro-habitats around snags left standing.

The current levels of snag and down woody material in the mixed conifer ecotypes are below guidelines that are listed in the Eastside Screens (Regional Forester's Forest Plan Amendment #2). The current snag and down woody debris levels would be maintained in

the short to potentially mid term period (5-20 years). The majority of snags will be small diameter that will provide some foraging substrate but do not provide nesting habitat especially for larger primary and secondary excavators. Increased stand densities and the resultant tree mortality will increase fuel loadings, which would increase the risk for stand replacement wildfires. Such fires have the potential for long-term negative effects to habitat for PCE's by consuming snags and large woody debris and altering the micro-habitats around snags left standing.

Alternatives 2 and 3 – Old Growth Associated Species

Direct and Indirect Effects - Livestock grazing has and continues to impact the shrub and forb layers of these stands by browsing, grazing, and trampling which can limit wildlife fauna that prefer this type of habitat. Riparian areas within old growth stands are also impacted from livestock grazing due to the same reasons as listed above.

Other factors have caused declines in old growth habitat such as logging, recreational activities, and wildfire. Historical logging has reduced many possible old growth stands. Previous fire suppression has lead to more intense fires which has destroyed acres of existing old growth areas. Recreational activities have also impacted some of the old growth. Activities such as OHV's, firewood cutting, and mushroom gathering have impacted some of the old growth areas.

Livestock grazing would cause few to no direct impacts on pileated woodpeckers. Livestock grazing would indirectly affect forested stands, especially in ponderosa pine stands. Grazing of grasses and other forbs reduces competition to pine seedlings and hoof action of livestock can also increase the amount of seeds from ponderosa pine into the ground. Pine seedlings and saplings can occur in thick patches in as little as 7-15 years when forbs and grasses are reduced by livestock grazing. This increase of thick patches of pine stands are at a greater risk to fire, insects and reduction of growth due to competition. Mixed conifer is not as susceptible to these livestock pressures because they do not contain as much forage as ponderosa pine stands.

The effects of livestock grazing on northern goshawk mainly involve grazing of prey habitat. If grazing removes major portions of shrubs and low vegetation cover, it could affect reproduction of small mammal and avian nesting. Livestock grazing is likely to alter the prey base and its availability for goshawks.

Other factors that affect goshawk populations include logging, recreational activities, prescribed and wild fires. Goshawks have been recorded both attacking intruders and failing to successfully reproduce when the disturbances are within their nesting groves (Desteffano and Meslow, 1994; Reynolds and Wight 1978). When goshawks are paying attention to human intrusion, it could cause predation of young or eggs by great horned owls, ravens or other raptors. Past logging and wildfires have reduced the availability of nesting trees, or abandonment of nests, loss of prey and cover for this species. Prescribed fires if conducted in spring will impact nesting goshawks if it occurs in close proximity of nests by causing abandonment or injury to nestlings.

With respect to primary cavity nesters, the effect would be minimal as there would be no adverse effect on existing snags and dead and downed wood and virtually no effect on foraging habitat. The major impacts of livestock grazing are in the hardwood component and ponderosa pine habitats in the analysis area. These impacts include grazing, browsing and trampling which have reduced many of the hardwood habitats and contributed to dense stands in ponderosa pine forests. There are several species such as downy woodpeckers and red-naped sapsuckers that prefer hardwood stands, and whiteheaded woodpeckers prefer larger diameter ponderosa pine forests.

Cumulative Effects Past timber harvest, prescribed fire and fuelwood cutting have reduced snag levels in the analysis area to below 100% snag levels (4 snags per acre). Current fuelwood gathering and past timber harvest methods have resulted in snag levels of less than 50% for potential woodpecker populations. According to research (Bull & Holthausen 1993) this is below the recommendation of at least 4 trees per acre up to 6-8 per acre for optimum woodpecker populations.

There is current research, which suggests that low intensity fires are necessary for the long-term maintenance of snags. Pitch increases within the bole during fires and "preserves" and strengthens the bole so underburning may improve snag habitat. Moisture, amount of downed wood, winds, slope, and aspect all factor into the amount of dead and downed wood that would be retained or added to the forest floor during a burn.

In the long-term current logging practices are anticipated to increase the diameter of existing trees, which would result in larger snags. However, this will likely be a long-term effect requiring at least 20+ years.

Alternative 2 is not expected to have a significant effect to current snag and LWD levels in the short to mid-term. The greatest impacts would be to hardwood components that several of the primary excavators prefer for foraging and nesting.

Among the most significant and declining wildlife habitat resources in the Pacific Northwest United States are residual stands of late and old successional stage structure (LOS) or old growth habitat. Old-growth stands contain mature and overmature trees in the overstory and usually contain a multi-layered canopy with trees of several age classes (Forest Plan). These areas have great value as places for recreation, nature study, and scientific research. Most importantly, they provide crucial habitat for a number of wildlife species. In the Blue Mountains, it is recognized that late and old growth habitat is now limited and well below historic levels (RFA #2 Screens, Silvicultural Report). Populations of species associated with late and old successional stages are also limited. Past timber harvest, road building and stand replacement fires have significantly reduced the amount and effectiveness of old growth habitat. Fire and insects are acting at higher rates than predicted in the Forest Plan (Forest Plan monitoring reports) and are further reducing old growth areas.

Existing Conditions – Migratory and Other Landbirds

Migratory landbirds are those that breed in the U.S or Canada and winter south of the border in Central and South America or the United States. Many well-known passerine songbirds, hawks, and shorebirds fall in this category. Approximately 150 different migratory and nonmigratory landbird species are either known or suspected to use the JCRAA for feeding, reproduction, or migratory habitat (Andelman and Stock 1994, Sallabanks 1996, Evanich 1992, Conley 1995, Altman 2000, Oregon Breeding Bird Atlas Project 2000 Oregon Birds Record Committee).

Migratory landbirds have experienced nationwide declines in population. Historic changes (last 100 years) in this landscape included loss of beaver and associated wetlands; wildfire and fire suppression; heavy grazing by livestock including cattle, sheep and hogs; agriculture and associated activities; timber harvest and associated activities (roads etc); and pesticide use has affected many of these avian species.

Grazing by livestock or wild ungulates can either directly or indirectly favor populations of some avian species while depressing others. Grazing alters abiotic and biotic relationships within and among local bird species (Knopf 1996, Owens and Myres 1972). Increased vegetation and structural diversity usually has a larger diversity of avian species (Bull et al 2001, Knopf et al 1988,, Knopf 1996, Taylor 1986).

Cattle grazing impacts the variety of vegetation types differently. Forest canopies have little impact from grazing. In shrub and grass habitats the effects can be major and immediate by removal of vegetation and structural diversity. Such changes affect the avian species guild, or reduce species diversity (Knopf et al 1988). Historical heavy grazing has removed or greatly reduced the shrub component from riparian areas throughout the west and in some segments within this analysis area (Knopf 1996, Bull and Skovlin 1982, Sedgwick and Knopf 1987). Other effects of grazing is the increase of brown-headed cowbirds which are nest parasites, higher predation rates by other species due to lack of vegetation or isolation of nesting habitat which reduces the search time for predators (Kauffman et al 2001. Knopf 1996). The response of bird species changes varies with the amount of vegetation removed. The most susceptible to these changes are rare avian species which can become extirpated with lack of nesting habitat. Lack of vegetation will shift to species that are more generalists within these areas (Knopf 1996). Impacts of grazing on gamebirds seems to be variable with positive or negative influences being noted as to the amount of vegetation removed (Knopf 1996).

Alternative 1 – Migratory and Other Landbirds

This alternative would remove livestock grazing within this analysis area which would impact many different plant communities. Growth of the hardwoods, shrub and herbaceous plants, would increase, eventually providing for more nesting habitat for many avian species. Forested areas would have increases in shrub and herbaceous communities. Forbs, grasses and shrubs would out compete some of the tree seedlings, thus reducing density in some forested habitats. In the long term (20+ years) stand types such as

ponderosa pine would increase in size and supply more habitat for species associated with these habitats.

Past timber management, livestock grazing, wildfire suppression, wildfires and other management activities, and natural processes, have altered the quantity, quality, and juxtaposition of habitat for many species of migratory landbirds. Various portions of the landscape now support different species of birds than historically. Management activities and natural processes will continue to affect bird species abundance and distribution over time.

More species are found in some forest types than others, but the greatest diversity of forest avifauna requires everything from early successional sapling stands to old growth forest. Each species has its own special habitat needs. Some migratory landbird species utilizing the analysis area will experience both negative and positive effects from implementation of any of the alternatives described. The analysis area currently provides a variety of successional stages in each plant community across the landscape. Over the long term, these vegetative communities will move into and out of the historic range of variability, favoring different species over others for varying periods of time as forest stands and steppe habitats change.

Habitat for migratory landbirds is not expected to change significantly in the short to mid-term under this alternative. The greatest potential risk to long-term habitat conditions for migratory landbirds under this alternative is from large scale, stand replacement wildfires and further loss of LOS. Such wildfires have the potential to eliminate habitat structures that many migratory and other landbird species depend on. Particularly at risk are those species that depend on late and old structure and closed canopy forest stands such as the brown creeper, Townsend's warbler, and red-breasted nuthatch. Species that depend on open areas and early successional vegetation might experience population increases in the analysis areas when such fire events occur. However, overall avian biodiversity would decrease as a result of a large-scale wildfire event for the mid to long-term period.

