# Precious Lands Wildlife Area
# Draft Management Plan

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Prepared By
Angela Sondenaa, PhD
and
Shana Kozusko
Nez Perce Tribe Wildlife Program
for
Bonneville Power Administration

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# 1.0 INTRODUCTION

The Nez Perce Tribe (NPT) has developed this management plan for the 15,325 acre Precious Lands Wildlife Management Area located in northern Wallowa County, Oregon and southern Asotin County, Washington (Figure 1). This plan outlines the NPT's strategy for mitigating wildlife habitat losses incurred from installation of the four lower Snake River dams. The project was developed under the Pacific Northwest Electric Power Planning and Conservation Act of 1980 (P.L. 96-501), with funding from the Bonneville Power Administration (BPA).

The purpose of this plan is to permanently mitigate and protect wildlife and wildlife habitat to address a portion of the mitigation goal identified in the Northwest Power Planning Council's Columbia River Basin Fish and Wildlife Program (2000).

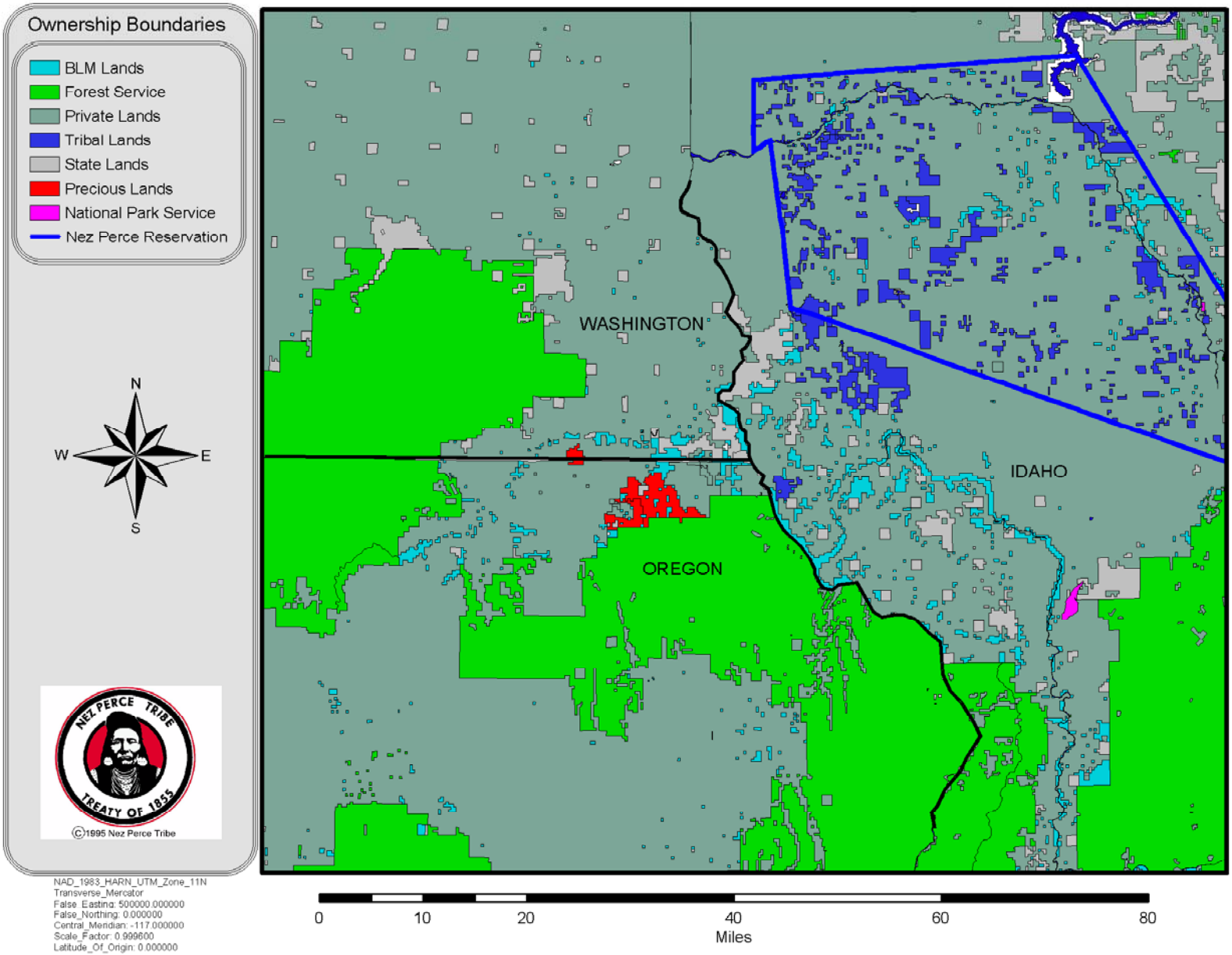
## 1.1 Project History

In 1995, the NPT submitted the "Northeast Oregon Wildlife Project" (#96-80) to BPA for potential funding under the Northwest Power Planning Council's Fish and Wildlife Program. The project was subjected to a National Environmental Policy Act (NEPA) review (BPA and NPT 1996), which resulted in a Finding of No Significant Impact (DOE 1996). Following the NEPA review, the proposal was funded and a Memorandum of Agreement (MOA) between NPT and BPA was signed in September 1996. The resultant contract (96 BI 97175) called for the purchase of approximately 16,500 acres of wildlife habitat using funding provided by BPA. The habitat units (HUs) protected under this contract will be credited to BPA for habitat permanently dedicated to wildlife and wildlife mitigation.

The first lands purchase occurred in November 1996 and consisted of 10,306 acres located in the Joseph Creek watershed in northern Wallowa County, Oregon. The area consists primarily of canyon grasslands with scattered shrub fields and conifer stands. In September 1998, an additional 158 acres was added along the western rim of Joseph Canyon. This area has gentle topography and deep soils that result in high wildlife values. Approximately 57 acres was under agricultural production for Christmas and ornamental trees. The next 1,541 acres was purchased in August 1999 and is located in the Buford Creek watershed of the Grande Ronde River. This parcel is another piece of canyon grassland habitat with scattered shrub fields and a few conifer stands. In addition, there are 123 acres in wheat and hay production. The latest purchase occurred in October, 2000 when the NPT liquidated 153 acres (including the 57 acres in commercial tree production) and acquired 3,472 acres within the Joseph Creek drainage. The current acre total is 15,325. All of these properties were in private ownership prior to their sale to the NPT.

For the purposes of this planning effort, three (3) Planning Units have been delineated. Boundaries were selected based on watersheds (Joseph and Cottonwood Units) or the fact that the parcels are discrete units surrounded by other landowners (Buford Unit, Figure 2).

**Figure 1. Vicinity Map of the Precious Lands Project**



### 1.2 Historical Land Uses

Prior to European settlement, the area was used by Nez Perce people for traveling from the beautiful Wallowa Valley to wintering sites along the Grande Ronde and Snake Rivers. Both Joseph and Cottonwood Creek are well-known travel corridors. Because of the low elevation of the area, it attracted elk, bighorn sheep, and mule deer that were used for subsistence during the winter months. The bunchgrass communities also provided roots, bulbs, and fresh greens to native inhabitants. After modern horses became available, the canyon grasslands were also used to graze Tribal horse herds.

Once European settlement occurred, much of the area was homesteaded for use as cattle ranches. Evidence of old homesteads can be seen throughout the area as dilapidated buildings, old fence lines, and remnant fruit orchards. Tax lot records indicate that numerous small parcels were purchased and consolidated over the years to form large holdings, which made cattle and sheep ranching more feasible in the modern era. Flat benches, ridge tops, and valley bottoms were plowed for hay, grain or vegetable production wherever the soils were deep enough. The steep, rocky terrain limited this type of use, however. Into the 1990's the primary economic activity remained livestock operations.

### 1.3 Current Land Ownership Patterns

The Precious Lands Wildlife Area is bordered by private land in the north, east and west, and by the Wallowa-Whitman National Forest in the south (Figure 3). Both the Cottonwood and Joseph Planning Units are adjacent to or include additional Bureau of Land Management (BLM) inholdings. In the north and west, the Joseph Unit borders BLM property for 7.25 miles. The Cottonwood Planning Unit shares 2.5 miles of exterior boundary with the BLM. In addition, the Joseph Planning Unit largely surrounds 760 acres (in three tracts) of Oregon Division of State Lands property. Private land completely surrounds the Buford Planning Unit. There are no private in-holdings within the Precious Lands Wildlife Management Area.

Private properties in the area tend to be large with several parcels exceeding 6,000 acres. Cattle and sheep ranching, grain crops, hunting and other recreational uses are the primary activities occurring on the private property surrounding Precious Lands. Land management activities on the Wallowa-Whitman N.F. include timber harvest, livestock grazing, hunting, fishing, and recreational uses such as camping and hiking.

**Figure 2. Planning Unit Boundaries**

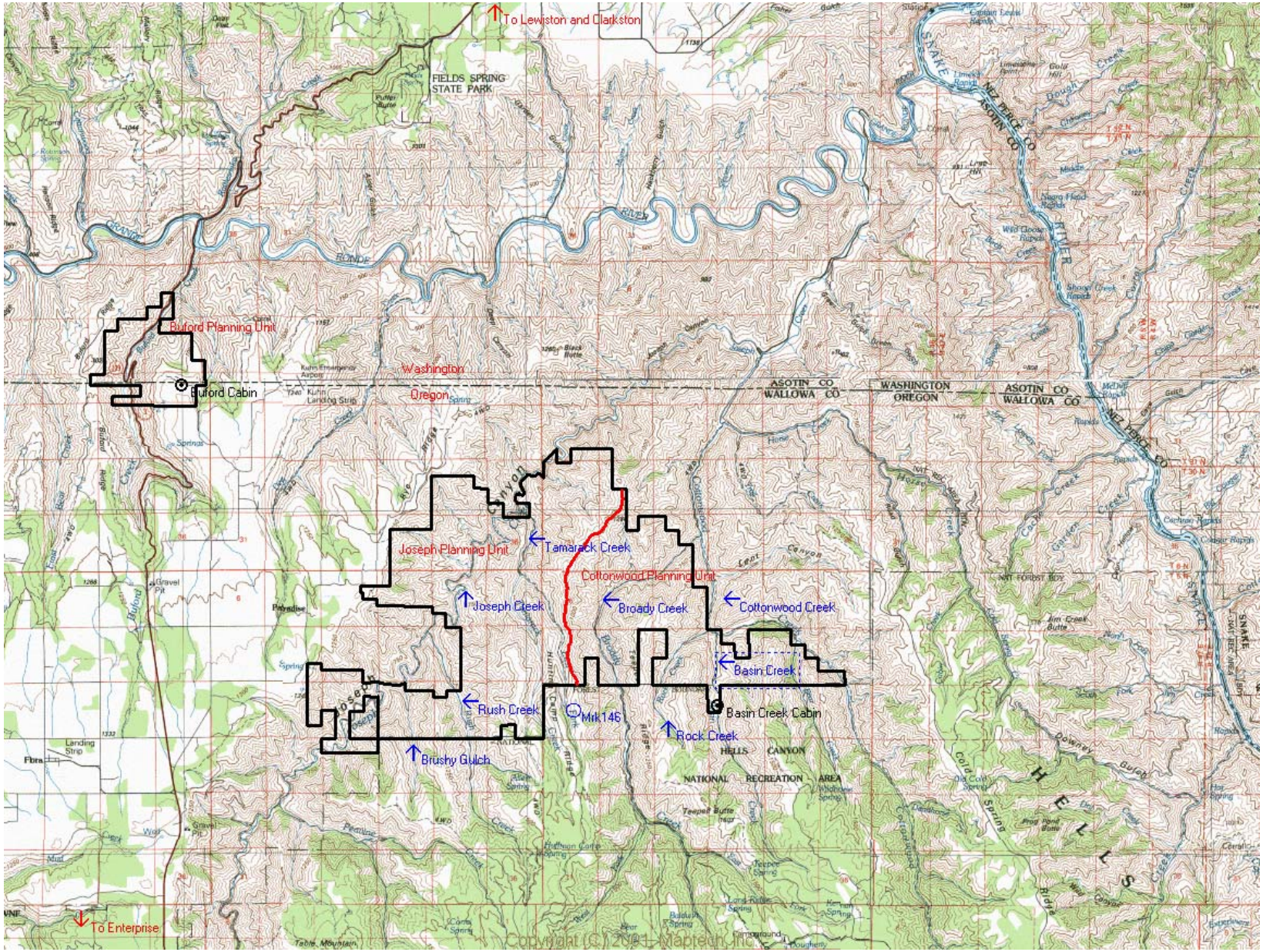
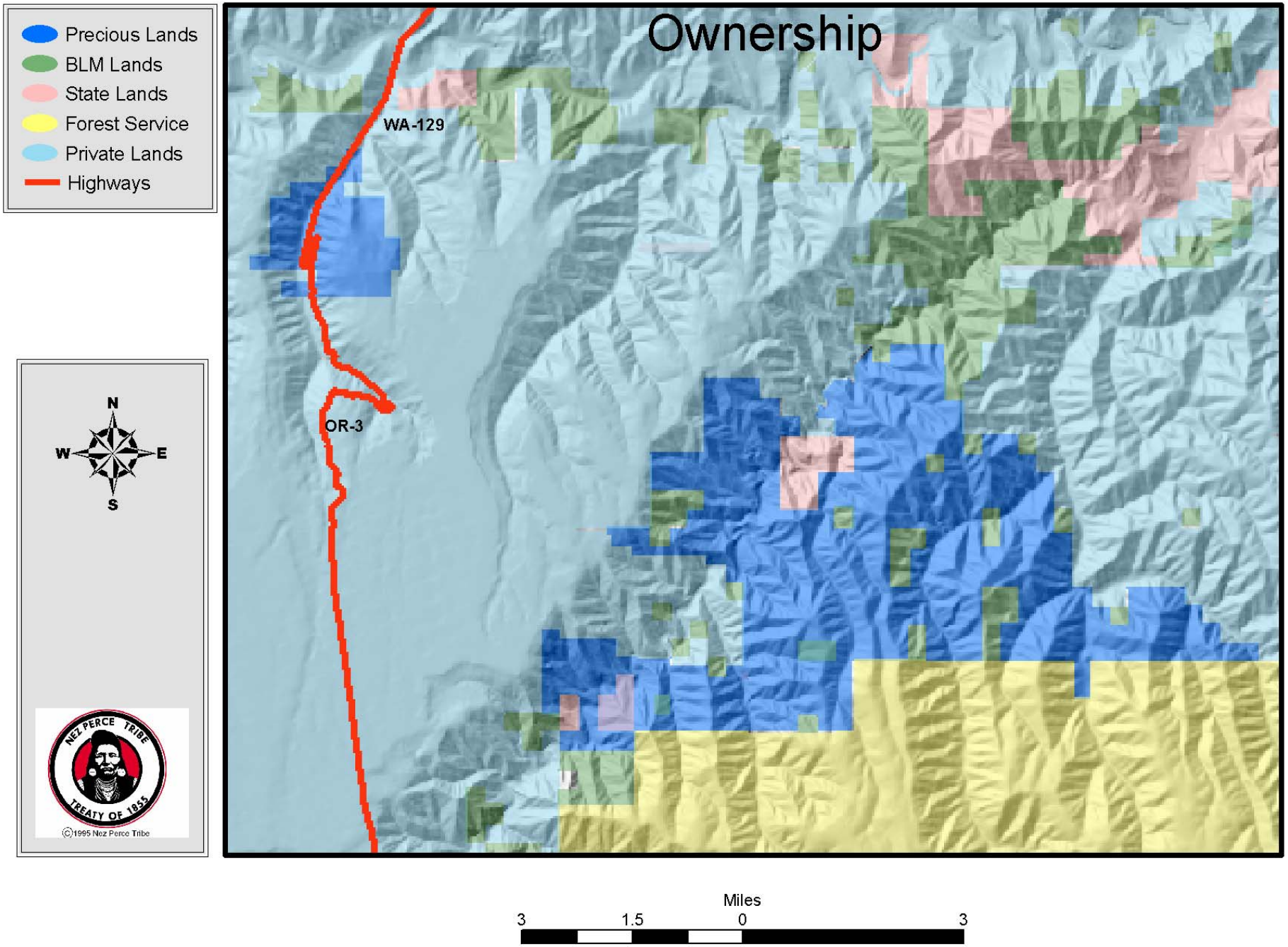