Alternatives 2 and 3 – Migratory and Other Landbirds

Direct and Indirect Effects - Livestock grazing is a widespread and important influence on migratory and other landbirds. Different species have different responses to grazing from positive to negative effects. Those species that are negatively influenced by grazing are those that are dependent on herbaceous ground cover for nesting and/or foraging. These populations are at risk and are most likely below historic population levels (Bock et al 1993, Taylor 1986).

Livestock grazing, especially the season of grazing affects avian species that prefer riparian, upland or forested landscapes. Direct effects of grazing in riparian areas is reduction of herbaceous, shrub and hardwood components, reduction of cover and width of the riparian zone which further fragments this limited habitat and reduces important nesting habitat (Bock et al 199, Sedgwick and Knopf 1987, Knopf et al 1988). In forested habitats avian species most affected by livestock grazing are those that are dependent on the herbaceous and shrub ground cover for nesting and foraging within the forest canopy.

Livestock grazing has positive influences on those avian species that prefer more open habitat. Avian species such as killdeers, house wrens, golden eagles and brown-headed cowbirds respond to more open grazed areas. The brown-headed cowbird is directly attracted to livestock, which is detrimental to other avian species because of brood parasite activities. The reduction of riparian habitat decreases the search time for brown-headed cowbirds to find nests and lay their eggs. Brown-headed cowbirds have had serious effects on some avian populations by reducing nesting success of these avian species (Bock et al 1993, Kauffman et al 2001).

Cumulative Effects - Many activities contribute to cumulative impacts on nesting and foraging habitats. Past logging, livestock grazing, fires, and fire suppression have all contributed to degradation of habitat for some of the avian species and have improved habitat for others. Some of these activities have positive effects for those avian species that prefer more open habitat, this type of habitat is not lacking across the analysis area. Habitats that have been reduced by these activities are woodlands, riparian areas, and shrub steppe and grassland areas (Johnson et al 2001, Bock et al 1993, Thomas et al 1979).

Past fire suppression, grazing, and logging have contributed to the loss of most fire-maintained old-growth forests and woodlands. Warm/dry habitat forest types have been more heavily impacted by these factors as compared to other eastside forest types. Today the greatest immediate threats for future viability of warm/dry forest types are high-severity fire occurrences and increased site-specific competition for nutrients and moisture that result in reduced growth in ponderosa pine regeneration and increase mortality over the long-term (Sallabanks etal 2001). If these forest types were to burn under a high-severity fire it could eliminate what little old-growth remaining and would take >200 years, before any restoration options were available (Sallabanks etal. 2001). These habitats have specific and generalist avian species associated with them. Wildfires would reduce possible nesting and foraging habitat for many of these species if the wildfires are large in size.

Existing Conditions – Bats

Several species of bats occur within and adjacent to the analysis area that are listed by the USDI Fish and Wildlife Service as species of concern: the small-footed, long-eared, long-legged, and Yuma myotis. Several other species of bats occur within and adjacent to the analysis area: big brown bat, hoary bat, silver haired bat, California bat, little brown bat, and western pipistrelle. Except for western pipistrelle, all of these species have been recorded within and adjacent to the project area during mist net surveys conducted from 1992 to 1995 (Perkins 1992,1993,1994,1995 & 2000).

Bats will use a variety of habitats for day roosts such as rock crevices, snags, old growth and decadent trees, cliffs, caves and various other sites if they provide cover, and are dry (Nagorsen and Brigham 1993, Perkins, 1992-1993). These habitat features exist throughout the analysis area, although there are no known hibernacula or maternity colonies. There are historical records of Townsend's big-eared bats in Joseph Canyon. Bat activity occurs at lower elevations such as in Joseph Canyon, in Swamp Creek, and the surrounding areas (Erickson and Adams 2003).

Several species of bats that inhabit upland aspen and old-growth ponderosa pine are more at risk because of loss of this type of habitat. The quality and availability of roost sites are considered to be critical factors influencing population size and distribution of some of the bat species. Proximity to forage and clean drinking water may limit bat populations (Johnson and O'Neil 2001). Clean water and healthy riparian areas are essential in providing abundant insect prey and for providing open flight corridors (Kauffman 2001). Livestock grazing has affected these habitat values in the past and in some areas currently. Aspen stands which are important habitat for several species of bats are particularly at risk because of browsing and clean water is scarce in many of these areas especially in upland ponds due to livestock use.

Alternative 1 – Bats

Bat species use a variety of successional forest habitats for different stages in their life histories. There will be no reduction of the current snag density for roosting under this alternative. No livestock grazing would improve hardwood habitats which some of the bat species prefer. Water sources would remain cleaner without the presence of livestock use which in turn increases some of the prey insect populations which bats feed upon.

Past management practices and natural processes have altered the quantity, quality, and spatial arrangement of habitat for some species of forest bats. These activities and processes will continue to affect the landscape, favoring some species over others through time. One example of change with the removal of livestock grazing would be the increase of hardwood stands such as aspen, over time these should increase in size and provide more habitat for bats. Hardwood stands may still be impacted from wild ungulate foraging which increase recovery time for some of these stands.

Some species of bats use rocky habitats, crevices and caves. Most of the natural rocky habitats would remain unchanged for the short to long-term. Adverse changes to the microhabitats around rocky areas could occur with stand replacement wildfires. Such fires could also destroy day roost habitat found under loose bark on larger dead and dying trees. This alternative will not reduce the risk of wildfires, or accelerate stands toward LOS for the potential of larger snags being available in the mid to long term.

The most significant threat to habitat for forest bats over the long term will be from large-scale wildfires, which could reduce the availability of larger snags for roosting sites and prey availability.

Alternatives 2 and 3 – Bats

Direct and Indirect Effects - Livestock grazing impacts some of the habitat needs for bats. Clean water is important for bats for drinking and maintaining insect populations. Livestock impact these areas by muddying and contaminating the water with their feces. Past and present livestock grazing has also impacted and reduced hardwood and riparian habitats by browsing, trampling, and grazing which bats rely on for feeding and roosting. These

habitats are important for some species of bats for feeding, movement and roosting. Several exclosures have been installed along riparian areas, ponds and hardwood habitats which will improve and increase these habitats, providing that they are maintained and prevent livestock grazing.

Cumulative Effects - Critical factors influencing population size and distribution of some bat species is the availability and quality of roost sites (Sallabanks et al. 2001). High levels of bat activity in mature and old-growth forests are thought to be partially due to availability of older trees for roosting in these stands (Sallabanks et al 2001). Past logging, fuelwood cutting and fires have reduced the availability of these larger sized trees throughout the forested areas, which impacts bat population. In the long term (20+years) current timber management would provide for larger trees which would provide more roosting areas.

Other factors that affect bat populations include human disturbance, mine closures, eradication of bats, vegetation conversion, and pesticide spraying that reduce lepidopteran species which is an important food source for bats. Human disturbance at maternity or roosting sites will often cause bats to abandon these areas and can cause major declines in some bat species. Pesticide spraying for various moths will reduce many of the lepidopteran species, which may affect bat populations in the areas treated.

Existing Conditions – PETS

The following proposed, endangered, threatened, sensitive species (PETS) or species of concern of wildlife are known to occur, or have potential or historic habitat, on the Wallowa Valley Ranger District. Habitat for these species is shown below for the JCRAA. The Regional Forester's Sensitive Animal list was updated as of November, 2000. The PET and SoC are from the USDI Fish and Wildlife Service and are updated every 6 months. A description of habitat and species for PETS is analyzed in the Biological Assessment.

Table 37– PETS Species Known or With Potential to Occur on the Wallowa Valley Ranger District

Animal Species	Listing	Habitat
Canada Lynx	Threatened	No known habitat
Northern bald eagle	Threatened	Potential habitat
Gray Wolf	Endangered	Historic and potential habitat
Spotted bat	Sensitive	Potential habitat
California wolverine	Sensitive	Potential habitat
Pacific Fisher	Sensitive	No known habitat
Preble's shrew	Species of Concern	Potential habitat
Small-footed myotis	Species of Concern	Known habitat
Long-eared myotis	Species of Concern	Known habitat
Long-legged myotis	Species of Concern	Known habitat
Yuma myotis	Species of Concern	Potential habitat
Townsends big-eared bat	Species of Concern	Potential habitat
Fringed myotis	Species of Concern	No known habitat
Rocky Mountain bighorn sheep	Sensitive	Known and potential habitat
Columbia sharp-tailed grouse	Sensitive	No known, but historic habitat
Greater sage grouse	Species of Concern	No known habitat

Animal Species	Listing	Habitat
Upland sandpiper	Sensitive	Historic habitat
Greater yellowlegs	Sensitive	No known habitat
Gray flycatcher	Sensitive	No known but possible historic habitat
Tricolored blackbird	Sensitive	No known habitat
Yellow-billed cuckoo	Candidate	No known habitat
Bobolink	Sensitive	No known but possible historic habitat
Peregrine falcon	Sensitive	Known habitat
Horned grebe	Sensitive	No known habitat
Bufflehead	Sensitive	No known habitat
Painted turtle	Sensitive	No known habitat
Columbia spotted frog	Candidate and Sensitive	Potential habitat
Northern Leopard frog	Sensitive	Potential habitat
Blue Mountain Cryptochia caddisfly	Species of Concern	Potential habitat

Alternative 1 – PETS

Previous sections of the wildlife resources section address effects to PETS. For Preble's shrew, Columbia spotted frog, and northern leopard frog, refer to the Riparian Habitat section. For Rocky Mountain bighorn sheep, refer to the Big-Game section. For Ferruginous hawk, olive-sided flycatcher, and peregrine falcon, refer to the Migratory Bird section. For the bat species, refer to the Bat section. Wolves and California wolverine tend to be forest generalists and descriptions of habitat for all species would apply. In general, all PETS species with known habitat in the JCRAA would observe an improvement in habitat conditions from implementing this alternative.

Alternatives 2 and 3 – PETS

Determinations of effect from implementing Alternative 2 or 3 on PETS species are provided below for those species with historic, potential, or known habitat within the project area

Table 38 – Determination of Effect to PETS Wildlife Species

Animal Species	Habitat	Alternatives 2 and 3	Rationale
Canada Lynx	N	NE	Will not adversely impact lynx habitat, is not considered a viable LAU
Northern bald eagle	P	NE	Potential foraging only, no nesting anticipated
Gray Wolf	H & P	NE	Historic range, will not impact potential habitat. Predator control of State of Oregon listed species is prohibited.
Spotted bat	P	MIIH	Habitat in common in watering areas, prey base may be affected
California wolverine	P	MIIH	Travel corridors and prey base may be affected, not denning habitat
Pacific Fisher	N	NI	No recorded sightings, no habitat

Animal Species	Habitat	Alternatives 2 and 3	Rationale
Preble's shrew	P	MIIH	Potential habitat, no recorded sightings within analysis area, historical sighting in Sled Springs which is adjacent to analysis area. potential to impact habitat
Small-footed myotis	K	MIIH	Habitat in common in watering areas, prey base may be affected
Long-eared myotis	K	MIIH	Habitat in common in watering areas, prey base may be affected
Long-legged myotis	K	MIIH	Habitat in common in watering areas, prey base may be affected
Yuma myotis	P	MIIH	Habitat in common in watering areas, prey base may be affected
Townsends big-eared bat	P	MIIH	Habitat in common in watering areas, prey base may be affected
Fringed myotis	N	NI	No habitat
Rocky Mountain Bighorn sheep	K & P	MIIH	Potential overlap of water and habitat
Columbia sharp-tailed grouse	H & N	NI	No current occurrence on allotment
Greater Sage grouse (SoC)	N	NI	No potential habitat, no records of sightings in Wallowa Co
Upland sandpiper (S)	H	NI	Suspected historic habitat
Greater yellowlegs (S)	N	NI	No habitat
Gray flycatcher (S)	H? & N	NI	Possible migrant occurrence, possible historic occurrence
Tricolored blackbird (S)	N	NI	No potential habitat, possible winter foraging only
Yellow-billed cuckoo (C)	N	NI	No recorded sightings
Bobolink (S)	N & H?	NI	No records, possible historic habitat
Ferruginous hawk (SoC)	K	NI	Foraging recorded in analysis area
Olive-sided flycatcher (SoC)	K	NI	Habitat present, and have been recorded within analysis area. No impacts from livestock grazing are anticipated.
Harlequin duck (SoC)	N	NI	No habitat or recorded sightings
Western burrowing owl (SoC)	N	NI	No nesting habitat or recorded sightings of this species
Peregrine falcon (S)	K	NI	Foraging habitat only, no nesting records
Horned grebe (S)	N	NI	No recorded sightings, no habitat
Bufflehead (S)	N	NI	No recorded sightings, no habitat
Painted turtle (S)	N	NI	No habitat
Columbia spotted frog (C) & (S)	P	NLAA	Potential habitat, no recorded sightings, very aquatic restricted
Northern Leopard frog (S)	P	NI	Potential habitat, no recorded sightings, very aquatic restricted
Blue Mountain Cryptochia caddisfly (SoC)	P	MIIH	Larval stage is aquatic, and species has been recorded adjacent to analysis area. May be impacted from livestock use in creeks.

C= Candidate species, S= Sensitive species, LE= Listed Endangered species, LT= Listed Threatened species. K= Known Habitat, P = Potential Habitat, H = Historic, NE = No Effect, NI= No Impact, MIIH= May impact individuals or habitat, but will not likely contribute towards Federal Listing or cause a Loss of viability to the population or species.

Refer to the Botanical Biological Evaluation for further information regarding Sensitive species. The Forest Plan (Page 4-30) requires that all actions and programs be reviewed to determine their potential effects on threatened, endangered, and sensitive species. This

evaluation has been prepared and therefore complies with the Forest Plan.

Recreation Resources

Existing Conditions - Recreation

The Oregon State Highway 3 corridor passes north/south along the western edge of the project area and includes the Joseph Canyon Viewpoint Unit of the Nez Perce National Historic Park. The entire length of the corridor has been designated as a section of the Nez Perce (Nee Mee Poo) National Historic Trail. In addition, much of the land to the east of the corridor has been designated as a level 1 critical viewshed (see attachment). Traffic counts taken by the Oregon Department of Transportation at the Oregon/Washington state line show a 36% increase in traffic on Highway 3 from 1991-1996. Observations made by Forest Service personnel during the same period indicate a substantial decrease in commercial traffic that is more than offset by an increase in recreation traffic.

The Joseph Canyon Viewpoint has been recently constructed and includes restroom facilities, an interpretive trail, and a viewing area. This site's location adjacent to Highway 3 makes it an unlikely location for livestock to congregate, and there are few livestock related conflicts at this site.

The roadless areas of Joseph, Swamp, and Davis Creeks are accessed via a system of non-motorized trails. Recreation use of the trails and the area is presently quite low, with the bulk of the use occurring from April to June, and during big game hunting seasons. Most access originates at the Chico Trailhead immediately adjacent to the range planning area on Oregon State Highway 3. Virtually all of this area is included in the Highway 3 Corridor viewshed area and also includes the Wild and Scenic portion of Joseph Creek.

With respect to Recreation Opportunity Spectrum (ROS), the unroaded portion of the analysis area is primarily designated semi-primitive motorized or semi-primitive non-motorized. The roaded portion of the JCRAA is primarily designated Roaded Natural.

The uplands comprise the remainder of the land base within the range planning area and provide the widest range of recreational opportunities. Currently, hunting is the most popular activity, although continued declines in available big game tags are decreasing its significance. In 1997, applications exceeded available tags by more than a 2:1 ratio. In 1998, that ratio continued to increase. As a result, many popular dispersed campsites are no longer used. Current trends show an increasing interest in mountain bike, OHV, and snowmobile based activities in the area. OHV use is encouraged on the Peavine Trail (#1657) and is becoming increasingly popular.

Two developed recreation sites are located within this portion of the project area: Red Hill/Red Hill Lookout and Coyote Campground. Red Hill offers a restroom, picnic facilities, and a panoramic view within an exclosure surrounding Red Hill Lookout. Coyote Campground includes 9 defined campsites and a large group area. It is fenced from livestock use.

Alternative 1 – Recreation

Recreation opportunities within the JCRAA would not shift between Recreation Opportunity Spectrum categories with elimination of livestock grazing. Because the ROS designations tend to reflect the roaded nature and primitive influence of the experience, the presence or absence of livestock grazing would not necessarily influence the ROS setting. However, within the setting indicators themselves, the elimination of grazing would tend to increase the primitive influence of the experience. As described below under scenery, a more natural setting would emerge as vegetation changes from the elimination of livestock grazing. More hardwoods and improved range conditions would tend to increase the primitive nature of the recreation opportunity setting.

Alternative 2 – Recreation

Direct and Indirect Effects - With respect to Recreation Opportunity Spectrum (ROS), the unroaded portion of the analysis area is primarily designated semi-primitive motorized or semi-primitive non-motorized. The roaded portion of the JCRAA is primarily designated Roaded Natural. Similar to Alternative 1, the presence or absence of livestock within the JCRAA is not enough of a change to cause a shift in ROS settings. Within the roaded natural, semi-primitive motorized, and semi-primitive non-motorized settings, the continuation of livestock grazing would cause each area to continue to provide the level of recreation opportunities they currently provide. The Joseph Creek Wild and Scenic River receives relatively light grazing use, which places it on the more primitive end of the scale of a semi-primitive motorized experience. This situation would continue, since Alternative 2 would continue with the current grazing schedule.

Cumulative Effects – Recreation opportunities within the JCRAA is expected to be influenced by the Draft National Off-Road Vehicle Policy, assuming it develops into a final rule. This policy would require managers to establish open routes for off-road vehicle travel, closing the remainder of the area to such travel. Other ongoing or foreseeable future actions consist of prescribed burning proposals and road closures for watershed improvement. In general, there is a trend to reduce motorized access on the National Forest, which would cause recreation experiences in the JCRAA to become more primitive and less roaded. However, livestock grazing would not necessarily influence that trend.

Alternative 3 – Recreation

Effects on ROS would be the same as described for Alternative 2 because changes in grazing systems would be subtle with respect to ROS setting.