**Figure 3. Land Ownership Map of the Precious Lands Area**



# 2.0 AREA DESCRIPTION

## 2.1 Climate

Climate in this area is largely a function of the topography and elevational gradient of the major river canyons in the region. Elevations on Precious Lands range from a low of 1,540 feet along Joseph Creek in Township 6N, Range 46E, Section 19 to a high of 4,600 feet in the upper reaches of Tamarack Creek in Township 5N, Range 45E, Section 13. Lower elevation sites experience very mild winter temperatures of 20-40$^0$ F but hot daily maximum temperatures averaging 89$^0$ F in July and August. Climatic conditions in the canyon bottoms are similar to those found at Lewiston, Idaho approximately 30 miles to the north (Table 1). Annual precipitation is relatively low and ranges from 12-17" at lower elevations. Most of this moisture comes in the form of rain during September through June.

**Table 1. Climate data for Lewiston, Idaho from 1961-1990. (USDA, 1999)**

| Month | Temperature ( $^0$ F) | | | Precipitation (In.) | |
|---|---|---|---|---|---|
| | Ave Daily Maximum | Ave Daily Minimum | Ave | Ave | Ave Total Snow Fall |
| January | 39.6 | 27.1 | 33.3 | 1.28 | 5.7 |
| February | 46.6 | 31.0 | 38.8 | 0.89 | 2.2 |
| March | 54.1 | 34.7 | 44.4 | 1.09 | 1.1 |
| April | 62.0 | 39.7 | 50.9 | 1.13 | 0.1 |
| May | 70.8 | 46.5 | 58.6 | 1.31 | 0.0 |
| June | 79.8 | 53.9 | 66.8 | 1.25 | 0.0 |
| July | 89.0 | 59.2 | 74.1 | 0.67 | 0.0 |
| August | 88.3 | 58.9 | 73.6 | 0.78 | 0.0 |
| September | 77.3 | 50.5 | 63.9 | 0.78 | 0.0 |
| October | 63.3 | 41.1 | 52.2 | 0.90 | 0.1 |
| November | 48.1 | 34.1 | 41.1 | 1.15 | 2.0 |
| December | 40.1 | 28.2 | 34.2 | 1.20 | 4.8 |
| | | | | | |
| Total | | | | 12.43 | 16.0 |
| Average | 63.2 | 42.1 | 52.7 | | |

Higher elevation sites experience lower winter temperatures and higher snowfall, but have more moderate summer temperatures. Upper elevation sites have climatic conditions similar to Enterprise, Oregon located approximately 34 miles to the south (Table 2). The entire area usually experiences a 90-day drought period during the summer months, which is typical of a xeric climate.

**Table 2. Climate data for Enterprise, Oregon from 1969-1990. (USDA, 1999)**

| Month | Temperature ( $^0$ F) | | | Precipitation (In.) | |
|---|---|---|---|---|---|
| | Ave Daily Maximum | Ave Daily Minimum | Ave | Ave | Ave Total Snow Fall |
| January | 36.5 | 16.0 | 26.2 | 1.84 | 10.7 |
| February | 43.2 | 20.4 | 31.8 | 1.36 | 5.3 |
| March | 50.6 | 24.8 | 37.7 | 1.64 | 2.5 |
| April | 59.3 | 29.0 | 44.2 | 1.8 | 0.3 |
| May | 66.8 | 34.8 | 50.8 | 2.14 | 0.0 |
| June | 75.3 | 41.0 | 58.2 | 1.94 | 0.0 |
| July | 83.8 | 43.2 | 63.5 | 1.19 | 0.0 |
| August | 84.0 | 42.1 | 63.0 | 1.29 | 0.0 |
| September | 74.1 | 35.2 | 54.7 | 1.37 | 0.0 |
| October | 62.2 | 28.2 | 45.2 | 1.12 | 0.0 |
| November | 45.9 | 24.0 | 35.0 | 1.89 | 4.8 |
| December | 36.7 | 16.6 | 26.6 | 1.81 | 8.7 |
| | | | | | |
| Total | | | | 19.39 | 32.4 |
| Average | 59.9 | 29.6 | 44.7 | | |

Topographic diversity is an important factor in local microclimatic conditions. Low rainfall coupled with differences in aspect results in varied microclimates throughout the area. North and east aspects are slightly cooler than west and south aspects. This has a dramatic impact on available soil moisture and results in sharp changes in vegetative cover. Conifer stands are mostly restricted to northerly aspects while southerly aspects are clearly dominated by grassland. Easterly aspects support either grassland or shrub communities while westerly slopes largely support grasslands.

### 2.2 Soils and Geology

The geologic history of the Joseph Creek area is dominated by a series of basalt flows known as the Columbia River Basalts. These flows are very deep and consist of highly fractured, fine-grained material deposited from 2 to 25 million years ago. In addition, loess deposits are found throughout the area, as are deposits of volcanic ash from Glacier Peak (12,000 years ago) and Mount Mazama (6,600 years ago). Some of our more productive forest and grassland sites are associated with deposits of these fine-grained materials (Johnson and Simon, 1987).

Most of the soils occurring on canyon walls and steep slopes are Lithic Argixerolls, Lithic Haploxerolls, or Pachic Argixerolls formed from weathering basalt. These soils are typically shallow, well drained and have a severe erosion potential rating. Benches and ridgetops with slopes of 3 to 45% have slightly deeper soils classified as Xeric Argialbolls or Typic Natrixerolls. These well drained soils formed from loess and minor elements of alluvium and volcanic ash. Erosion potential on these soils ranges from

moderate to severe (Gentry, 1991). In most cases, these soils have been used for agricultural production of dryland crops such as wheat or hay.

## 2.3 Vegetation

Climate, topography and elevation all significantly influence the type and extent of plant communities throughout the area. North aspects are dominated by mixed conifer stands, shrub fields and, in previously burned areas, open woodlands containing tall shrubs with limited conifer regeneration. Occasionally, an Idaho fescue, prairie junegrass community can be found on north aspects not currently dominated by trees or shrubs. South and west aspects are clearly dominated by bunchgrass communities, which is largely a function of moisture availability. These aspects receive more solar radiation over the course of a day, so are drier than either northern or eastern aspects. Lower moisture (due to higher evaporation) results in slopes dominated by drought tolerant grasses rather than shrubs or trees. Easterly aspects support all vegetation types found within the area. At higher elevations, east aspects tend to support more trees than at lower elevations where grasses predominate.

Streamside vegetation consists primarily of black cottonwood or white alder with diverse understory shrubs and the occasional Douglas fire, larch or ponderosa pine. In a few sites, quaking aspen is a significant component of the riparian overstory. Moist draws, springs, and intermittent streams typically support dense thickets of black hawthorn.

Common and scientific names for all plant species mentioned in the text can be found listed in Appendix C.

### 2.3.1 Grassland Communities

**Figure 4. Bluebunch Wheatgrass Community**

Precious Lands is overwhelmingly dominated by canyon grassland communities. A full 74% (11,318 acres) of the total area is classified as some type of grass community, which is typical of the canyon areas of the Snake and Grande Ronde Rivers. The predominant

grass within the Precious Lands Area is bluebunch wheatgrass (Figure 4). Bluebunch is often associated with Sandberg's bluegrass to form vast expanses of grassland on southerly aspects. On ridgetops or other areas of thin soil, these two grasses may form "scabland" communities as described by Johnson and Simon (1987). Regardless of the context, bluebunch wheatgrass is of primary importance to the wildlife species of the area. It is preferred forage for elk and deer on winter range, and provides an important seed source for small rodents and birds.

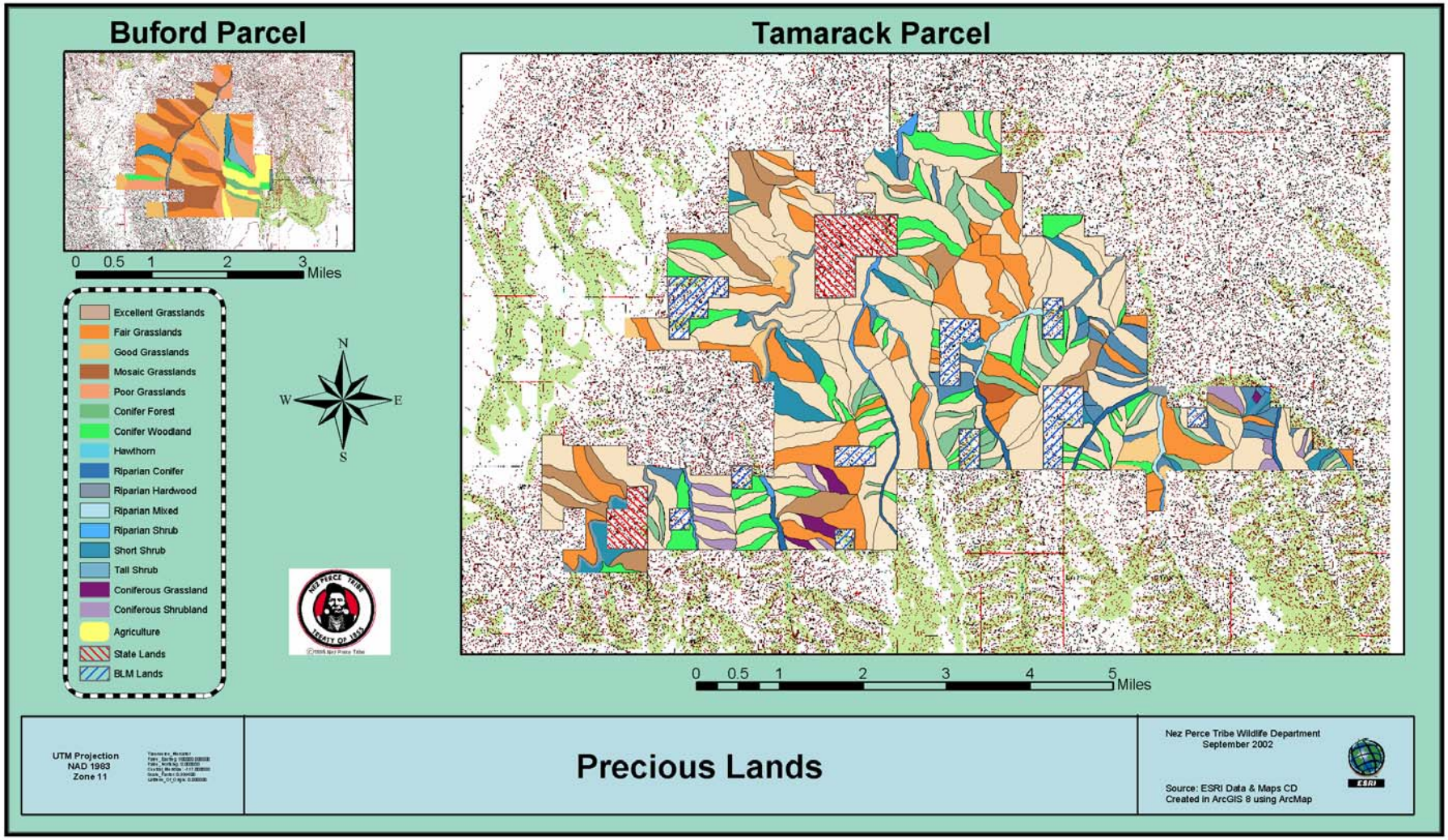
The other common grassland association within the wildlife management area is Idaho fescue, which can either co-dominate a site with bluebunch wheatgrass, or prairie junegrass. The Idaho fescue/bluebunch wheatgrass association is typically transitional between the wetter, higher elevation Idaho fescue/prairie junegrass sites and the drier bluebunch wheatgrass communities of the steep canyon slopes (Johnson and Simon, 1987). North aspects support the more moisture loving Idaho fescue/prairie junegrass communities. These communities are often very rich in forbs and may contain rare species such as Spalding's catchfly. This is a relatively rare plant community within the Precious Lands because most northerly aspects support dense shrub fields or conifer stands.

Noxious weeds are a management concern within the grassland types of the area. Because of past grazing activities and other disturbance events, undesirable species such as cheatgrass, St. John's Wort, and yellow starthistle have become established. Commonly, the initial disturbance creates a favorable seedbed for the establishment of cheatgrass, which is then followed by other weeds like tumble mustard and yellow starthistle. Once these weedy sites are established it is difficult or impossible to rehabilitate them back to a native plant composition without intensive management actions.

To better understand the current conditions of grassland communities on the Precious Lands Area, an extensive mapping project was initiated in 2001. Staff members visited as much of the property as possible to map and assess ecological condition. Excellent grassland sites had < 10% exotic species with little or no cheat grass; Good sites had up to 30% exotics in a matrix of healthy bunchgrasses; Fair sites had from 30-50% exotics with cheat grass common; Poor sites had >50% exotics with cheat grass clearly dominant but with some remnant bunchgrasses. A Mosaic category was also created which represents relatively healthy bunchgrass communities interspersed with patches dominated by cheat grass in a 50/50 mix. From this effort we learned that 8.3% of the grasslands are in excellent condition, 65.4% in good, 20.3% in fair, 3.5% in poor, and 2.5% in a mosaic condition. The majority of poor and fair sites occurred within the Buford and Joseph planning Units (Figure 5).

Although weed inventories are currently on-going, Tribal staff have located and mapped at least 400 acres of yellow starthistle in grassland communities. This particular weed will continue to be a focus of management activities into the future, as will any infestations of new invaders such as leafy spurge, dalmation toadflax, common crupina, or rush skeleton weed.

Figure 5. Plant Community Assessment Map



### 2.3.2 Forest Communities

**Figure 6. Conifer stands amid grasslands**

Forested areas within Precious Lands are largely confined to north and east aspects due to high summer temperatures and low rainfall. Sites that support trees are typically narrow strips running from ridge top to canyon bottom along a slope, and rarely exceed 100 acres in size (Figure 6). Douglas fir is the climax species on nearly all the areas that have been examined, with ponderosa pine and occasionally larch found as seral species. Some stands contain a relatively large number of old pine trees but the younger trees and most of the overstory is Douglas fir. Perhaps, prior to modern day fire suppression, these stands were maintained in a fire climax of ponderosa pine, but currently they are succeeding to a Douglas-fir/ninebark community. All stands have a significant shrub component consisting of ninebark, oceanspray, serviceberry, and common snowberry. Some stands appear to have high levels of dwarf mistletoe infestation, which may not be desirable from a forestry standpoint, but provide great roosting sites for ruffed and blue grouse.

Ponderosa pine is found throughout the wildlife area but rarely creates a climax community. Pure ponderosa pine communities are rare throughout the Wallowa-Snake Province because they require drier conditions than what is typical (Johnson and Simon, 1987). This does not, however, diminish the importance of this species from a habitat standpoint. Many wildlife species utilize large diameter ponderosa pine for feeding, roosting, and foraging. Most notably, flammulated owls, pileated woodpeckers, and ruffed grouse all utilize live or standing dead pines for required habitat components.

During the late 1980's several large fires impacted forested stands within the wildlife management area. Most notably, the Teepee Butte and Joseph Creek Fires burned several hundred acres of conifer forest and returned them to early seral shrub stands. Parts of Bear Creek, Brushy Gulch, and Rush Creek all experience stand-replacing fires. Some of these areas are starting to regenerate naturally but are still lacking in large

overstory trees. Approximately 312 acres within the Joseph and Cottonwood Planning Units have burned and are still in a grass or shrub cover type. Portions of the Buford Planning Unit have also lost much of their overstory either through selective timber harvest or conversion to wheat and hay production. All of these areas may require active management to help restore them to a mature stand condition.

Forested sites are a limited resource within the management area and only represent 12% (1,819 acres) of the total area, yet are disproportionately important to wildlife. Neotropical bird diversity was much higher in forested sites compared to grassland types (NPT, unpublished data). Forest areas also provide the structure required for cavity nesting birds, roosting bats, and other forest-dependant species, which may be considered rare or sensitive. Additionally, stands with high canopy coverage are critical thermal cover and security areas for wintering big game animals (Lyon and Ward, 1982). Clearly, this is a cover type that should be protected and managed for its unique habitat values within this canyon grassland ecosystem.

### 2.3.3 Riparian Communities

**Figure 7. Aspen / shrub riparian area along Tamarack Cr.**

Riparian vegetation occurs along all perennial and intermittent waterways within the Precious Lands Wildlife Area. Moist draws also support moisture-loving shrub communities dominated by black hawthorn. The larger streams such as Cottonwood and Joseph Creeks support black cottonwood communities, while small tributaries often contain white alder as the dominant overstory tree. Douglas fir, ponderosa pine, and occasionally larch, are also found throughout the riparian areas, and in the case of Broady Creek, represent a significant constituency within the community. Aspen may also be present. One section of East Fork Tamarack Creek contains an aspen gallery along approximately 0.5 miles of the waterway (Figure 7).

Shrubs are an important component of all riparian areas, and in some cases make significant contributions to community diversity. Common understory shrubs include red

osier dogwood, elderberry, syringa, thimbleberry, current, and the ubiquitous black hawthorn. Small trees are also present in the form of chokecherry, water birch and cascara. In some cases, black hawthorn forms a nearly impenetrable thicket of shrubs along intermittent waterways and moist draws. These areas are important for nesting birds and as escape cover for deer, grouse, cottontails, black bears, and many other species. The berries provided by riparian shrubs form the mainstay of the diet for neotropical birds, and black bears preparing for winter hibernation. The importance of these rich communities is further illustrated when one considers that only 4% (609 acres) of the Precious Lands Area supports riparian plant communities.

Important but often overlooked "riparian areas" are the communities that develop around seeps and springs. Typically these sites support dense shrub stands but they may also contain overstory trees such as black cottonwood. Often, these communities exist as islands in a sea of grassland, and as such, provide much needed vertical structure, shade, escape cover, nesting sites, perches, and drinking water. They may also harbor rare or unique plant species.

The riparian areas within the Precious Lands Wildlife Management Area are in good to excellent condition, with a few exceptions. The flood events of 1996-97 caused considerable damage to overstory vegetation in Joseph, Buford, and Cottonwood Creeks. Many large trees were uprooted and in some cases, severe down grading occurred within existing stream channels. As a result, canopy coverage has declined and become patchy within those systems. This increases solar radiation and may negatively impact stream temperatures.

In addition to mainstem passage, high stream temperatures and loss of riparian vegetation are significant limiting factors for salmonid production within the Joseph Creek watershed, which includes Cottonwood Creek. Protection and enhancement of streamside vegetation should improve shading and reduce sedimentation into the stream channel while also benefiting terrestrial wildlife species. A healthy overstory will also contribute to large woody debris recruitment, which was identified as a management concern in the lower reaches of Joseph Creek during a 1999 stream survey (Stein 2000).

The Teepee Butte Fire of 1988 completely consumed the riparian vegetation within the Bear Creek drainage (see Figure 17). Twelve years post-fire, the area is recovering naturally with dense shrub communities along the stream. Overstory species, however, are just now beginning to over top the shrub canopy. Protection of this stream from trespass livestock grazing should benefit natural recovery efforts.

### 2.3.4 Shrub Communities

**Figure 8. Smooth sumac shrub community**

In addition to their role in riparian communities, shrubs also develop unique, identifiable communities on north slopes and on deep soil toe slopes within the Precious Lands area. Shrub communities are an important component within the canyon grassland ecosystem. Approximately 7.5% of the area (1,143 acres) supports shrub communities of which about half occurs as tall shrub stands (598 acres) and half as short shrub stands (545 acres).

The ninebark community is the most extensive of the shrub fields within the management area. Ninebark, in association with snowberry and rose, forms dense thickets along canyon slopes with northerly aspects. These communities typically lack any tree component and possibly never supported trees even in the absence of fire (Johnson and Simon, 1987). These communities are heavily utilized by wildlife for cover, shade, and nesting. Songbirds appear to be particularly abundant within these shrub types (NPT, unpublished data). Ninebark is very resistant to fire and sprouts vigorously after being burned (Johnson and Simon, 1987) so it is uniquely adapted to the canyon ecosystem.

Snowberry-dominated shrub fields occur throughout the Management Area on north aspects as inclusions within the Idaho fescue/prairie junegrass community type. Unlike the ninebark communities, these shrub patches rarely exceed one meter in height but may become quite thick. Rose is always an important component of this community and, along with snowberry, can provide important forage for wintering big game animals, and livestock (Martin et al., 1951).

Smooth sumac shrub communities are largely restricted to deep soil toe slope areas, and often occur between riparian areas and upland bunchgrass communities (Figure 8). Although these communities are rarely very large in extent, they nonetheless contribute

to habitat diversity within the canyon ecosystem. Plants often show evidence of a browse line from herbivore activity. Perhaps their most distinctive feature is their bright red foliage during the fall. Not only are they quite attractive during this period, but communities are also quite easy to map from a distance.

The various shrub communities found within the Wildlife Management Area appear to be in relatively good ecological condition. Few weeds can penetrate the dense stands of ninebark, but there is encroachment of weedy species (notably cheatgrass) into some snowberry/rose and sumac communities. Ninebark communities within the Bear Creek drainage may have increased in extent due to the Teepee Butte Fire that eliminated overstory vegetation in that area. We expect, however, that those areas will reestablish tree cover over time. Because of their importance to wildlife, management actions will strive to protect and promote healthy shrub communities throughout the Wildlife Management Area.

### 2.3.5 Agricultural Areas

**Figure 9. Field A on the Buford Planning Unit**

The Buford Planning Unit contains 124 acres of agricultural fields (Figure 9). These fields have moderately deep soils and gentle topography. They were probably created by clearing ponderosa pine / Douglas-fir forests or native bunchgrasses followed by plowing. These fields provide some forage value to resident wildlife species, but offer very little cover during fall and winter months after harvest. The Farm Services Agency (FSA) in Enterprise, OR rates all the fields as Highly Erodible (FSA, unpublished data).

When the NPT purchased this area in 1999, most of the fields were in annual wheat production with approximately 12.4 acres dedicated to grass hay production. The NPT has continued to lease these fields for agricultural purposes. It is the intent of the NPT that eventually, most fields will be restored to native vegetation. In October 2001 a single 30-acre field was removed from production and planted with native bunchgrasses and forbs. In October 2002 an additional 38 acres is slated for planting to bluebunch

wheatgrass and Idaho Fescue. Section 8.0 of this document contains more details of the restoration plan for the agricultural fields on the Buford Unit. Monitoring and evaluation criteria can be found in Section 9.10.

### 2.3.6 Threatened, Endangered and Sensitive Plants

The Precious Lands Area contains habitat for several special status plant species. Specifically, the area may provide habitat for the federally Threatened Macfarlane's four-o'clock which is known to occur in Wallowa County in the Hell's Canyon National Recreation Area. To date, however, no populations of this plant have been documented for the Grande Ronde River drainage where Precious Lands occurs. The area also contains habitat for the Threatened Spalding's catchfly, which occurs on north-facing grasslands containing Idaho fescue and prairie junegrass. There are currently seven known populations of this plant in Wallowa County (US Fish and Wildlife Service, 2001). Habitat-specific surveys were conducted for these two species during the 2002 field season but no populations were discovered. Further efforts will be made to inventory and map potential habitats so that management activities do not inadvertently impact undocumented populations.

Numerous other special status plant species may also occur within Precious Lands but none have been documented to date. Two species (Engelmann's daisy and male fern) occur on Forest Service property directly adjacent to the wildlife management area, so probability of occurrence within the project area is considered high for these species. Appendix B lists the other special status plants that may occur within the area. This list was generated using information provided by the Oregon Natural Heritage Program (1998), the Washington Natural Heritage Program (1997), Flora of the Pacific Northwest (Hitchcock and Cronquist, 1973), and consultations with knowledgeable individuals. This list simply indicates the species that MAY be present and in no way infers that all these species are found within the planning area. This list was generated to provide information to interested individuals and to serve as a planning tool. Habitat specific surveys will need to be conducted to confirm any special status plant populations within the area.

## 2.4 Wildlife and Fish Populations

After purchase of the Precious Lands Wildlife Management Area, tribal staff initiated extensive surveys of the wildlife resources of the area. Efforts concentrated on the birds, mammals, amphibians, and reptiles of the area. Due to lack of funding and time constraints, no systematic surveys have yet been conducted for invertebrate or aquatic resources. Historical data of the aquatic resources of Joseph, Broady, and Cottonwood Creeks has been incorporated into the management plan, where appropriate.

Appendix A contains a complete list of the birds, mammals, amphibians, and reptiles formally documented for the property. Special status vertebrates have been designated as such in the tables.