Scenic Resources

Existing Conditions - Scenery

The area is part of the 20,000 acre Highway 3 Level 1 Viewshed Corridor and is managed to protect the natural landscape of the areas as viewed from the highway. The Oregon State Highway 3 corridor is located on the rim of Joseph Canyon and includes Joseph Canyon Viewpoint, which was included in the Nez Perce National Historic Park in Sept. 1997. The Visual Management System defines Sensitivity Level 1 as the highest sensitivity and includes all seen areas form primary travel routes, such as Highway 3. The entire length of the travel corridor has been designated as a section of the Nez Perce National Historic Auto Tour. Presently the Joseph Canyon Viewpoint consists of a paving parking area outlined by a rock wall with an interpretive sign along the canyon rim.

- Preservation/very high rating allows ecological changes only. Management activities, except for very low visual-impact recreation facilities, are prohibited. Because Joseph Creek is designated Wild, areas within the Wild and Scenic River corridor are designated preservation/very high.

- Retention/high rating refers to landscapes where the valued landscape character "appears" intact. Deviations may be present but must repeat form, line, color, texture and pattern common to the character so completely that they are not evident.

- Partial retention/moderate refers to landscapes where the valued landscape character "appears slightly altered." Noticeable deviations must remain visually subordinate to the landscape character being viewed. Road 46 corridor falls within this partial retention/moderate ratings as does a transition area adjacent to the Wild and Scenic River.

- Modification/low refers to landscapes where the valued landscape character "appears moderately altered." Deviations begin to dominate the valued landscape character being viewed but they borrow valued attributes such as size, shape, edge effect and pattern of natural openings, vegetative type changes outside the landscape being viewed. They should be compatible or complementary to the landscape character. The majority of the Joseph AMP, primarily at higher elevations, is located within this classification.

The larger-sized range allotments have the following VQO/SMS ratings:

Table 39 – Visual Quality Objectives and Scenery Management System Ratings

Allotment	Visual Classifications Allotment-wide		Visual Classifications Excepted Locations	
	VQO	SMS	VQO	SMS
Cougar Creek	Modification	Low	Partial Retention for Road 46 and Peavine Creek	Moderate for Road 46 and Peavine Creek
Crow Creek	Modification	Low	Partial Retention for Road 46 and Elk Creek	Moderate for Road 46 and Elk Creek
Hunting Camp	Modification	Low	Partial Retention for steeper slopes on the east and west allotment boundaries	Partial Retention for steeper slopes on the east and west allotment boundaries
Joseph Creek	Retention	High	Primitive within W&S River	Very High within W&S River
Swamp Creek	Modified	Low	Retention within W&S River and Partial Retention within Road 46 corridor	High within W&S River and Moderate within Road 46 corridor
Table Mountain	Modified	Low	Retention within W&S River and Partial Retention adjacent to W&S River corridor	High within W&S River and Moderate adjacent to W&S River corridor

Alternative 1 – Scenery

Livestock related impacts to scenery would diminish immediately as the first growing season would display taller grasses, and existing livestock developments such as fences and water developments would be removed. Over a 20-year period, the elimination of livestock grazing would allow an increase in hardwoods and a trend for improved forage conditions.

Alternative 2 – Scenery

Direct and Indirect Effects - Effects on scenery are discussed below with respect to general forestland, the Joseph Creek Wild and Scenic River corridor, the Road 46 and Highway 3 corridor, and other exclusions of specially protected areas within general forestland.

General forestland within the JCRAA refers to those areas designated as 'modification' under the visual management system and 'low' under the scenery management system. These areas would receive various levels of livestock grazing. The presence of livestock, including developments such as fences, stock ponds, troughs, and corrals are part of the general forest area. Continuation of these conditions would be consistent with 'modification' and 'low'

The Oregon State Highway 3 corridor is isolated from livestock grazing associated with the JCRAA because those allotments along the highway are fenced to prevent livestock from reaching the corridor. This situation would continue, and scenic values associated with the

corridor would not be altered by livestock. The Road 46 corridor, is designated 'partial retention' and 'moderate'. The evidence of livestock use from the road would continue, so long as corrals and stock ponds are not constructed in the foreground view. Recent restoration of the McCarty Reservoir has improved the scenic integrity of the road's foreground view. Current grazing systems would continue which have been consistent with the designation for Road 46.

The Joseph Creek Wild and Scenic River corridor has scenery designations of 'preservation' and 'very high'. Current grazing systems operate within these designations because no inconsistent livestock developments exist within the corridor, use of the trail by livestock is completed so that the trail does not become overly braided or eroded, and forage condition is managed in a good to excellent condition – except where annual grasses are a relic of the homesteading era. Continuation of this grazing system would be consistent with visual standards for this area.

Cumulative Effects - Areas within the general forestland that are designated 'moderate' and 'partial retention' tend to relate to anadromous fisheries such as Peavine Creek. Restoration efforts, such as fencing, instream habitat improvements, and hardwood planting for many of these streams have virtually eliminated the visual effect of livestock grazing. Continuation of the current grazing system would be consistent with visual standards for these areas because these fish-bearing streams are under a strategy for restoration.

Alternative 3 – Scenery

Effects on scenery from Alternative 3 would be similar to Alternative 2. Despite the flexibility in grazing schedules associated with Alternative 3, it also provides specific protections for special areas such as the Joseph Creek Wild and Scenic River corridor, big-game winter range, and the riparian conditions along Swamp Creek. Livestock grazing would remain an influence on the scenery, but as described for Alternative 2, these impacts would be managed consistent with the scenic integrity designated throughout the JCRAA.

Specially Designated Areas

Existing Conditions - Joseph Creek Wild and Scenic River

The 2750-acre Joseph Creek Wild and Scenic River corridor is allocated to Management Area 7 by the Forest Plan. The corridor also overlaps 150 acres of the Haystack Rock Potential Research Natural Area (Management Area 12), 8 acres of old-growth (Management Area 15), and 275 acres of private land, which is zoned to maintain farm and forest use. Where dual management area designations exist, the more restrictive guidelines apply. The entire wild and scenic river corridor falls within the Joseph Creek Rangeland Analysis Area. The corridor is within the Swamp Creek, Table Mountain, and Joseph Creek Allotments.

The Wild and Scenic Rivers Act requires that a river be free flowing and possess one or more "outstanding remarkable values." The Omnibus Oregon Wild and Scenic River Act of 1988 designated 8.6 miles of Joseph Creek as 'Wild' within the Wild and Scenic River System. The Congressional Records indicated that Joseph Creek's Scenic, Recreational, Biological, Fisheries, and Cultural values qualified as outstandingly remarkable (OR). The Joseph Creek Wild and Scenic River Management Plan confirmed these OR values, added the OR of Wildlife, and clarified the Cultural value as Cultural (Historic). The Plan also provided for the continuation of domestic grazing if it is consistent with the management objectives of the river corridor, protects or enhances the OR values, and protects water quality. Any adverse impacts to OR values, water quality, or free-flow, even though within Forest Plan Standards and Guidelines, will be corrected immediately.

Within the wild and scenic river corridor, rangeland vegetation is in good to excellent condition with the exception of several benches that have been converted to annual grasses due to past homesteading and grazing activities. However, in 1988 when Joseph Creek was designated a Wild and Scenic River no homesteading activities were occurring. Evidence of this era still exists in the form of abandoned farm implements, idle fields with introduced species (private land), cheat grass benches, and man made structures. The corridor includes 275 acres of private property. At the time that the W&S River Management Plan was written there were 225 animal unit months (AUM's) of livestock grazing (cattle and some horses) within the 2750-acre river corridor. The riparian zone was considered to be in excellent condition although some localized impacts to riparian vegetation were noted.

Vegetation within Joseph Canyon is dominated by shrub-steppe communities, particularly on south facing aspects and at the lowest elevations. Plant communities include bluebunch wheatgrass-Idaho fescue/arrowleaf balsamroot, Sandberg's bluegrass/narrow-leaved skullcap, and Talus garland types. The river corridor contains about 100 acres of the 400 acre proposed Haystack Rock Natural Areas which is to be managed to preserve expels of these plant communities.

Other vegetation types include the Douglas-fir and ponderosa pine that dominate the north aspects and steep side drainages. A few wet meadows exist along the river and are comprised of grasses, sedges, rushes, and forbs. The narrow riparian zone along Joseph Creek consists of willow, Rocky Mountain maple, mock orange, hawthorns, and other

water-loving shrubs grasses, sedges, and rushes. Brief descriptions of the OR values and their relationship to livestock grazing follow.

Scenic - Rivers with and OR value for scenery are selected for landscape elements of landform, vegetation, water, color and related factors that result in notable or exemplary visual features and/or attractions within the geographic region. Additional factors such as seasonal variations in vegetation, scale of cultural modifications, and the length of time negative intrusions are viewed are also considered.

Joseph Canyon is a spectacular example of the steep rimrock-exposed canyons found in Northeast Oregon. Commonly viewed from the rim, Joseph Canyon is dominated by grassy, open slopes and benches. Generally, Joseph Creek lies in an arid, steppe vegetation canyon. Large expanses of grass and grass like elk sedge and pine grass communities can be found throughout Joseph Canyon. In many places, stringers of trees, grow in the side drainages. The narrow riparian zone along Joseph Creek is a greenbelt of vegetation, even in the driest seasons.