### 2.4.1 Threatened, Endangered and Special Status Animals

The Precious Lands area currently provides habitat for two federally listed Threatened species: Snake River steelhead (*Oncorhynchus mykiss*) and bald eagle (*Haliaeetus*

*leucocephalus*). The bald eagle has been proposed for de-listing but that decision is still pending. Until a final ruling has been made, all management decisions will consider the bald eagle a listed species. Bald eagles have been documented on Precious Lands during the fall and winter months but there is no evidence of nesting activity.

Snake River steelhead are known to occur in Joseph, Cottonwood, and possibly Broady Creek. In 2001 and 2002 NPT field crews observed spawning adults in Cottonwood Creek. Data on current population levels in the Joseph Creek Watershed are not available, however. A report by the Wallowa-Whitman National Forest (Hardy, 1992) stated that 418 spawning adults were estimated in Joseph Creek in 1984. Habitat assessments within Lower Joseph Creek indicate that habitat diversity is low, pool numbers are less than optimal, large woody debris is lacking, stream shading is low, and water temperatures are too high (Hardy 1992, Stein 2000). All of these conditions result in lowered habitat quality for steelhead within the Joseph Creek drainage.

Hardy (1992) recommended a cooperative project to conduct stream surveys on fish bearing and potentially fish bearing streams in the Joseph Creek Drainage. The NPT endorses that recommendation. Streams on Precious Lands that might be included in such a survey include Joseph, Cottonwood, Bear, Basin, Broady, Tamarack, Rush, and Buford Creeks. Rock Creek is considered unsuitable for fish because of its intermittent nature and subsurface flows at its mouth.

A third federally listed species, the lynx (*Lynx canadensis*), is thought to occur in the region but there have been no documented sightings in recent years. Lynx habitat is characteristically considered to be above 4500' elevation in areas with dense stands of young conifers interspersed with small openings containing grass or shrubs. There have been reports of lynx in more open bunchgrass habitats but these appear to be atypical (Coggins, 1969, as cited in Verts and Carraway, 1998). Considering the open nature of the Precious Lands Area and general lack of regenerating conifer stands, it is unlikely that lynx inhabit the management area. They may, however, occur to the south near the Table Mountain area on the Wallowa-Whitman National Forest where more suitable habitat exists (R. Anderson, personal communication, 2000).

Historical records indicate that Townsend's big-eared bats (*Corynorhinus townsendii*) occurred in the Grande Ronde River drainage and possibly Joseph Creek Canyon (Bailey, 1936; J. Perkins, personal communication, 2000), but none have been documented in recent years. The potential exists, however, for this special status mammal to occur within the planning area, especially at low elevation sites containing caves.

More recent historical documentation indicates that the mountain quail (*Oreortyx pictus*) still inhabits portions of the Joseph Creek drainage and possibly areas of Horse and Cottonwood Creeks adjacent to the management area. Although Tribal staff has made no sightings, there is a strong possibility that remnant populations still persist in the area.

### 2.4.2 Culturally Important Species

**Bighorn Sheep**
Bighorn sheep populations in the area immediately surrounding Precious Lands are relatively low in number but are increasing. Individual animals have been seen in Tamarack Creek and lower Joseph Creek. It's possible that some animals use the area throughout the year. Table 13 in Appendix A displays bighorn population data for the Joseph Canyon/ Chesnimnus-East Sled Springs Units as obtained from ODFW. Numbers have slowly increased since 1986 but the herd experienced a *Pasteurella* outbreak during 1996, which they have been slow to recover from. Population estimates for 1999-2000, place the herd at about 35 animals.

**Elk**
The Oregon portion of Precious Lands lies within the Chesnimnus Wildlife Unit except that portion of the property lying west of Joseph Creek, which is included in the Sled Springs Wildlife Unit. The Chesnimnus Unit is managed as a permit-only elk hunt with 700 tags issued during the year 2000 season. The Sled Springs Unit has two permit-only elk seasons; one for spikes only (400 tags) and one for mature bulls (500 tags). Table 14 in Appendix A summarizes ODFW winter herd count data for the seven major ridge systems located within or adjacent to the Precious Lands area. These data demonstrate the importance of the Precious Lands area for wintering elk herds. Satisfactory winter cover for elk is comprised of dense conifer stands with greater than 70% canopy closure and trees greater than 40ft tall (Thomas et al. 1988). Many of the conifer, riparian conifer, and riparian mixed cover types on the project area support satisfactory winter range for elk. An average 18% of all elk in the Chesnimnus Unit can be found on or adjacent to the wildlife area in any given year. The target elk population for the Chesnimnus Unit is 3,500 animals, although there has been a declining trend in both overall numbers and calf recruitment in the last 10 years.

**Mule Deer**
The Precious Lands area lies within the Chesnimnus Wildlife Unit (ODFW) except that portion of the property lying west of Joseph Creek, which is included in the Sled Springs Wildlife Unit (ODFW). The whole Chesnimnus Unit was estimated to contain a population of 6,000 mule deer in 2001, and the Sled Springs Unit was estimated at 14,000 (ODFW 2002). Winter range for mule deer is characterized by 10-45% slope on a south or westerly aspect, and below 4,000ft elevations (Snyder 1991). Mule deer prefer open forests and grasslands on rocky terrain throughout the year, and seek shelter in brushy draws and river drainages when snow in the upper elevations becomes too deep. Many of the conifer, riparian conifer, and riparian mixed cover types on the project area would be suitable mule deer winter range, although an actual acre figure has not yet been determined.

**Native Grouse**
The Precious Lands management area provides habitat for both ruffed and blue grouse. Both species may be found in mixed conifer woodlands, although the ruffed grouse prefer a quaking aspen habitat association, while blue grouse prefer a ponderosa pine

component. Moderate shrub canopy cover offers both concealment and forage, but neither species prefers dense canopy cover due to the increased risk of ambush by predators. Both species have been regularly observed on the Precious Lands.

**Golden Eagle**
Golden eagles nest on rocky cliffs overlooking grasslands where they forage for small mammals and occasionally other bird species. This species is very sensitive to human disturbance and may abandon nests if disturbed. Individual eagles are occasionally seen on the Precious Lands and a nesting pair has been observed with an immature offspring in the Cottonwood creek drainage. Habitat management for golden eagles primarily consists of protecting nesting and foraging areas and protecting habitat for prey species (Tesky 1994).

**Red-tailed Hawk**
Red-tailed hawks are commonly seen perched or hunting on the Precious Lands management area. This species prefers cover types such as open conifer forests, mixed deciduous woodlands, grasslands and agricultural fields with scattered trees. They most often nest in tall or isolated trees in riparian zones and forage for small mammals and reptiles in open habitats (Tesky 1994b). Management for red-tailed hawks would be to maintain 50-100 trees per acre with > 40% of those being 8" diameter breast height. Snags should be retained as perch sites (Tesky 1994b).

**Steelhead**
The Precious Lands management area provides spawning habitat for steelhead in Cottonwood and Joseph creeks, and both adult and juvenile steelhead have been observed in these two systems. Steelhead require cool water temperatures, ample oxygen, and low levels of suspended solids and contaminants. Fine sediment can damage the gills of adult steelhead and bury or reduce oxygen flow to eggs. Steelhead require large woody debris and deep pools to provide refuge from predators and cool water when shallow areas warm up in the summer. Steelhead typically spawn in the spring and prefer streams in the highest reaches of the watershed, on steep slopes, and with streambeds composed of large gravel and rock. Young steelhead prefer fast moving water. Management considerations for steelhead include streambank restoration to reduce siltation, reclamation of stream-side vegetation, and recruitment of logs and large woody debris.

## 3.0 HEP ANALYSIS

Under the Northwest Power Planning Act, the Bonneville Power Administration was mandated to mitigate for wildlife habitat losses. In order to do that BPA must be able to measure the amount and quality of habitat lost and gained through their activities, including the Precious Lands project. The accounting system adopted by BPA is a habitat modeling strategy known as a Habitat Evaluation Procedure (HEP) developed by the U.S. Fish and Wildlife Service. This procedure uses models to measure the quality of a specific habitat for target wildlife species. The models are based on key habitat parameters (ex. shrub height, snag density, or distance to water) and provide a measure of the habitat quality for that particular species. One product of HEP is a quantitative

evaluation of habitat quality that is provided in terms of a Habitat Unit (HU). One acre of optimum habitat equals one HU. This HU accounting system is used to determine the amount of credit BPA receives for the land being protected.

A baseline HEP analysis was initiated on the Precious Lands Area in 2000 with data collection occurring for the past three summers. The difficult terrain and limited access on the wildlife area has created logistical challenges for data collection that has resulted in a greater time commitment and smaller sample sizes than would be optimal. Field data collection has been completed, however, and a detailed HEP Report will be completed in the fall of 2002. The data presented in this Management Plan should be viewed as preliminary pending the completion of the HEP Report.

### 3.1 Methods

HEP is a standardized habitat-analysis model that uses Habitat Suitability Indices (HSI) for target wildlife species to evaluate the plant community as a whole (Anderson and Gutzwiller 1996). Field methods follow standard U.S. Fish and Wildlife Service protocols (USFWS 1980a, 1980b; Hays, Summers and Seitz 1981) based on cover type sampled and Habitat Suitability Index (HSI) models being applied. The HSI values range from 0.0 – 1.0 and are multiplied by potential habitat acreage to determine quantity and quality of habitat available to target wildlife species.

While HSI models were initially used to evaluate the baseline condition of the project area, long-term monitoring will continue to use HEP data collection procedures, but is not limited to particular wildlife variables. Long-term monitoring will document trends in plant community health, weedy encroachment, limiting factors for wildlife, and identify/monitor areas of habitat degradation. Transects will be stratified over all cover types so that at least two transects per cover type are evaluated. Due to the monotypic nature of the agricultural fields (all winter wheat) only one transect was established in this cover type. The Monitoring & Evaluation section contains an in-depth discussion of protocols, models, and methods.

### 3.2 Target Species

Target wildlife species identified for the Precious Lands Area HEP analysis are: downy woodpecker, song sparrow, yellow warbler, western meadowlark, mule deer, chukar, California quail, blue grouse, black-capped chickadee, and beaver. Originally, river otter was selected as a target species for riverine habitats but was replaced by beaver because of the lack of a suitable model for otter. The beaver model (Allen, 1983) provides a more detailed evaluation of riparian community condition compared to the relatively simple otter model used during the Lower Snake Assessment.

Table 3 provides a description of the rational for selecting each species, and the habitat variables measured for each.

**Table 3. Target wildlife species selected for the HEP analysis.**

| HEP Target Species, Rationale, and Model Variables | | |
|---|---|---|
| **Species** | **Rationale for Selection** | **HIS Model Variables** |
| Downy Woodpecker (*Picoides pubescens*) | Selected to measure forested riparian habitats. Represents snag-dependant species. | V1: Square feet basal area/acre<br>V2: # snags (>6" dbh)/acre |
| Song Sparrow (*Melospiza melodia*) | Selected to measure riparian shrub/woodland habitats. | V1: % canopy cover of shrubs <6 m tall<br>V2: Ave height of shrubs <6 m tall (m)<br>V3: Ave distance to potable water (km) |
| Yellow Warbler (*Dendroica petechia*) | Selected to measure riparian shrub habitat. Species with declining population trend throughout its range. | V1: % canopy cover of deciduous shrubs <6 m tall<br>V2: Ave height of deciduous shrub canopy (m)<br>V3: % of shrub canopy consisting of hydrophytic species |
| Beaver (*Castor canadensis*) | Selected to measure riverine habitats and riparian vegetation.<br>NOTE: Substituted for river otter. | V1: % tree canopy cover<br>V2: % trees in the 1-6" DBH class (2.5 – 15.2 cm)<br>V3: % shrub crown cover<br>V4: Ave height of shrub canopy (m)<br>V5: Species composition of woody vegetation<br>V6: % lacustrine surface dominated by water lily<br>V7: % stream gradient<br>V8: Ave annual water fluctuation |
| Western Meadowlark (*Sturnella neglecta*) | Selected to measure grassland and shrub/steppe habitats. | V1: % herbaceous canopy cover<br>V2: % herbaceous cover comprised of grasses<br>V3: Ave height of herbaceous canopy cover in spring (cm)<br>V4: Ave distance to perch (m)<br>V5: % canopy cover of shrubs <6 m tall |

| | | |
|---|---|---|
| Chukar<br>(*Alectoris chukar*) | Selected to measure grassland habitats.<br>Important game species. | V1: % canopy cover of herbs<br>V2: % canopy cover of shrubs <6 m tall<br>V3: Distance to exposed rocky areas (km)<br>V4: Topographic class<br>V5: Distance to mesic shrub cover (km) |
| Mule Deer<br>(*Odocoileus hemionus*) | Selected to measure grassland and upland shrub habitats. Important game species. | V1: % cover preferred shrubs <1.5 m<br>V2: # preferred shrub spp.<br>V3: Mean shrub height (m)<br>V4: % cover shrubs < 1.5 m<br>V5: % cover palatable herbaceous species<br>V6: Presence of crops within 1.6 km of site<br>V7: Aspect<br>V8: Road density<br>V9: Topographic diversity<br>V10: % evergreen canopy >1.5 m |
| California Quail<br>(*Callipepla californica*) | Selected to measure upland shrub habitats. Important game species. | V1: % herbaceous canopy cover<br>V2: Distance to roost cover (m)<br>V3: Distance to escape cover (m)<br>V4: Herb height (cm)<br>V5: % shrub canopy cover<br>V6: Ave shrub height (m) |
| Black-Capped Chickadee<br>(*Parus atricapillus*) | Selected to measure conifer forest habitats. Represents snag-dependant species. | V1: % tree canopy closure<br>V2: Ave height of overstory trees (m)<br>V3: Tree canopy volume<br>V4: # snags 4-10" DBH per 1 acre (10-25 cm DBH per 0.4 ha) |
| Blue Grouse<br>(*Dendragapus obscurus*) | Selected to measure conifer forest habitats,and the interspersion of conifer and shrub/grass types.<br>Important game species. | V1: % conifer and aspen canopy cover over entire area<br>V2: % shrub crown cover<br>V3: Ave shrub canopy height (cm) |

| | |
|---|---|
| | V4: % herbaceous canopy cover<br>V5: Ave herbaceous canopy height (cm)<br>V6: # herbaceous species per cover type<br>V7: Distance to forest or tree savanna (km) |

### 3.3 Cover Types – Descriptions and Acreage

There are four general cover types represented in the Precious Lands Wildlife Area – Grassland, Shrub, Conifer, and Riparian. Health and diversity of a cover type are evaluated by measuring habitat variables associated with target wildlife species chosen to assess each community. Wildlife species and their associated cover types are as follows:

| | |
|---|---|
| Grassland: | mule deer, blue grouse, Western meadowlark, and chukar. |
| Shrub: | mule deer, blue grouse, song sparrow, Western meadowlark, and California quail. |
| Conifer: | mule deer, blue grouse, and black-capped chickadee. |
| Riparian: | mule deer, blue grouse, song sparrow, downy woodpecker, yellow warbler, beaver, and black-capped chickadee. |

Cover type classifications were modified from the four basic Grassland, Shrub, Riparian and Conifer categories to acknowledge ecological changes and variability in some communities.

Grassland sites comprise 74% of the total acreage on the Precious Lands and have been separated into Agriculture, Good grassland, and Degraded grassland. In 2001 there were approximately 124 acres of land in agricultural production. The ‘good’ and ‘degraded’ classifications were based on percent cheatgrass and average herbaceous height. A high percentage of cheatgrass indicates recent disturbances such as grazing or erosion, and height is used to differentiate between the shorter cheatgrass and the taller native bunchgrass plots. Degraded grasslands cover 2,929 acres, and had an average herbaceous height of 27.4cm and 55% cheatgrass. Good grassland sites cover 8,423 acres and average 48.9cm herbaceous height and 15.5% cheatgrass.

Shrub communities were separated by Tall shrub and Short shrub designations. Tall shrub sites covered 598 acres and were dominated by ninebark or sumac. Short shrub sites were dominated by snowberry/rose communities and covered 545 acres.

Riparian sites are all evaluated as a single cover type in the HEP model runs, although the range of dominant vegetation included hawthorn shrub, riparian hardwood, riparian conifer, riparian mixed, and riparian shrub. Additionally, flood events have drastically changed the streambed channel and vegetation structure of some sites, making them

highly variable and difficult to delineate. All riparian communities grouped together total 609 acres.

Conifer communities are divided by percent evergreen canopy and recent fire events. Conifer sites are characterized by >30% evergreen canopy cover, Open conifer sites have <30% evergreen canopy cover, and two recent sites that have been burned are designated as Burned Conifer Grass and Burned Conifer Shrub. The two burned sites have "0" evergreen cover and are currently dominated by grass or shrub species. They are expected to progress back into Open conifer or Conifer communities and are being monitored for regeneration success. Conifer sites total 630 acres, Open conifer covers 1,189 acres, and the two burned sites cover 312 acres together.

### 3.4 Baseline HEP Survey Routes

In year 2000, 23 baseline HEP transects (10 grassland, 3 shrub, 6 riparian, and 4 conifer) were randomly established and sampled within the Precious Lands Wildlife Area. A further six transects (3 shrub and 3 conifer) were completed in 2001 to better sample cover types that were either highly variable or poorly represented in the 2000 sampling effort. A final six transects (3 grassland and 3 riparian) were completed during 2002 in attempt to sample across a wider range of aspects on grasslands, and in previously unsampled creek drainages. Total baseline HEP sampling efforts yielded 35 plots by the end of 2002, and 24 of those plots will be monitored on a 5-year rotational basis to document habitat changes and trends. Master charts detailing variable values of each transect (years 2000-1 only) are located in Appendix D.

### 3.5 Results

Habitat Suitability Index (HSI) values have been calculated for each of the target wildlife species. Those values represent a relative measure of habitat quality based on the variables measured and the model used. All HSI values fall between 0 and 1.0 with 1.0 considered optimal habitat. Using these criteria, habitats can be rated as poor (0.0-0.2), marginal (0.21-0.3), fair (0.31-0.5), good (0.51-0.7), excellent (0.71-0.99), and optimal (1.0).

**Blue Grouse**

Shrub canopy cover was too dense to yield a suitable SI rating in many cover types. The most suitable shrub densities were found on sites that had experienced recent flood events or fires (Cottonwood Creek, Buford Creek, Tamarack Ridge). Due to the high percentage of grass and shrub cover types in the overall acreage, total evergreen canopy cover for the entire habitat is very low and received a low HSI. Shrub and evergreen data were not collected on grassland plots, which reduced all grassland SI Shrub food/cover ratings to zero and Cover Type SI Evergreen canopy to 0.24.

**Mule Deer**

Lack of shrub data collected in the grassland cover types during 2000 reduced all SI Food ratings to < 0.1. It is believed that the actual data would not have differed greatly from that estimate based on data from 2002 that consistently yielded '0' shrubs in grassland communities. Aspect for many plots was N, E, or W and only a single transect fell within the optimal SE to SW orientation, greatly reducing the overall SI Food rating. A lack of

crops (other than the Buford area) reduced the winter food rating, but not drastically. It is believed that the presence of crops is not a significant factor in quality of winter range in these particular habitats.

Topographic diversity was the most important factor in assessing winter cover of grassland and shrub cover types, and due to the close association with brushy draws, gives these cover types high SI Cover ratings. (This model was not designed for grasslands and this high rating seems inaccurate. Topography was assigned a class by nearness to draws or breaks, in addition to percent slope – the 'D' category was "rolling w/ rims, ridges, and drainages", and the 'E' was "mountainous >25% slope", neither of which seemed representative of the area. Many of the grasslands were classified in the "D" category.). Overall HSI value for mule deer is 0.13.

**Black-capped Chickadee**
Percent tree canopy cover was the greatest limiting factor of SI Food in all cover types except conifer. The conifer cover types rated the highest overall HSI at 0.99, while riparian rated 0.55, open conifer 0.25, and both of the burnt conifer cover types rated 0.0 due to lack of trees or snags.

**Chukar**
HSI values were very high for this species due to their use of grasslands and rocks, which comprise a large portion of the study area. Although percent shrub canopy cover was not measured in most grassland cover types and were defaulted to zero, the SI value for shrub cover is a 1.0 from 0-25% cover - a fairly broad range that was probably not skewed by the lack of shrub data. Unfortunately there are no variables that distinguish between good grassland and degraded grassland cover types. Lack of steep slopes and excessively dense grass cover reduced the value of agricultural lands as chukar habitat. Cover types rated by HSI values are as follows: Good grass 0.99, Degraded grass 0.96, Burnt conifer grass 0.92, Agriculture 0.63.

**Downy Woodpecker**
Both upper and lower Tamarack transects were dry riparian shrub sites with a very low number of trees or snags for feeding or reproduction life requisites. Basal area was a significant limiting factor in four of the six riparian transects. Habitat HSI was 0.39.

**Beaver**
Very little habitat in the study area is suitable for beaver due to seasonal water fluctuations that reduce the SI Water value to zero in five of six riparian transects. Lack of small diameter hardwood trees for feeding was also a significant limiting factor in three of the riparian areas sampled. HSI value for the entire riparian cover type was 0.08, and only Broady Creek had any amount of suitable beaver habitat.

**Western Meadowlark**
All shrub and burned conifer shrub cover types rated HSI values < 0.1 due to dense shrub canopies. Agricultural fields are limited by large areas of uniform grass coverage without perches, and five of the nine grassland transects were limited by low percent grass cover.

HSI ratings for each cover type are as follows: good grass 0.76, degraded grass 0.65, agriculture 0.50, burnt conifer grass 0.31, tall shrub 0.03, and both burnt conifer shrub and short shrub 0.0.

**Yellow Warbler**
The drainages that have experienced the greatest change due to flood events (Cottonwood Creek and Buford Creek) are most significantly limited by a lack of shrub cover, while the remaining four riparian sites are limited by percent hydrophytic shrubs. HSI for riparian habitat is 0.62.

**Song Sparrow**
Distance to potable water was a limiting factor for three shrub transects and two riparian transects (Upper and Lower Tamarack) where the water was either absent or underground at the time of sampling. All Short shrub transects rated poorly due to low Average shrub heights, and both highly disturbed riparian transects (Cottonwood Creek and Buford Creek) were most limited by Percent shrub cover. Average HSI per cover type was: riparian 0.59, short shrub 0.34, tall shrub 0.57, and burnt conifer shrub 0.82.

**California Quail**
In all three life requisite categories (food, escape, and roost) burnt conifer shrub, tall shrub and short shrub rated poorly, with roost being the most lacking variable. Tall shrub did rate well in the escape category, but was < 0.15 for each of the remaining requisites. Of the four habitat types utilized, riparian areas rated the best, with the most limiting factor being food. Overall HSI for California quail habitat was 0.98.

### 3.6 Discussion
Now that HEP data collection has been completed, NPT staff can finish analyzing the data, running the models, and calculating HU's. Preliminary analysis indicates that the Precious Lands Area provides at least 4,500 HU's that can be credited to BPA. It is expected that that figure will increase significantly once the analysis has been completed. A final HEP Report is scheduled for completion in the fall of 2002.

The HEP results are also being used to shape management activities on the Precious Lands Area. Management activities will address limiting factors wherever possible to improve habitat conditions for target species. In some cases, optimal conditions for one species result in undesirable conditions for another. Management actions will try to capture habitat conditions that benefit the most species. Depending on current conditions, some areas may be managed for specific habitat values while others are managed differently. For example, conifer stands on the Buford Planning Unit are easily accessible by vehicles and personnel so prescribed fire may be used to create open, park-like stands of mature pine and fir. In other, more remote areas, conifer stands may be managed as closed canopy sites with abundant undergrowth.

Established HEP transects will be used as a vegetation monitoring tool to evaluate structural changes over time. Section 9.0 outlines the strategies for using HEP in this manner.

## 4.0 MANAGEMENT ISSUES

A management plan must respond to specific management issues in order to be effective. Different areas containing unique plant and animal communities located in different socio-economic climates will all have site-specific management issues that need to be addressed by the management plan. A key element in the planning process is determining the important issues and then developing management responses to address those issues. The contractual agreement between BPA and the NPT requires participation by state and federal agencies as well as members of the public in addressing management issues. This plan is closely tied to the concerns of local citizens and land management agencies.

### 4.1 Agency Involvement

In September 1999, the NPT formally initiated the management planning effort by requesting representatives from other government agencies to sit on the planning team or serve on an agency review team. The NPT recognized that many agencies might be interested in the contents of the management plan but would be unable to participate directly in plan development. Each agency was given the opportunity to decide on their own level of involvement based on available resources and potential impact to their programs or resources.

Member of the planning team actively assisted NPT wildlife staff in the development of this plan. Members of the agency review team have provided feedback on earlier drafts of the plan and their comments and concerns have been incorporated into the final document.

Precious Lands Planning Team:

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| Angela Sondenaa, Ph.D. | Nez Perce Tribe, Wildlife Program |
| Joe McCormack | Nez Perce Tribe, Fisheries Program |
| Victor Coggins | Oregon Department of Fish and Wildlife |
| Howard Strobel* | Oregon Department of Forestry |
| Ralph Anderson | Wallowa-Whitman National Forest |

*Replaced by Andy White in 2001

Precious Lands Agency Review Team:

| | |
|---|---|
| John Andrews | Washington Department of Fish and Wildlife |
| June Davis | Wallowa County, Planning Office |
| Gregg Miller | Bureau of Land Management, Baker Field Office |
| Karst Riggers | Asotin County, Planning Office |

### 4.2 Public Involvement

Before the planning team began work on this document, the NPT wildlife staff developed a list of potential management issues. That initial list included public access, hunting, livestock grazing, facilities management, socio-economics, priority wildlife, noxious weeds, biodiversity, water quality, and fire. These potential issues were presented to the public at a series of public meetings held throughout the local area (Table 4). Notification of the meetings was sent to local newspapers and radio stations, and fliers were posted at public bulletin boards. All meetings were held in the evenings to encourage community participation.

**Table 4. Public meetings held to solicit input on the Precious Lands Management Plan.**

| Place | Date | # Attending |
|---|---|---|
| Enterprise, OR | November 1, 1999 | 23 |
| Paradise Ridge, OR | November 2, 1999 | 13 |
| Asotin, WA | November 3, 1999 | 7 |
| Lapwai, ID | November 8, 1999 | 4 |
| Orofino, ID | November 9, 1999 | 1 |
| Kamiah, ID* | November 16, 1999 | 8 |

* The Kamiah meeting was held in conjunction with a planned NPT Roots and Berries Commission meeting.

The public was invited to comment on the issues and provide input on management strategies and projects. The public comments received at these meetings or through the mail were used to further refine the management issues that guided the planning team in developing the management direction of the property. From these comments, public access (particularly motorized access), livestock grazing, and noxious weeds were presented as the primary issues of concern. Table 5 provides a summary of the public comments and the management response for each issue.