Seasonal variations in Joseph Canyon highlight the ruggedness of this landscape. Snow on the rim is plentiful but melts out early in the spring leaving behind slopes of lush green grass. Summer temperatures are high and grasses on the slope dry out by midsummer. Evidence of human intrusion is light, consisting of isolated cabins, farm implements, old hay fields, fences, and cattle trails. Highway 3 located on the rim of Joseph Canyon is not seen from the river corridor.

Due to the steepness of the canyon walls much of the views from Highway 3 and especially from Joseph Canyon Overlook are of the east side of Joseph Creek. The Overlook looks directly across into the Table Allotment where views of Table Mountain, Haystack Rock Research Natural Area, canyon rims, and old hayfields can be observed. Occasionally, domestic and wild animals can be observed grazing on the hillsides. A few fences separate the cattle allotments, and grazing occurs during the more “hospitable” months. Cattle trails crisscross the slopes but are not wide or obtrusive. Some Forest Service trails are also present but receive little use and are not highly evident.

Evidence of the 1986 Joseph Creek/Starvation Ridge Fire can still be observed. Silver snags can be viewed throughout the western slopes of Joseph Creek. However, generally the vegetation has regenerated and appears in a healthy state.

The Joseph Creek Wild and Scenic River Management Plan states that-range management structures will be visually compatible with the visual classification of Preservation.

Recreational - A combination of recreational opportunities exist including big game hunting, hiking, fishing, dispersed camping, sightseeing, wildlife viewing, boating, kayaking, motorized and mountain biking, and horseback riding.

The criteria for recreational OR value include recreational opportunities that are unique enough to attract visitors from outside of the geographic region. In addition, interpretive opportunities may be of exceptional value. The river itself may provide or potentially provide settings for national or regional usage or competitive events.

Joseph Canyon and creek are named for young Chief Joseph. Joseph Creek is included within the ceded boundaries of the Nez Perce Tribe. Traditionally it supported numerous Indian villages and camps and is still used for hunting, fishing, and gathering purposes.

Joseph Canyon provides a limited range of recreational opportunities due to the topography, remoteness, climatic conditions, and lack of easy motorized access to the river itself. The area is unroaded and only accessible by trail. The upstream termini of the Wild and Scenic River is located on private land with no established right of way. This entrance is limited to foot and horseback traffic with permission via private landowners.

Two trails lead to the canyon bottom, both are steep and difficult. A third trail parallels Joseph Creek above the riparian vegetation and on the canyon sideslopes. Views from the trail are overlooking the creek and up to the breaks at the canyon rim. The majority of use includes foot, horseback traffic in spring and early summer and again during fall hunting season. There is also incidental fishing use in association with the above stated use. In addition, the private landowner has a special use permit from the Forest Service to conduct outfitting and guiding operations within the Joseph Creek Canyon.

Joseph Canyon Overlook is located on the canyon rim along Highway 3. It provides spectacular views of the Wild and Scenic River and adjacent country. This site has recently been included in the Nez Perce National Historic Park. It provides outstanding opportunities to interpret the Native American role in this canyon.

Joseph Creek is not considered a "floatable" river. Only one known rafting/kayak party in the past 20 years has been recorded attempting to float this creek.

Although difficult to access, the adventurous visitor will be rewarded with a quality recreational experience. Hiking, horsepacking, birdwatching, wildlife viewing, fishing, hunting, and photography can be enjoyed in a solitary manner in a spectacular setting. This qualifies recreation as an outstanding remarkable value.

Geologic – The geologic criteria for OR value requires that the river or the area within the river corridor contains an examples(s) of a geologic feature, process, or phenomena that is rare, unusual, one of a kind, or unique to the geographic region. The feature(s) may be in an unusually active stage of development, represent a "textbook" example and/or represent a unique or rare combination of geologic features (erosional, volcanic, glacial, and other geologic structures).

Joseph Canyon represents the Miocene Epoch, 15-30 million years ago, when widespread volcanism layered much of Northeast Oregon with Columbia River basalts. The series of small buttes are actually basalt cinder cones, or old volcanoes from which some of the lava poured through the basalt dikes in Joseph Canyon. This is one of the few places in which volcanic vents have been recognized in NE Oregon and are known as Elk Mountain, Roberts, Greenwood, Haskins, and Findley Buttes.

As a result of erosion and down cutting of rivers and creeks the depth and layers of basalt are evident. It reveals stacked layers of basalt lava flows and columnar basalt 10-200 feet

thick.

Joseph Creek is an excellent example of the NE Oregon geology typified by Columbia River basalt canyons, exposed by the down cutting of river. The canyon is virtually unmodified and its spectacular details can be easily viewed from the canyon rim. Therefore, geology qualifies as an Outstanding Remarkable Value.

Joseph Creek flows over a gentle gradient through the basalt canyon, carving "s" turns where the water speeds up and slows to form deep pools. The surrounding rugged landscape with basalt rims and timbered draws makes for an impressive view.

Fisheries and Water Quality - The river corridor provides high quality habitat to wild steelhead and trout populations. The criteria for evaluating fisheries for an OR value relates to the relative merits of either fish populations, habitat, or Native American cultural use – or a combination of these river-related conditions.

The water quality of Joseph Creek is below state of Oregon standards, primarily due to high summer temperatures and sediment. Under the Wild and Scenic River Act, no human caused action may be undertaken which will result in a measurable reduction of existing water quality or that will prevent the meeting of State water quality standards (Joseph Creek Wild and Scenic River Management Plan 1993). Since 1988, many projects have occurred in the headwaters and tributaries of Joseph Creek that would help to reduce sediment (riparian exclosures, road decommissioning, culvert removal, upland water development repair, and more restrictive vegetation management practices) and water temperatures (riparian exclosures, and riparian planting). Within the Wild and Scenic River, habitat conditions are favorable. Streambanks are stable (90%), with minor bank damage occurring on shallow banks of alluvial fans. Riparian vegetation is diverse and in good quantity. Tributaries flowing directly into the Wild and Scenic River portion are in excellent condition.

A more in depth discussion for each of the standards and guidelines for Water Quality and Fisheries can be found in the analysis file.

Joseph Creek is recognized as an important wild steelhead and wild rainbow trout fishery and is a significant tributary to the Grande Ronde and Snake River system Therefore fisheries qualifies as an OR value.

Wildlife - Joseph Creek provides opportunities to view a wide variety of wildlife, including Rocky Mountain elk, Rocky Mountain bighorn sheep, river otter, black bear, cougar, and several Protected, Endangered, Threatened, and Sensitive species such as peregrine falcons and bald eagles.

Wildlife values can be eligible as an OR value based on the relative merits of either wildlife populations, habitat, or Native American cultural use – or a combination of these conditions.

Joseph Canyon supports a healthy and diverse population of wildlife. Rocky Mountain bighorn sheep were indigenous to the area and presently there is a resident herd

established in the area. Black bear frequent the riparian areas while Rocky Mountain Elk and mule deer are common on the canyon breaks. Healthy snake populations also exist in this canyon. Numerous bird populations can be found throughout the canyon. In particular, Bald eagles (USFWS listed as threatened) winter in Joseph Canyon and Peregrine falcons have been re-introduced to lower Joseph Canyon.

Habitat in Joseph Canyon is quite varied due to the dry, upland slopes and contrasting riparian area in the canyon bottom. The winter range present to support Rocky Mountain elk and mule deer is in very good condition and consists of bluebunch wheatgrass, Idaho fescue, and grass like elk sedge. Canyon benches of cheatgrass are relics of historic homesteading in the area. This habitat is in poor condition, but is a remnant of a previous era which could only be changed through active grassland restoration.

Excellent nesting habitat occurs just downstream of the designated stretch of Joseph Creek. Sightings of peregrine falcons in Joseph Canyon indicate they use the area for post-nesting dispersal and late season migration.

There is a long history of livestock grazing on the grassy slopes of Joseph Canyon but otherwise, human use is minimal.

The diversity of wildlife and the significance of the federally-listed species qualify wildlife as an OR value.

Cultural – Throughout the corridor there are Euro-American historical sites and locations vital to Nez Perce tribal history.

Criteria for OR values includes the river or area within the river corridor that contains a site(s) or feature(s) associated with a significant event, an important person, or a cultural activity of the past that was rare, unusual or one of a kind in the region.

The significance of Joseph Creek is a vital part of Nez Perce tribal history. The area near the mouth of Joseph Creek, downstream of the W&S River designation, was a meeting place for the Nez Perce tribe. It is certain that tribal members traveled upstream to hunt, fish, and gather.

There are two significant homesteads located on Joseph Creek. The Wilder Homestead consists of cabin remnants, outbuildings, and rusty farm implements. The Vauter Homestead is located at the mouth of Swamp Creek and consists of a cabin and rusty farm implements. This cabin is located on private land and still used by the private landowner. The areas surrounding these homesteads were used for grazing, gardening, and other homesteading activities. The upper benches were farmed with an annual rye grass. According to one local homesteader the yield was not measured by tons per acre but by gallons per acre! In the early 1900s the homesteaders raised sheep. The sheep were sold in 1943 due to the high predation/coyote kills. Cattle followed shortly there after. Farming also ended about that same time.

The significance of the Nez Perce tribal history as well as the historic contributions qualify history as an OR value.

The criteria for OR rating is that the river or area within the river corridor contains a site(s) where there is evidence of occupation or use by Native Americans. Sites must be rare, one of a kind, have unusual characteristics or exceptional human interest value(s).