**Table 5. A Summary of Primary Management Issues.**

| Management Issue | Proposed Management Action |
|---|---|
| **Public Access and Travel Management**<br><br>1. Will motorized access be allowed?<br>2. If the area is limited to non-motorized use, who has permission to drive the roads?<br>3. Will Tribal and non-Tribal publics have equal access? Will the same regulations apply to both?<br>4. What are the impacts to adjacent landowners of allowing public access?<br>5. What types of developments are needed to facilitate access by the public? | 1. Most road access to the property occurs through private land, which does not allow for open public use. All roads in the Buford, Joseph, and Cottonwood Planning Units will be closed to publicly owned motorized vehicles (including ATV's) yearlong. A seasonal closure for administrative use will occur from November 1 – May 1 on the Tamarack Creek Road to minimize disturbance to wintering elk.<br>2. Motorized access on closed roads will be allowed for administrative, law enforcement, emergency rescue, and fire protection purposes only. Special use permits may also be issued for specific dates and activities, subject to approval on an individual basis.<br>3. All access management guidelines will be applied equally to tribal and non-tribal publics.<br>4. To minimize negative impacts to adjacent landowners, all property boundaries will be clearly marked. Informational signs at primary access points will encourage users to respect private property rights.<br>5. Provide and encourage non-motorized use of the property.<br>a. Maintain or improve gates at all primary access points and install informational kiosks.<br>b. Develop trailheads suitable for stock use on the south and west sides of the property.<br>c. Some new trail construction may be required to provide access from trailheads.<br>d. Reconstruct trail along Hunting Camp Ridge, and from Rye Ridge down to Joseph Creek. |

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| **Appropriate Public Uses**<br><br>1. Is hunting allowed? Are there any restrictions on hunting?<br>2. Can members of the public use the cabins on the property?<br>3. Is collection of native plant material allowed?<br>4. Will people be allowed to hike and camp on the property? | 1. Hunting is allowed subject to Oregon state law for non-tribal members and subject to treaty rights for Nez Perce tribal members.<br>2. Use of the cabins will be for administrative purposes to facilitate management of the property. Special permission may be given to other tribal departments or cooperating agencies to use the Tamarack cabin for meetings or fieldwork. The Buford House will be available to non-profit groups for scientific, educational or cultural purposes. All such uses are subject to prior approval and may require a fee. The Basin Creek Cabin will be managed as an open access facility for members of the public to use for short periods. Occupancy is on a first-come, first-served basis and is subject to rules posted on the premises. All such use is at your own risk.<br>3. Protection of native plant resources is a high priority both from a cultural and ecological viewpoint. Only enrolled members of the Nez Perce Tribe will be allowed to remove any native plant materials from the site for personal cultural uses. Removal of plant material for commercial purposes will only be allowed with NPTEC approval, and then only if compatible with habitat management objectives.<br>4. Hiking, horseback riding, and camping are allowed during all seasons. To protect wildlife habitat, no campfires will be allowed during fire season (generally May 1 – October 31). |
| **Livestock Grazing**<br><br>1. Can livestock be used to condition winter range for big game species?<br>2. What is being done to limit the impact of trespass livestock?<br>3. Will sheep or goats be used to help control noxious weeds? | 1. Livestock grazing is permitted under the BPA contract but may only be used to meet specific habitat objectives. A cost-benefit analysis would be conducted before any grazing activity. Costs associated with fencing or other improvements, herd administration, and transportation would be considered. Impacts to riparian vegetation, breeding bird habitat, and elk wintering and calving activities would also be considered in the analysis.<br>2. Wherever possible, property boundaries are being fenced to exclude neighboring livestock. The Nez Perce Tribe is working in cooperation with local landowners to limit livestock impacts.<br>3. Domestic sheep or goat grazing will not be permitted because of the risk of disease transmission to wild bighorn sheep populations. |

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| **Noxious Weed Control and Vegetation Management**<br><br>1. What will be done to limit the spread of noxious weeds?<br>2. Will yellow star thistle be a priority weed species in your management strategy?<br>3. Chemicals can be detrimental to the environment. Will chemical herbicides be banned on Precious Lands?<br>4. What type of fire prevention program will be employed?<br>5. Will prescribed fire be used to maintain bunchgrass communities? | 1. An integrated weed management plan will be developed that utilizes all acceptable control and prevention strategies including but not limited to biological control, mechanical treatment, herbicides, restoration, restrictions on motor vehicles, and public education. Additionally, survey, monitoring and mapping of existing weed populations will be conducted yearly. Aggressive action will be taken on new or expanding populations of target weed species.<br>2. Yellow star thistle will always be a high priority for management action. A target weed list has been developed in conjunction with the Wallowa County weed control agent. This list will be used to make decisions regarding allocation of resources and priority of treatment.<br>3. While inappropriate use of chemical agents can be detrimental to biological systems, use of herbicides to control noxious weeds may be allowed on Precious Lands. All applicable laws and label directions will be followed and monitoring plans developed to ensure proper use of any chemical agent. Herbicides may be used as a first line of attack to get infestations under control so other control methods can then be employed.<br>4. Currently, the Nez Perce Tribe and the Oregon Department of Forestry (ODF) have a cooperative agreement whereby ODF will provide fire suppression activities on all Wallowa County properties. To minimize accidental fires, no campfires will be allowed during fire season.<br>5. Fire is an integral part of the canyon grassland ecosystem. Prescribed fire may be used as a management tool to remove undesirable vegetation and condition forage on big game winter range. All available tools will be used to minimize negative impacts to riparian areas, conifer stands, air quality, and adjacent landowners. |

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| **Management Emphasis and Priority Wildlife**<br><br>1. Will there be equal protection of all species and resources?<br>2. Will the area be managed as a natural area emphasizing broad biodiversity?<br>3. The management plan must reflect the cultural values of the Nez Perce.<br>4. What management activities will protect big game wintering habitat?<br>5. Are there plans to initiate a predator control program to help increase big game populations?<br>6. Will salmon recovery be emphasized? | 1. While all species will be considered during management activities, native species will take priority over introduced species when there is a conflict, or limited resources. Management emphasis will be given to the target species specifically outlined in the contact between the NPT and BPA, as well as Threatened & Endangered species, and those species considered to be of significant cultural importance.<br>2. The overall goal of the project will be to maintain the area in as pristine a condition as possible with the intent that such a condition will support the widest range of plant and animal species. Management actions may, however, target specific species such as mountain quail or bighorn sheep.<br>3. An understanding and appreciation of the Nez Perce cultural, spiritual and religious values has guided the development of this plan and the management strategies contained herein. An attempt has been made to use science and technology to support traditional values.<br>4. Numerous management practices may be used to protect or improve big game winter range:<br>a. Road closures will reduce disturbance on winter range.<br>b. Fencing property boundaries will reduce impacts from neighboring livestock.<br>c. Prescribed fire and/or grazing may be used to reduce decadent, unpalatable grass and improve forage quality.<br>d. Aggressive weed control will ensure high quality plant communities.<br>e. Protection and improvement of riparian areas will provide areas of thermal cover.<br>5. An active predator control program will not be implemented unless it is deemed necessary to help recover target species such as bighorn sheep. Harvest of predators by sportsmen will be allowed subject to treaty rights and state laws.<br>6. Native, endangered and threatened fish will be emphasized. Additionally, riparian vegetation improvement projects will benefit fish as well as songbirds and big game. |

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| **Cultural Practices**<br><br>1. What will be done to ensure protection of treaty rights and cultural activities?<br>2. Does the Tribal research code apply?<br>3. Will the area be available for cultural activities such as gathering roots?<br>4. Archeological sites need protection. | 1. The contract with BPA in no way restricts treaty hunting, fishing, or gathering rights. All culturally significant activities protected by treaty rights will be allowed (see section 4.3 below).<br>2. The Nez Perce Tribal research code would apply to any proposed research on culturally significant sites. Any research activities would have to be approved by NPTEC.<br>3. Cultural use of the area by Nez Perce people will be encouraged. Activities involving cultural education will receive priority consideration for use of the property and facilities.<br>4. All archeological resources are protected under federal law and removal, disturbance or destruction of such resources is prohibited. Prior to any ground disturbing activity, a cultural resource inventory will be performed. Whenever possible, disturbance to cultural sites will be avoided. |
| **Other Concerns**<br><br>1. Does the Nez Perce Tribe own the mineral rights on the property? Particularly for the lignite deposits?<br>2. What plans are being made for effective communication with the public?<br>3. Who has jurisdiction for law enforcement purposes? Who will enforce road closures and other regulations specific to Precious Lands? | 1. All mineral rights are owned by the Tribe with the exception of a conservation easement with the non-profit Grande Ronde Land Trust on approximately 1,540 acres within the Buford Planning Unit, and 3,350 acres within the Joseph Unit. The easement covers strip or surface mining and was specifically enacted to restrict mining of low-grade lignite deposits. The easement expires in 2002.<br>2. Effective communication with the public and other governmental bodies will be a priority. Information and education will be conducted through the local media, by direct mailings, and through pamphlets, maps and other materials distributed at trailheads and other outlets such as tribal offices. Plans are also being made for a semi-annual newsletter to be mailed to individuals and government officials.<br>3. County and state law enforcement officials will be responsible for violations of state and county laws. The NPT Office of Legal Counsel is still exploring other jurisdictional questions. |

### 4.3 Protection of Treaty Rights

The Precious Lands project in no way restricts or compromises Nez Perce Tribal treaty rights. Page 5 of the MOA between BPA and the NPT states "Fishing, hunting, gathering, and Tribal cultural and religious activities on the properties according to Tribal custom and law shall not be prohibited by this agreement." The MOA further states on page 6 that "Nothing in this agreement limits the authority or ability of the Tribe to manage the properties for public safety and wildlife habitat conservation, or to preserve and protect cultural, historic, and religious sites, and to carry out and protect the federally guaranteed rights of the Tribe and its members. Nothing in this agreement limits or diminishes any treaty retained right or privilege of the Tribe or its members afforded under federal law as a result of the status of the Tribe or Tribal members, provided that treaty reserved rights will be exercised consistent with this agreement."

Opportunities to exercise tribal treaty rights have been enhanced by the Precious Lands project. The 15,325 acres within Precious Lands was formerly under private ownership so was not unconditionally available to tribal members for hunting, fishing or gathering. Now that these lands are under tribal ownership, all tribal members have access to them for federally protected activities. It is the intent of this plan to encourage use of the area by tribal members for the promotion and preservation of Nez Perce cultural activities in so far as such activities do not represent an unacceptable impact to sensitive plant or animal communities.

## 5.0 POLICY AND ADMINISTRATION

Management of any large parcel of land requires a considerable amount of planning and day-to-day administration, especially when that land is open to public use. In order to avoid conflicts and provide consistent management decisions, it becomes necessary to develop policy to guide those decisions. Along with policy, it is often necessary to develop additional rules or guidelines for specific activities. For example, a policy may say that hunting will be allowed, but that state hunting regulations will determine when and how that hunting is accomplished.

The following section provides an overview of the policies and guidelines that will govern the management of the Precious Lands Wildlife Management Area during this planning cycle. This overview is being provided to clarify the position of the NPT concerning the management issues outlined in section 4.0 above, and inform the public of acceptable activities and applicable rules.

### 5.1 Access and Travel Management

No new roads will be constructed. Existing roads will be maintained at current levels to allow motorized access of the property by NPT staff, fire crews, rescue personnel, and other approved parties. Members of the public will not be allowed to access the property using motorized vehicles. This restriction includes full-size passenger vehicles, all terrain vehicles, and two-wheel motorcycles. Special use permits may be issued to groups and/or individuals for specific dates or activities but will require prior approval. A seasonal restriction from November 1 – May 1 will be imposed for all vehicles on the Tamarack Creek Road to minimize disturbance to wintering elk. Persons violating the

access restrictions will be asked to leave the property immediately and may be charged with trespass.

Non-motorized access will be allowed on the project area for all members of the public. The use of helicopters to scout for, locate, pursue, or retrieve game animals is strictly forbidden. Landing a helicopter on the Precious Lands Wildlife Area is a violation of the motorized vehicle closure. People are encouraged to hike or ride horses onto the property. Bicycles may also be used on trails and roads. Two of the main access roads to the property pass through private land so are not available for public use. The main points of public access at this time include Forest Service Road 4655, Hwy 129 (3), and Rye Ridge road (Figure 10). Persons on foot or horseback can access much of the property through National Forest land in the south. Where compatible with wildlife management objectives, trail access will be improved in the future. Management objectives include good trail access into each of the Planning Units.

### 5.2 Appropriate Public Uses

Appropriate public uses include camping, hiking, bird watching, and other non-consumptive recreational activities. Open campfires are not allowed during the regular fire season (generally May 1 – October 31) or periods under special restriction due to extreme fire risk. There are no sanitation facilities on the project area so users are asked to dispose of their waste in a responsible manner. All trash must be packed out.

This is a wildlife management area so the privileges of human use are necessarily subordinate to wildlife protection needs. Harvest and removal of non-game wildlife and plant resources is strictly forbidden except for treaty-reserved gathering rights of enrolled Nez Perce tribal members. Firewood cutting is also restricted since standing dead and downed trees provide important wildlife habitat. Fallen wood on the ground may be gathered for campfires during open burning periods. Hunting and fishing are allowed subject to treaty harvest guidelines and state regulations. The use of helicopters to scout for, locate, pursue, or retrieve game animals is strictly forbidden. Landing a helicopter on the Precious Lands Wildlife Area is a violation of the motorized vehicle closure.

Recreational livestock owners are asked to practice a “leave no trace” philosophy when traveling or camping on the property. Establish camps well away from streams and avoid tying animals directly to trees. Wallowa County is a hay quarantine area. The use of locally grown or weed-free hay and feed is required. Approved recreational livestock include horses, mules, and llamas. Pack goats are not allowed due to the potential for disease transmission to wild bighorn sheep.

### 5.3 Facility Use and Management

The Precious Lands area contains three livable buildings and numerous outbuildings and barns. Due to public safety concerns most of these buildings are for administrative use only. Exceptions include the Basin Creek Cabin and the Buford Ranch House. The Basin Creek Cabin is a small log cabin with a sleeping loft and wood stove. There is no electricity or potable water. When not being used by project staff, this cabin is available for public use on a first come basis. Patrons are asked to limit their stay to a maximum seven (7) days, clean up, remove trash, and replenish wood supplies before they leave.

This cabin will remain available to the public so long as incidents of vandalism, theft, or other problems don't force the NPT to close the site. Reservations are not needed but it may be helpful to contact the NPT Wildlife Program prior to your stay to check on availability and let them know of your plans.

The Buford Ranch house is a five-bedroom, two-story home with an unfinished basement. It has electricity, running water, and phone service. This facility may be reserved by non-profit groups for educational, scientific or cultural uses. All such uses are subject to prior approval and may require a fee.

The Buford Planning Unit has numerous outbuildings and barns associated with the house. Some of these buildings are in good condition and are quite serviceable for project activities, while others are in disrepair or require extensive renovations to make them serviceable. Because of liability and public safety issues, all outbuildings are considered administrative in nature so public use is prohibited. Section 8.0 below outlines the specific actions that are being proposed for the existing buildings on the Buford Unit. Some buildings will be actively removed from the site, others will be repaired and maintained, and a few will be allowed to naturally deteriorate through benign neglect.

### 5.4 Fire Management

The NPT has entered into a fire management agreement with the Oregon Department of Forestry (ODF) to provide wildland fire suppression activities on Precious Lands. The ODF will respond to all lightning or human-caused blazes, and cooperate with other fire suppression teams working on the fire.

Prescribed burning may be used as a habitat management tool to reduce fuel loads in conifer stands, rejuvenate decadent shrub fields, and provide improved forage conditions for big game animals on grassland sites.

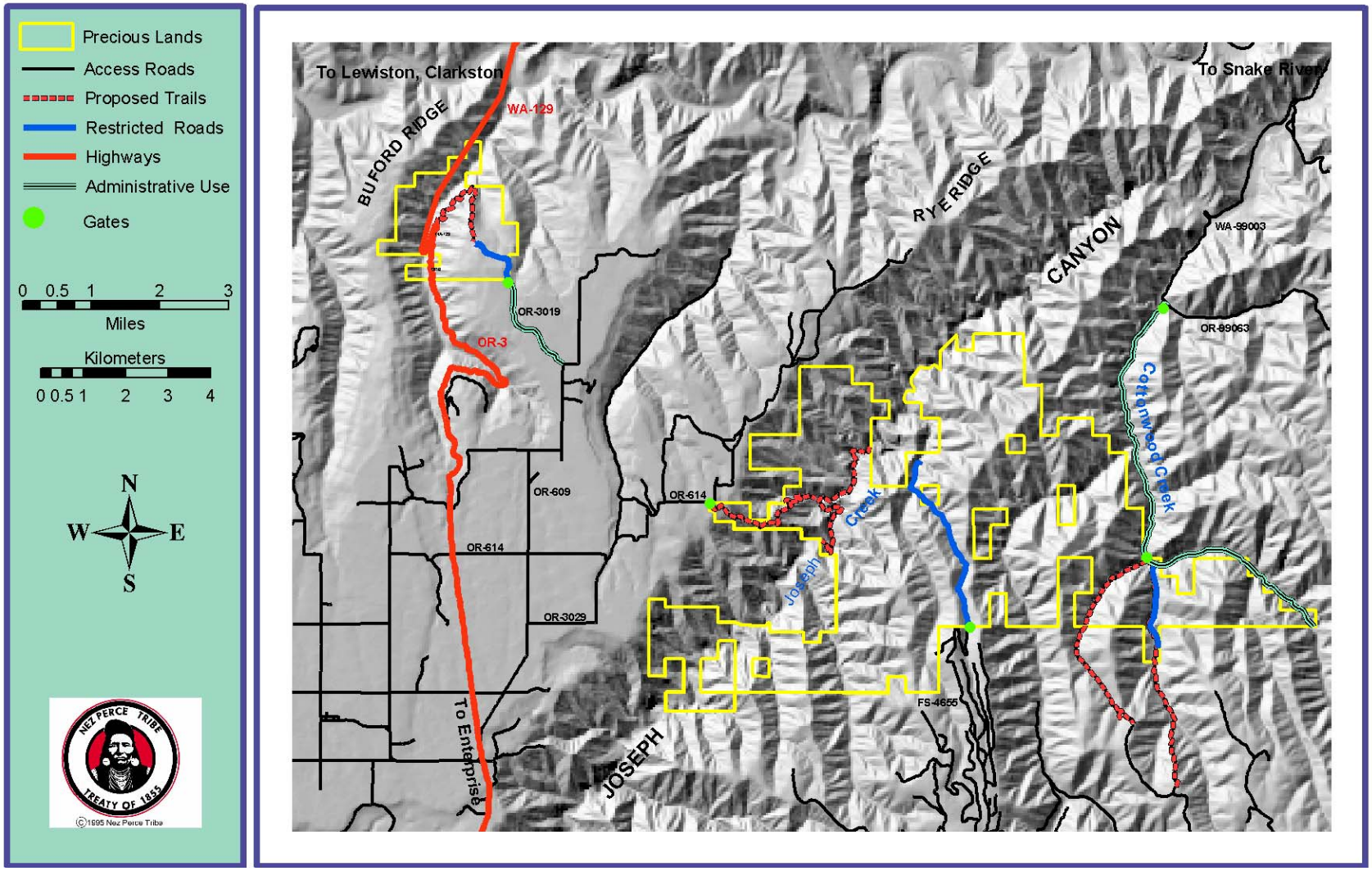
### 5.5 Livestock Grazing

The NPT recognizes that livestock grazing can be an effective tool in manipulating vegetation to meet management objectives. As such, grazing animals need to be tightly controlled to ensure proper vegetative response without unacceptable impacts to other resources. Control of livestock often requires extensive fencing and/or very active involvement of human herders. The Precious Lands area lacks extensive pasture fences that could be used to contain livestock within defined areas. Because of these constraints, generalized season-long grazing will not be permitted on the Wildlife Area. Localized, high intensity, short-duration grazing may be used, however, as a tool to reduce cover of noxious weeds, remove older dead grass stems, or otherwise manipulate site-specific vegetation.

The Memorandum of Agreement between the NPT and BPA protects treaty-reserved rights of the Nez Perce with regards to the Precious Lands Project. Included in the Treaty of 1855 was language reserving grazing rights for tribal members. If a proposal were made to exercise treaty grazing on the wildlife area it would undergo an environmental analysis and be approved by NPTEC resolution. Any such grazing would also have to be

**Figure 10. Roads, Gates, and Proposed Trails**

# Precious Lands Access



compatible with the provisions set forth in the contract between the NPT and BPA.

The use of sheep or goats will not be allowed within the Joseph and Cottonwood Creek planning units because of potential disease transmission from domestic animals to wild bighorn sheep. Restrictions on sheep and goats extend to pack goats used by recreational users, which would not be allowed. Domestic sheep and goats may be used for short periods of time on the Buford Planning unit where bighorn sheep do not occur.

Some light grazing is anticipated by pack and riding stock (horses, mules, and llamas) of recreational users. Such use is expected to be light to moderate in intensity and of short duration. Recreational users will be encouraged to provide their own weed-free hay or pellets rather than depend on on-site grazing opportunities. In high-use areas near favored camping sites, the NPT may establish corrals for recreational stock. Such sacrifice areas would limit negative impacts to smaller areas that would be relatively easy to manage.

Animals used for administrative purposes may also graze portions of the management area as a supplement to regular hay and grain rations. Such use would be largely restricted to pasture areas immediately adjacent to human dwellings at Buford, Tamarack and Basin.

### 5.6 Vegetation Management

A wide variety of vegetation management tools will be employed to create or promote more desirable conditions for target species. For example, noxious weeds may be controlled by mowing, hand pulling, herbicide application, selective grazing, or plowing. Following weed removal, seeding, or planting nursery stock may be used to rehabilitate native vegetation. Agricultural fields will be planted with native grass seed followed by weed control, and shrub and tree planting where appropriate. Whenever possible, site-specific seed or propagules will be used in rehabilitation efforts.

Because the Precious Lands Area is overwhelmingly dominated by steppe habitat, the importance of riparian, shrub, and forest communities is elevated. Such areas of increased vertical height and habitat diversity support greater numbers and diversity of breeding birds (NPT, unpublished data), and provide critical thermal and hiding cover for other species such as mule deer, elk, and smaller mammals.

Forest and overstory development in riparian areas and conifer stands has been identified as a management objective. Past fire and flooding events have negatively impacted the overstory trees in some areas. Structural conditions within riparian and forest communities may require active management to reach desired conditions. For example, trees may be girdled in some forested stands to increase nesting habitat for black-capped chickadee and pileated woodpeckers. In ponderosa pine stands, small diameter trees may be removed to promote open, more fire-resistant conditions. Prescribed burning may also be used in pine stands to remove fuels and regenerate understory browse for deer and elk. Tree planting may be required on some older burned sites (most notably in the Bear and Rush Creek areas) to re-establish forested conditions. In all cases, treatments will be site-

specific depending on the current conditions, ease of access, project costs, and probability of success.

### 5.7 Priority Wildlife

While some wildlife species have been highlighted as being of management priority, the overall goal of this project is to promote biological diversity. Of particular importance is maintenance of any at-risk, rare or sensitive species that may be present. For example, improving mountain quail populations would take precedence over increases in California quail numbers even though California quail are listed as a target species in this management plan.

Species having particular cultural, subsistence or spiritual value to the Ni Mii Puu people will also be emphasized. Such species would include steelhead, elk, bighorn sheep, golden eagle, red-tailed hawk, mule deer, and native grouse.

### 5.8 Cultural Resources

Federal law and NPT Code protect all cultural resource sites located on Precious Lands. Information on the nature and location of cultural sites is, however, lacking for this area. A comprehensive cultural resource inventory needs to be conducted by the NPT Cultural Resources Program so that adequate protection and management planning can be developed. Funds will be requested from BPA to conduct such an inventory.

Cultural activities by Ni Mii Puu people will be allowed and encouraged on Precious Lands in so far that such activities are sustainable and do not significantly impact wildlife populations or habitats. Treaty reserved hunting, fishing, and gathering rights will be allowed. Educational opportunities for tribal youth to develop cultural skills and knowledge will be encouraged.

### 5.9 Other Management Directions

Commercial, residential, or industrial uses of the property are not permitted under the MOA between the NPT and BPA. All such activities would need to be compatible with the overall objectives of this Plan and the Northwest Power Planning Council's Fish and Wildlife Program, and would require approval by NPTEC resolution. Commercial outfitting and guiding, agricultural production, and plant or mushroom harvesting, are all examples of commercial activities requiring formal review and approval.

It is the desire of the NPT to transfer properties contained in the Precious Lands project into Trust status with the federal government. The agreement between the NPT and Wallowa County recognized this desire and states in part, "The County agrees to support an application by the Tribe to have the project lands placed in trust by the federal government, so long as payments in lieu of taxes are agreed to be paid." Trust status would allow for cost-share funding from the federal Bureau of Indian Affairs (BIA) for special projects, and would further safeguard treaty rights of tribal members. Trust status would not jeopardize the ability of BPA to assume ownership of the land in the event the NPT fails to meet the terms of their contract with BPA. Transfer of the property would simply go from the BIA to the BPA, since both are federal agencies.

# 6.0 MISSION STATEMENT

The mission of the Precious Lands Project is to protect, mitigate, and enhance desirable wildlife and wildlife habitat permanently as compensation for the inundation of habitat behind the lower four Snake River dams. This project will also promote and restore biological diversity, ecological processes, and watershed health.

## 6.1 Desired Future Condition

The desired future condition (DFC) for Precious Lands is one where the area supports a mixture of grasslands (74%), shrub fields (8%), mixed conifer forest (14%), and hardwood riparian areas (4%). Grasslands and shrub fields are maintained in a mid to late seral condition, with early seral (often weedy) grassland areas declining in extent. Riparian areas are moving toward a climax condition with a minimum 60% canopy closure across the entire area. Conifer forests are expanding in extent as open woodland areas develop into more closed canopy conditions. Agricultural fields have been re-planted to native bunchgrasses, forbs, shrubs, and where possible, trees. Populations of existing noxious weed species are stable or declining with new invaders eradicated.

Wildlife populations on the whole are stable or increasing. Specifically, the desire is to have increasing populations of bighorn sheep, mountain quail, blue and ruffed grouse, neotropical migrant landbirds, and snake river steelhead. Populations of culturally important and target species (see Sections 2.4.2 and 3.2 above) are stable or increasing. Elk and mule deer numbers are stable or increasing.

Natural processes have been returned to historic levels of intensity and frequency. The hydrology of all streams has been restored as much as possible considering upstream impacts over which we have no control.

Cover types within the project area are highly variable due to past disturbances and extreme aspect and elevation ranges. Few cover types exhibit uniform characteristics that may be used as a standard; therefore DFC objectives were developed based on criteria that optimize habitat needs for the greatest number of target species. Each of the four general cover types (Grassland, Shrub, Conifer, and Riparian) has associated species chosen from the HEP process that assess community health and production trends. A range of DFC was chosen from the habitat requirements of the associated wildlife, and an attempt was made to span the highest range of quality habitat for the greatest number of species. This broad target range will allow for site-specific modifications, fluctuating budgets, and catastrophic changes such as fires and floods, while still providing a guideline to meet diverse wildlife habitat needs.

Grassland community DFC:

- 60-75% herbaceous cover
- < 30% cheatgrass
- 30-35 cm average herbaceous height

Herbaceous cover within a healthy bunchgrass community will have established grass hummocks with interspaces that are free of cheatgrass or other weedy species.

Cheatgrass is typically shorter than bunchgrass; therefore the height of the community may be an indicator of weedy species and quality nesting or hiding cover.