Joseph Creek is included within the ceded boundaries of the Nez Perce Tribe. The area was used in prehistoric and historic times for fishing, hunting, and gathering. Although there has been no extensive cultural resource inventory, there is much interest in establishing the special cultural values associated with their history and present day activities. This is especially true for the Nez Perce Tribe due to the proximity of Chief Joseph's activities to Joseph Canyon.

Alternative 1 – Joseph Creek Wild and Scenic River

Scenic – Refer to the previous section on Scenic Resources.

Recreational – Refer to the previous section on Recreation Resources.

Geologic – There would be no effect on the components that resulted in the designation of geological as an OR value.

Fisheries and Water Quality – Refer to the previous section of Aquatic Resources.

Wildlife – Refer to the previous section on Wildlife Resources.

Cultural – This alternative would have no effect on any prehistoric or historic components relating to the OR value for Joseph Creek. The historic homesteads are on private land, and are not portions that are waived to the Forest Service for grazing management. The potential birthplace of Chief Joseph occurs in Joseph Canyon which has received light grazing use in the recent past. Discontinuation of grazing would not change the current situation.

Alternatives 2 and 3 – Joseph Creek Wild and Scenic River

Scenic – As described in the range condition analysis, range vegetation currently identified in unsatisfactory condition would be expected to improve as domestic livestock grazing is removed from the area. The immediate difference to scenic values would be the relatively high stand of grass that would develop after the first growing season. This appearance within the Wild and Scenic River corridor would be consistent with the 'preservation standard for scenery. Alternatives 2 and 3 would continue grazing in the corridor. While grasslands would appear grazed, much of the corridor has good to excellent forage conditions (except for the cheatgrass benches that were converted during the homesteading era). These conditions have been maintained under the current grazing schedule by relatively light use of the corridor. Alternative 2 would continue this approach. Alternative 3 would allow for greater flexibility in grazing schedules, but sets a standard for

maintaining forage in a good or excellent condition within the corridor. Both action alternatives would protect the scenic values of the corridor.

Recreational - Recreational activities such as hiking, horsepacking, birdwatching, wildlife viewing, fishing, hunting, and photography would not be adversely altered by any of the alternatives. Grazing under the current management scheme is relatively light and has not contributed to adverse effects on the riparian conditions along Joseph Creek (refer to the analysis of Issue 1 on Page 179). Recreationists can encounter livestock along the trail under the current grazing schedule, particularly in fall when hunting seasons overlap with use of the Wilder Pasture of the Table Mountain Allotment. However, riparian utilization standards ensure that riders will move livestock up the slopes, rather than having the livestock congregate along the river corridor and the trail. Alternative 3 allows for increased flexibility in grazing schedules, but it also recognizes a level of residual forage that must be maintained for big –game winter forage and specifies that livestock browse of hardwoods will be minimized. In addition, livestock operators are instructed to herd livestock away from the trail to minimize conflicts with recreationists. Both of the action alternatives protect recreation opportunities along the Wild and Scenic River corridor.

Geologic – The geologic ORV would not be affected by any of the alternatives because none of the alternatives involve activities that would alter the geological landform of the area.

Fisheries and Water Quality – The analysis of Issue 1 related to grazing effects on Joseph Creek and its fishery ORV is provided in the Aquatics section. None of the alternatives would increase the effects on this value over livestock related effects that were occurring in 1988 at the time of the river's designation as Wild and Scenic. The analysis of Issue 2 is also provided in the Aquatics section. This issue addresses concerns with water quality from tributaries to Joseph Creek. Issue 2 also shows that no increase in effects on this value are anticipated. The monitoring protocol for the Meadow Segment of Swamp Creek prescribed by Alternative 3 would improve the effectiveness of a grazing system that is already improving conditions on this tributary. With increased hardwoods and streambank stability, water quality contributions from Swamp Creek would improve over time.

Wildlife – Effects on Rocky Mountain elk, Rocky Mountain bighorn sheep, river otter, black bear, cougar, and Endangered, Threatened, and Sensitive species such as peregrine falcons and bald eagles are addressed in the Wildlife section. Alternative 2 prescribes a grazing schedule that has provided adequate big game winter range for elk over time. Alternative 3 increases the amount of flexibility associated with grazing schedules, but also controls the amount of fall forage utilization that can occur in big-game winter range. Neither alternative would adversely affect the Wildlife OR value.

Cultural – Effects on cultural resources within the river corridor are related to livestock presence in areas where evidence of American Indian use of Joseph Creek still occurs. Because livestock use of the corridor is light (135 am for the Joseph Creek Allotment, 400 am for the Buck Pasture of the Swamp Creek Allotment, and 675 am for the Wilder Pasture of the Table Mountain Allotment), there is little opportunity for livestock congregation in the corridor. In addition, riparian utilization standards encourage riders to move these livestock onto the canyon slopes rather than allowing them to concentrate in the canyon

bottom. Alternative 3 allows more flexibility of grazing schedules than Alternative 2, but it also prescribes that grazing regimes allow no more than 50 percent forage and 20 percent shrub utilization in the corridor, recognizing that isolated benches within the corridor were converted to annual grasses in the homesteading era, and will remain in that condition without active restoration. With this level of control on grazing to maintain forage condition, Alternative 3 would also protect any cultural resources in the corridor.

Existing Conditions - Potential Research Natural Areas

The Table Mountain Allotment contains two potential Research Natural Areas, Haystack Rock and Horse Pasture Ridge. Designated by the Forest Plan, these areas were considered for their potential for preserving examples of all significant natural ecosystems for comparison with those influenced by humans, providing educational and research areas for ecological studies, and preserving gene pools for typical and endangered plants and animals. Refer to Figure 1 in Chapter 1 for a map of these areas, which are designated Management Area 12.

Research Natural Areas typify important ecosystems such as forest, shrubland, grassland, alpine, and aquatic; geologic types, and other natural situations that have unique characteristics of scientific interest. The Haystack Rock Potential RNA is approximately 400 acres in size, all of which are located in Wallowa Valley Ranger District. The area is dominated by shrub-steppe communities such as bluebunch wheatgrass/Idaho fescue/arrowleaf balsamroot; bluebunch wheatgrass/Sandberg's bluegrass/narrow-leaved skullcap; and Talus garland types. These protected natural ecosystems occur in limited numbers in Northeastern Oregon. The condition of the Haystack Rock Potential RNA was evaluated in 2001 by the Blue Mountain Area Ecologist for a 15-year re-evaluation after the 1986 Joseph Creek Fire. He noted that the area was lightly used by cattle coming upslope from Joseph Creek. Because there is no water in the area, use is very light. Although a formal evaluation had not been completed, his professional judgment indicated that the forage condition was good and stable (Johnson 1992).

The Horse Pasture Ridge potential RNA is approximately 250 acres in size. This area is representative of Idaho fescue/prairie junegrass ridgetop communities, Idaho fescus/bluebunch wheatgrass ridgetop communities, and Idaho fescue/bluebunch wheatgrass/arrowleaf balasmroot communities. The condition of this area was evaluated in 2003 by the Wallowa Mountains Office range manager and botanist. It was determined that plant communities were in good to excellent condition and basically ungrazed by domestic livestock with the exception of the northeastern boundary where livestock were once salted near the potential RNA perimeter.

Before either potential RNA is established, an establishment report is prepared. This report will determine area boundaries. Potential RNAs are protected from uses that would reduce their suitability for RNA designation. Both areas receive incidental cattle use which has not reduced their suitability for RNA designation. Activities in RNAs are limited to research, study, observations, monitoring, educational functions, and actions that are non-destructive and non-manipulative.

Alternative 1 – Potential Research Natural Areas

The Haystack Rock and Horse Pasture Ridge potential Research Natural Areas would be unaffected by livestock grazing. Forage in these areas would remain in good to excellent condition, unless another influence such as noxious weed invasion changed the condition.

Alternative 2 – Potential Research Natural Areas

Direct and Indirect Effects - Livestock grazing of the Wilder Pasture of the Table Mountain Allotment would continue similar to current grazing systems. The Haystack Rock potential RNA is in good to excellent forage condition. This condition would continue because spring and fall grazing of this 1680-acre pasture would be limited to 300 animal months for less than 45 days in the spring and 375 animal-months for less than 60 days in the fall. The Haystack Rock proposed RNA is approximately 400 acres in size and is in a relatively steep portion of the pasture that receives only incidental use.

Livestock grazing of the Horse Pasture Ridge Pasture of the Table Mountain Allotment would continue similar to current grazing systems. The Horse Pasture Ridge potential RNA is in good to excellent forage condition. This condition would continue because summer grazing of this 1443-acre pasture would be limited to 360 animal-months for 30 days or less in the summer. The Horse Pasture Ridge proposed RNA is approximately 250 acres in size and is in a relatively isolated portion of the pasture that receives only incidental use. Salting near the proposed RNA perimeter has encouraged some livestock use that would otherwise not occur. Salting would no longer be permitted in this vicinity.

Cumulative Effects - Noxious weed invasion in both potential RNAs is a threat, but with the presence of livestock operators in the area each year, it is likely that any infestations would be identified early.

Alternative 3 – Potential Research Natural Areas

The Haystack Rock and Horse Pasture Ridge potential RNAs would be placed under flexible grazing schedules under this alternative, although the stocking level for each allotment would remain the same as Alternative 2. A utilization standard of no more than 10 percent would be established for both areas. Consequently, forage conditions would remain in good to excellent condition. Noxious weed invasion in both potential RNAs is a threat, but with the presence of livestock operators in the area each year, it is likely that any infestations would be identified early.

Issue 3 – Potential Research Natural Areas

Key Issue - Authorizing livestock grazing as proposed may not preserve options for establishing Research Natural Areas for the Haystack Rock and Horse Pasture Ridge potential Research Natural Areas.

Table 40 - Comparison of Issue 3 Indicators by Alternative

Indicator	Alternative 1	Alternative 2	Alternative 3
	Area Maintained as Good or Excellent Condition (acres)		
Haystack Rock potential RNA	250	250	250
Horse Pasture Ridge potential RNA	400	400	400

As shown above, all of the alternatives preserve options for future designation of the Haystack Rock and Horse Pasture Ridge potential Research Natural Areas. Alternative 1 resolves the potential RNA issue because no livestock grazing would be authorized, and there would be no influence from livestock use. Alternative 2 addresses Issue 3 by retaining the current grazing system and schedule for these pastures. This system has been shown over time to provide for only incidental use of the potential RNAs. Alternative 3 broadens the flexibility of the grazing schedule, but it also increases the level of control on livestock grazing by specifying that no more than 10 percent of the forage may be utilized within the potential RNAs.

Existing Conditions - Joseph Canyon Inventoried Roadless Area

This roadless area of approximately 23,602 acres lies adjacent to State Highway 3 on the northern boundary of the Forest, 20 miles north of Enterprise. It contains the upper reaches of the Joseph Creek drainage, including the tributaries Swamp Creek, Peavine Creek, Rush Creek, and Davis Creek. Fifteen miles north of the roadless area Joseph Creek empties into the Grande Ronde River. The roadless area was inventoried during the first Roadless Area Review and Evaluation, and allocated to nonwilderness uses through the Wallowa Valley Planning Unit EIS (Land Management Plan), dated November 3, 1975. In this plan the commitment was made to retain the essentially roadless character of this area. The roadless area is included in the November 2000 Roadless Area Conservation Final Environmental Impact Statement. Refer to Figure 6 for the roadless area location.

The Roadless Area Conservation FEIS sets out roadless characteristics of soil, water, and air; sources of public drinking water, diversity of plant and animal communities, habitat for threatened, endangered, proposed, candidate, sensitive, and other species; primitive, semi-primitive, non-motorized, and semi-primitive motorized recreation opportunities; reference landscapes; landscape character and scenic integrity; traditional cultural properties and sacred sites; and other locally identified unique characteristics. These roadless characteristics are either discussed in previous sections of this chapter, or further information is provided below.

Reserve this page for Figure 6 – Roadless Area

Because of its relatively small size, irregular configuration, and many miles of boundary, manageability as wilderness would be difficult. Adjustments of the boundary to shield a sizable portion of the area from the sounds of vehicles on State Highway 3 would not be possible. In addition there are multiple examples of human evidence in the area. Old railroad grades and skid trails in the lower reaches of Davis and Swamp Creeks witnessed logging activities that occurred in the 1920s and 1930s. Abandoned fields and remains of buildings occur within the isolated private land parcels that occur along Joseph Creek. In 1986, wildfire swept through most of the roadless area. Thereafter, a salvage sale resulted in more than 30 MMBF of timber being removed. Logging was done by helicopter; therefore, the primary effect on the roadless area was the addition of many new stumps.

There are two small parcels of private land within the area totaling 401 acres. These parcels lie within the heart of the canyon, immediately below the Joseph Canyon viewpoint on the State Highway. The lands are not occupied and are used for grazing purposes. Six miles of jeep trail access these private lands. There are approximately 50 livestock watering facilities and 30 miles of fence found within the area.

Approximately 1,600 acres of the area is within the roaded natural component of the Recreation Opportunity Spectrum (ROS) while 12,600 acres are considered semi primitive-motorized, and 9,400 acres are in the semi primitive nonmotorized component. The depths of the canyons provide opportunities for solitude, providing the recreationist with a sense of self-reliance. Total recreation use amounts to an estimated 4,000 RVDs per year.

The roadless designation benefits the area wildlife that includes virtually every species that inhabits northeast Oregon. Sightings of peregrine falcons and bald eagles are reported. Elk and deer use most of the land for winter range. The major streams provide quality habitat to both anadromous and native fish species. No threatened and endangered plants are known to exist within the area. Refer to the previous sections on aquatic resources and wildlife for further information on this area.

Nez Perce Indians used the area as evidenced by stone implements and examples of lithic scatter. The primary canyon and creek were named for Joseph, who was Chief at the time of settlement of Wallowa Valley and the surrounding area by non-Indians. There is speculation that Chief Joseph was born within what is now the roadless area, but this has not been verified. If the canyon is his birthplace, it is more likely that he was born in one of several caves near the mouth of Joseph Creek, well north of the roadless area in the State of Washington.

Regardless of Chief Joseph's birthplace, the roadless area does have potential archaeological significance. The Senate Committee on Energy and Natural Resources recognized this in a May 18, 1984 report that accompanied the Oregon Wilderness Act of 1984 (HR –1149). This legislation directed the Forest Service to "inventory all archaeological and historic sites in the drainage and determine their eligibility for the National Register of Historic Places. Prior to activities that may affect such prehistoric, historic or cultural sites, the Forest Service shall follow the procedures in 36 CFR 800 which implement the Natural Historic Preservation Act, as amended, in order to fully consider and protect the important values of such sites."

At the present, Nez Perce Indians occasionally exercise their treaty rights to hunt and fish in the area, but use is thought to be low within the Roadless Area itself since there is an abundance of more accessible land nearby.

Alternative 1 – Joseph Canyon Roadless Area

Alternative 1 would preserve all of the roadless characteristics by eliminating livestock grazing from the JCRAA.

Alternative 2 – Joseph Canyon Roadless Area

Alternative 2 would perpetuate current conditions within the roadless area by prescribing continuation of current grazing management systems. Refer to previous sections of this chapter which address effects on these characteristics. The current level of impacts on these resources would be no more than impacts that were in place at the time the Joseph Canyon Roadless Area was first considered for Wilderness designation under RARE I. These impacts have also been found consistent with Forest Plan direction for the Joseph Canyon Roadless Area. Continuation of current grazing systems would not change the characteristics that have been in place over the last 30 years as wilderness eligibility has been under consideration.

Alternative 3 – Joseph Canyon Roadless Area

Alternative 3 would increase flexibility for grazing systems within the roadless area, but prescribes specific protections for areas within the roadless area boundary. For example, protections related to the Haystack Rock potential Research Natural Area, the Joseph Creek Wild and Scenic River, and big-game winter range for the Joseph Breaks area would ensure that grazing is consistent with resource management goals for these areas. Protection of the Haystack Rock potential Research Natural Area speaks to plant diversity characteristics of the roadless area. Setting standards for and monitoring big-game winter range speaks to continued protection of a locally important wildlife habitat need. Establishing a monitoring protocol for the Meadow Segment of Swamp Creek provides for a greater assurance that livestock controls would result in improved riparian condition which would benefit the overall system of steelhead habitat within the roadless area. An inventory schedule to search greater areas for undiscovered Spalding's catchfly occurrences is also part of this alternative. Alternative 3 provides protections for roadless characteristics at a higher level than Alternative 2.

Specifically Required Disclosures

This section contains disclosures of effects that are required by federal law, regulation, policy, or Executive Order.

Economics - A comprehensive economic efficiency analysis requires that all economic benefits and costs be identified and compared. In lieu of a comprehensive analysis, a financial analysis based on identifiable and quantifiable economic benefits and costs can be done. Only actual dollar flows are used in this type of analysis for costs and benefits which have an associated cash price or fee. This difficulty in specification and measurement in no way diminishes the absolute or comparative importance of nonquantifiable economic benefits. However, precisely because these impacts are difficult to quantify, they are typically not included in efficiency or financial analyses. This may create an inherent bias since cost and budget information is typically more readily available than economic benefit information. Economic indicators are used in this analysis as a basis for comparison among the alternatives.

The 2004 discounted forage values were calculated for each alternative. These values were reached by culminating the 10-year present value of anticipated permitted animal unit months. A forage value of $6.90 per AUM was used to calculate present value according to the FY 1999 Animal Value Coefficient memo issued by the Washington Office March 23, 1999. An Animal Unit Month (AUM) is 1.32 times the number of animal months.

Present net costs include costs to the Forest Service and the permittee for structural and nonstructural improvements, monitoring, administration, and mitigation. Structural improvements include fence and water development construction and reconstruction or replacement. Nonstructural improvements include burning and seeding. Monitoring includes implementation, effectiveness, and validation monitoring. General administration activities include those necessary for the Forest Service to administer the permit process. Mitigation includes measures taken to ensure reduce the effects of grazing. Table 41 displays total percent change in the present value of variable costs and activities as compared to Alternative 2 the current management alternative.

Table 41 - Variable Cost of Activities by Alternative

Variable Cost of Activities			
	Alternative 1	**Alternative 2**	**Alternative 3**
Forest Service			
Improvements/ Mitigation	$ 0	$ 10,000	$ 0
Monitoring/ Administration	$ 0	$ 26,000	$ 40,000
Subtotal	$0	$ 36,000	$ 40,000
% Change	100 %	0 %	+ 11 %
Permittees			
Administration/ Operating Costs	$0	$335,400	$ 290,000
Structures	$ 15,000	$ 5000	$ 5000
Subtotal	$0	$ 340,400	$ 295,000
% Change	- 96 %	0 %	- 13 %
TOTAL	$ 15,000	$ 376,400	$ 335,000
% Change	- 96%	0%	+ 11 %

Total annual costs from 2004 to 2014 (10-year duration) discounted to 2004.

The two basic evaluation criteria for efficiency analysis are Present Net Value (PNV) and a Benefit-Cost ratio (B/C). Present net value is defined as the percent (discounted) Value of Project Benefits (PVB) minus the present (discounted) Value of Project Costs (PVC), or PNV = PVB – PVC. A benefit cost ratio is the ratio of PVB to PVC (FSH 1909.17, Chapter 10, section 15). PVB is the present value of the expected future benefits derived from project implementation. PVC is the present value of expected future costs due to project implementation. PNV is one measure of net return on investment (cost).

Employment and personal income impacts were derived from estimates predicted for the Wallowa-Whitman National Forest area-of-influence (Forest Plan and FEIS, Appendix B-85). The results are most useful for evaluating relative differences between alternatives. Personal income effects have been adjusted to 2004 dollars. Annual jobs based on 0.53 jobs/MAUM and $10,232/MAUM (1999 $); Wallowa-Whitman National Forest LRMP, FEIS Appendix B-85).

Grazing Revenues - Grazing revenues are based on Forest Service fees of $1.35 per head month for cattle.

Table 42 – Economic Indicators by Alternative

Indicators	Alternative 1	Alternative 2	Alternative 3
Authorized Head-Months	0	18,130	18,130
Forage Value or Present Net Benefits ($)	0	165,128	165,128
Present Net Costs ($)	15,000	376,400	335,000
Present Net Value ($)	- 15,000	- 211,272	- 169,872
B/C Ratio	NA	0.44	0.49
Annual Jobs	0	13	13
Annual Income ($)	0	$ 245,000	$ 245,000
Grazing Revenues ($)	0	$ 24,475	$ 24,475

Total annual costs from 2004 to 2014 (10-year duration) discounted to 2004.

Cultural Resources - None of the alternatives prescribe ground-disturbing activities that initiate consultation with the Oregon State Historic Preservation Office. If such activities were necessary, such as spring development or fence construction, they would be addressed under a separate analysis. Current livestock impacts to the cultural site near Starvation Springs have been mitigated for the short term by a riparian exclosure. A need for expanding this exclosure was identified in the Upper Joseph Community Watershed Planning Process. Expansion of this exclosure is a foreseeable future action which would further reduce conflicts between livestock grazing and protection of this site.

Probable Adverse Environmental Impacts that Cannot Be Avoided - Grazing by any large ungulate, including deer, elk or domestic livestock can cause some degree of damage to forage or browse plants or to soil structure. Most, but not all of these impacts can be mitigated for use by livestock through implementation of the Forest Plan utilization standards and guidelines and riparian standards. In addition, intensification of management can insure that impacts are kept to acceptable levels. Impacts to riparian areas through the existence of current and past roads and structures in the riparian zones would continue. These impacts would limit recovery potentials and, in places, would prevent the reaching of desired future condition objectives.

Some recreationists object to sharing the public lands with commodity users. The National Forests provide for grazing by domestic livestock where it can be done in a manner compatible with the objectives of the act. However, as with any land management activity, some conflicts are unavoidable.

Relationship Between Short-Term Use and Long-Term Productivity - Forage harvest is a short term use of the resources that is permitted over a ten year period but is managed on an annual basis. The action alternatives promote long term use and management of the range vegetative and related resources under management standards that are designed to promote long term health of the resources on the allotment.

Irreversible and Irretrievable Commitment of Resources - There are no irreversible or irretrievable commitments of resources associated with implementing the alternatives that are not already identified in the FEIS for the Forest Plan.

Potential Conflicts with Plans and Policies of Other Agencies - Implementation of Alternatives 2 or 3 would not result in conflicts between the provisions of the proposed activities and any goals or objectives developed for other government entities. All alternatives are consistent with water quality objectives for the area that have been identified in draft versions of the Wallowa County Total Maximum Daily Load analysis currently being prepared by the Oregon Department of Environmental Quality.

Implementation of Alternative 1 would not be consistent with the Wallowa County – Nez Perce Tribe Salmon Habitat Recovery Plan because the plan allows for livestock use of forage so long as salmon habitat recovery is being accomplished. Eliminating grazing from the JCRAA would not be consistent with the plan's goal for resource management.

Tribal Treaty Rights - Certain rights and privileges are afforded members of the Nez Perce Tribe and the Confederated Tribes of the Umatilla by virtue of the treaties of 1855. These treaties resulted in cession by the Indians to the United States of a large territory which includes approximately two-thirds of what is now the Wallowa-Whitman National Forest. The JCRAA is within ceded territory for the Nez Perce Tribe and is within territory traditionally used by the Confederated Tribes of the Umatilla. The treaties provide that the Indians will retain the rights of taking fish in streams running through and bordering the reservations and at all other usual and accustomed stations in common with other citizens of the United States and of erecting suitable buildings for fish curing; the privilege of hunting, gathering roots and berries, and pasturing stock on unclaimed lands.

All of the alternatives provide the opportunity for Indian tribes to assert their rights for the pasturing of stock. When approached by a tribe for assertion of those rights, the Forest Service would work with existing livestock permitees to establish an area that would serve tribal needs. Alternatives 1 and 2 do not provide a mechanism to accommodate such a need without initiating further environmental analysis. Alternative 3 does provide such a mechanism. The alternative prescribes limits on allotment and pasture stocking while leaving individual permits the flexibility to graze either cattle or horses. Under this scenario, tribal assertion of treaty rights related to pasturing of stock could be accommodated without further environmental analysis.

Alternative 3 provide greater assurance that livestock grazing controls in the Meadow Segment of Swamp Creek would result in true restoration. Swamp Creek is a steelhead fishery, and an improvement in condition could contribute to recovery of fish stocks. Both alternatives strive for restoration of Swamp Creek, but Alternative 3 may accomplish restoration more efficiently.

Issue 5 – Adaptive Management

Key Issue - Authorizing livestock grazing as proposed throughout the Joseph Creek Rangeland Analysis Area may not be adaptive enough to allow a timely or effective response to changing conditions.

Table 43 - Comparison of Issue 5 Indicators by Alternative

Indicator	Alternative 1	Alternative 2	Alternative 3
Can tribal treaty rights for pasturing of horses be asserted without a new analysis?	No	No	Yes

As shown above, all of the alternatives preserve options for future designation of the Haystack Rock and Horse Pasture Ridge potential Research Natural Areas. Alternative 1 resolves the potential RNA issue because no livestock grazing would be authorized, and there would be no influence from livestock use. Alternative 2 addresses Issue 3 by retaining the current grazing system and schedule for these pastures. This system has been shown over time to provide for only incidental use of the potential RNAs. Alternative 3 broadens the flexibility of the grazing schedule, but it also increases the level of control on livestock grazing by specifying that no more than 10 percent of the forage may be utilized within the potential RNAs.

Prime Farmland, Rangeland, and Forestland - Adverse effects on prime farmland, rangeland and forestland not already identified in the FEIS for the Forest Plan are not expected from implementing the action alternatives. Adverse effects to prime rangeland are occurring under the current situation alternative.

Energy Requirements - There would be no unusual energy requirements for implementing the alternatives.

Wetlands and Floodplains - Refer to the analysis of effects on aquatic resources. Jurisdictional wetlands and floodplains occur within the JCRAA. As displayed in Table 28, the effects of implementing Alternatives 2 or 3 would not increase effects on wetlands or floodplains beyond the existing situation. Alternative 3 implements riparian grazing standards for Swamp Creek which allow for more rapid recovery of the shrub component and an increase in streambank stability. These standards will allow for an increased protection or restoration of the Swamp Creek floodplain and its associated wetlands.

Civil Rights, Women, Minorities, and Environmental Justice - Executive Order 12898 directs each Federal agency to make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations. The President also signed a memorandum on the same day, emphasizing the need to consider these types of effects during NEPA analysis.

On March 24, 1995, the Department of Agriculture completed an implementation strategy for the executive order. Where Forest Service proposals have the potential to disproportionately adversely affect minority or low-income populations, these effects must be considered and disclosed (and mitigated to the degree possible) through the NEPA analysis and documentation.

Effects of alternatives on the human environment (including minority and low-income populations) are disclosed in the Economic analysis of this document. The current unemployment rate for Wallowa County is 8.2 percent (June 2004 as disclosed by the Oregon Employment Department in their August 2004 newsletter). Alternative 1 contributes to an increase in the unemployment rate by eliminating approximately 12 jobs within a population of 7,150, which is 0.2 percent. These jobs were estimated to contribute an average of $22,000 per year. Loss of these jobs is not expected to disproportionately affect particular nationalities, genders, or races. Alternatives 2 and 3, however, result in no change in employment from the current situation.