Shrub community DFC:

- A mosaic of seral stages with the majority in the mature class
- 40-65% shrub canopy cover, on average
- 50-75% herbaceous cover

Shrub fields support a wide variety of wildlife and function as travel corridors between the low elevation riparian areas and upper grassland communities. The moderate range of both shrub and herbaceous canopy cover offers a high quality mix of concealment, roost, thermal protection, and browse opportunities for various wildlife species. For the entire project area, the goal for shrub communities is to have a mosaic of seral stages across the project area. Specifically, 60% of the shrub communities support 60-75% canopy cover, 20% have >75% canopy cover, and 20% have <60% canopy cover.
The species use to develop shrub community desired conditions are: mule deer, western meadowlark, blue grouse, California quail, and song sparrow.

Conifer community DFC:

- 50-80% tree canopy cover
- 25-45% shrub canopy cover
- ≥ 2 snags 4-10” dbh per acre
- ≥ 0.5 snags ≥ 20" dbh per acre

The forested communities offer cover in all seasons and fill many life requisites for wildlife. Because use varies so greatly among species, the DFC range was left broad to accommodate differing sites and wildlife needs. Some conifer patches may be maintained at either the higher end of the range or the lower, depending on site-specific goals and funding. Mule deer, blue grouse, and black-capped chickadee are used to develop conifer community desired conditions.

Riparian community DFC:

- 40-70% tree canopy cover
- 35-65% shrub canopy cover
- ≥ 3.5 snags 6-10” dbh per acre

Riparian communities are not easily characterized due to fluctuating water supplies, extreme elevation changes, and natural catastrophic events of the past. These communities can range from dry-bed drainages in hawthorn scrub to intermittent streams within open Ponderosa pine forests, to year-round streams in Birch/ syringa communities. This cover type was given a broad DFC range to allow for the extremely different community conditions while still maintaining a standard for management practices. More site-specific considerations will be taken into account depending on the target wildlife needs and the goal of the individual project. Mule deer, blue grouse, song sparrow, downy woodpecker, beaver, yellow warbler, and black-capped chickadee were used to develop DFC's in riparian communities.

In-Stream habitat DFC:

- 60-100% shading of water surface

- Maximum daily summer temperatures $\leq 68^0$ F
- $\geq$ 20 pools per stream mile
- $\geq$ 60 pieces of woody debris $\geq$ 12" diameter and 30' long per stream mile

Existing in-stream habitat quality for the Precious Lands Area is currently poorly understood. Survey work performed in Joseph Creek above and below the project area (Hardy 1992, Stein 2000) indicate that this stream does not currently meet water quality objectives for stream temperatures, or optimal habitat characteristics for pool:riffle ratios, woody debris, or stream shading. Comprehensive habitat surveys need to be completed for fish-bearing streams to evaluate current condition and develop management strategies to meet the DFC's described above. Steelhead were used to develop desired conditions in stream habitats.

## 7.0 MANAGEMENT GOALS

**Goal 1:** Maintain or improve native plant communities and other desirable species to benefit fish and wildlife, and provide traditional gathering and cultural opportunities for tribal members.

- Objective 1: Reduce noxious weed infestations to acceptable levels by use of prevention and control strategies.
  - Task 1: Develop an integrated weed management plan.
  - Task 2: Yearly survey, map and monitor infestations of target weed species.
  - Task 3: Control target weed species using mechanical, chemical, cultural, and biological control methods.
  - Task 4: Restore degraded areas to desirable plant communities.
- Objective 2: Restore all agricultural areas to desirable plant communities.
  - Task 1: Plant former crop areas in the Buford Planning Unit to bunchgrasses, shrubs, and trees.
  - Task 2: Control noxious weeds on restored sites.
- Objective 3: Protect and enhance riparian area plant communities to improve or maintain canopy cover, and species diversity.
  - Task 1: Build and maintain fences to keep cattle out of riparian areas.
  - Task 2: Plant native shrubs and trees in degraded riparian areas to speed development of mature stands.
  - Task 3: Where necessary, stabilize eroding stream banks and re-vegetate with desirable species.
- Objective 4: Encourage traditional, cultural activities on Precious Lands.
  - Task 1: Educate and learn from Nez Perce Tribal members about the natural resources of the area and opportunities they provide.
  - Task 2: Monitor cultural uses to ensure they are compatible with maintaining high quality wildlife habitat.

**Goal 2:** Maintain or enhance fish and wildlife populations.

- Objective 1: Maintain the area as a refugia protected from major human disturbance.
  - Task 1: Restrict motorized access except for administrative purposes and permitted uses only.
  - Task 2: Post signs along external property boundaries and at all major access points.
  - Task 3: Develop an enforcement strategy.
  - Task 4: Remove interior fences that pose entanglement threats.
- Objective 2: Emphasize management of target wildlife species or groups.
  - Task 1: Conduct habitat inventories (availability and quality) for selected species, including steelhead.
  - Task 2: Develop monitoring protocols and schedules for target species.
  - Task 3: Implement habitat improvement projects to benefit target species.
- Objective 3: Improve or maintain forage conditions and thermal cover on big game winter range.
  - Task 1: Utilize fire and/or grazing to restore and maintain palatable forage in bunchgrass and shrub communities.
  - Task 2: Protect riparian areas and conifer stands from loss or degradation from fire or other structure-altering events.
- Objective 4: Improve water quality to benefit listed fish.
  - Task 1: Increase riparian canopy cover to improve stream shading.
  - Task 2: Reduce or eliminate sediment-producing activities such as ORV use, livestock grazing, road drainage problems, and annual farm cropping.
- Objective 5: Increase in-stream habitat quality and complexity in fish-bearing streams.
  - Task 1: Conduct detailed fish habitat evaluations to establish baseline conditions and limiting factors.
  - Task 2: Develop habitat improvement strategies in association with Tribal, State, and Federal agencies.
  - Task 3: Promote riparian vegetation development to improve stream shading, woody debris recruitment, and pool creation.

**Goal 3:** Provide public access for activities compatible with maintaining high quality wildlife populations and habitat.

- Objective 1: Provide high-quality, low-impact recreational opportunities.
  - Task 1: Develop three (3) staging areas for horse and foot access into Precious Lands. One each into the Joseph, Cottonwood, and Buford Planning Units. Rehabilitate or construct appropriate trails.

- Task 2: Install interpretive signs at major access points and provide brochures, maps, and other materials to educate the public about Precious Lands and the Nez Perce Tribe Wildlife Management Program.

- Objective 2: To the extent possible, promote Nez Perce cultural use of the area.
  - Task 1: Inform tribal members about the project and the opportunities it provides for cultural or subsistence activities.
  - Task 2: Conduct educational field trips for tribal youth.
- Objective 3: Encourage use of the area for scientific research on biological systems and processes.
  - Task 1: Increase awareness of the project for such uses by contacting local schools and agencies.

**Goal 4:** Foster productive, interactive relationships with neighboring landowners, including private individuals and state and federal agencies.

- Objective 1: Work with neighbors to cooperatively control noxious weeds and construct and maintain fences.
  - Task 1: Maintain regular contact with all adjoining landowners.
- Objective 2: Continue information sharing with state and federal agencies through meetings and cooperative projects.
  - Task 1: Develop cooperative travel management agreements.

**Goal 5:** Conduct Monitoring and Evaluation activities to ensure that management actions are providing the desired response and/or benefit.

- Objective 1: Conduct baseline population monitoring of selected wildlife species or groups.
  - Task 1: Cooperate with state wildlife agencies to conduct big game winter counts on the project area; provide cost-share funding as necessary.
  - Task 2: Conduct annual sampling of neotropical bird populations using a point-count methodology.
  - Task 3: Sample pond amphibian populations yearly.
  - Task 4: Periodically monitor populations of interest such as carnivores, small mammals, bats, or sensitive species to ensure population numbers are remaining stable or increasing.
- Objective 2: Monitor vegetative communities to evaluate seral stage, ecological condition, and wildlife habitat values.
  - Task 1: Complete a baseline HEP analysis
  - Task 2: Collect data on select HEP transects at 5-year intervals.
  - Task 3: Establish permanent photo plots and livestock exclosures to evaluate structural change over time.
- Objective 3: Conduct project-specific monitoring to ensure project goals are being met.

- Task 1: Monitor agricultural field restoration efforts.
- Task 2: Monitor spring development projects

- Objective 4: Document human activities to evaluate impacts to natural resources.
  - Task 1: Document human use patterns (seasons, locations, and activities).
  - Task 2: Monitor consumptive uses to ensure no adverse impacts are occurring to desirable plant and wildlife species.

## 8.0 PROPOSED ACTIVITIES

This section outlines the management activities that the NPT believes are necessary to provide high quality wildlife habitat and protect biodiversity on the Precious Lands Area. These recommendations are necessarily general but wherever possible, specific sites are mentioned in the text.

### 8.1 Operations and Maintenance

Management of any large land holding requires certain day-to-day activities to maintain facilities, control boundaries, and ensure public safety. The Precious Lands Area is quite large with irregular boundaries (approximately 40 miles of external property line) so a large part of on-going O&M activities is related to posting and controlling external property lines. Because the Precious Lands Area is open for public use, human trespass onto adjacent private property is a management concern. Also of concern is livestock trespass onto the Wildlife Area. In addition to access management activities, NPT staff also has the responsibility of maintaining living quarters and outbuildings acquired with the property.

**Fence Construction and Maintenance**

The following action items will be implemented as part of the fence construction and maintenance activities on the Precious Lands Area. It is currently estimated that 8.7 miles of good condition fence exists with another 6.9 miles in moderate condition. Over the next five years, approximately 5.6 miles of new construction needs to occur with an additional 2.9 miles of old fence replaced. Obsolete, dilapidated fences need to be removed on 10.7 miles. Figure 11 and Figure 12 show the condition and location of fences on the Buford and Joseph/Cottonwood Planning Units, respectively.

- Construct new livestock fences in areas experiencing trespass problems
- Maintain existing fences in good condition
- Replace old, unsuitable fences where needed to control neighboring livestock
- Cooperate with neighbors to identify and construct / maintain fences
- Remove unnecessary fencing that poses a threat to wildlife, recreational livestock, or people
- Post all exterior fence lines with signs indicating tribal ownership

**Figure 11. Status and Location of Existing and Proposed Fences for the Buford Planning Unit**

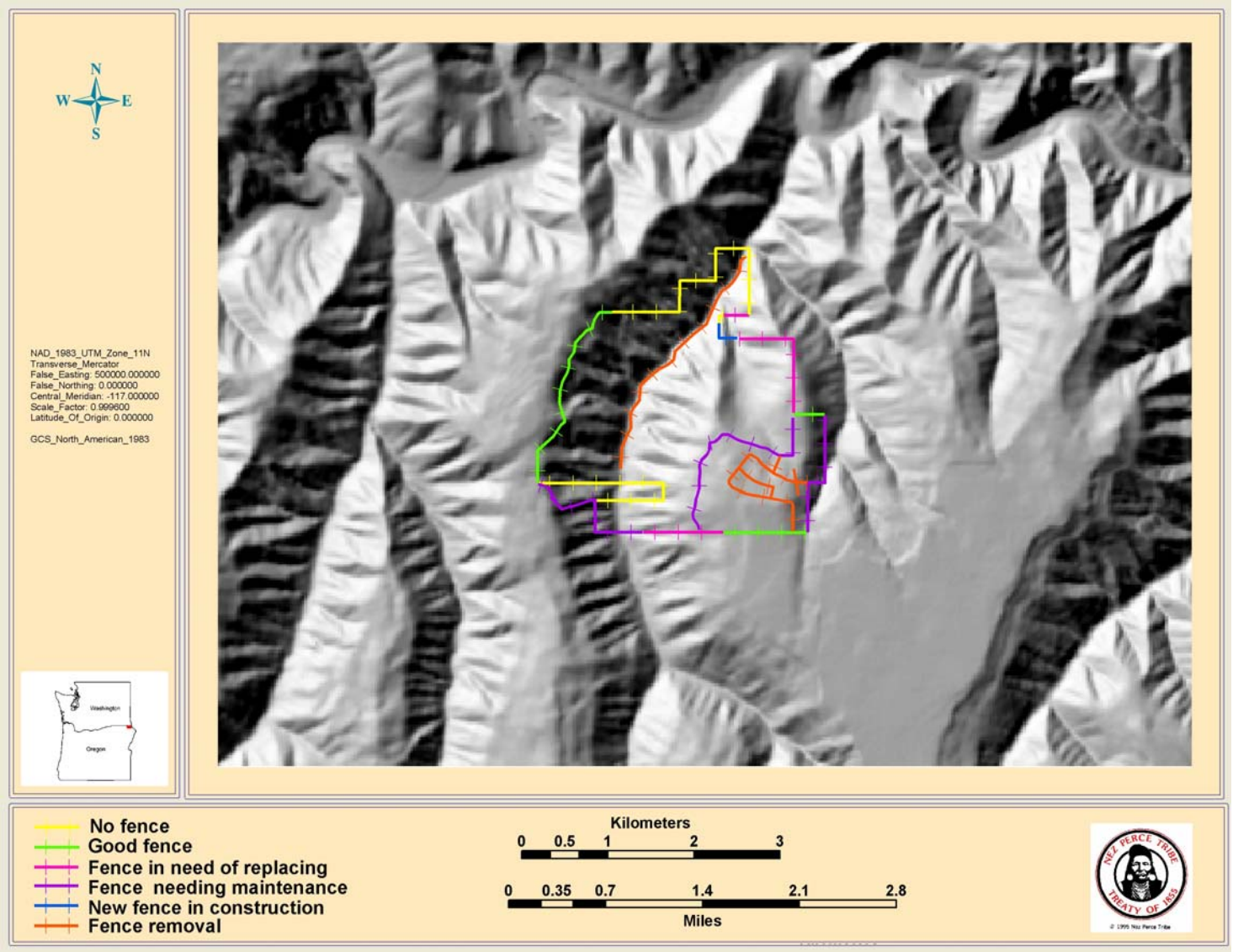
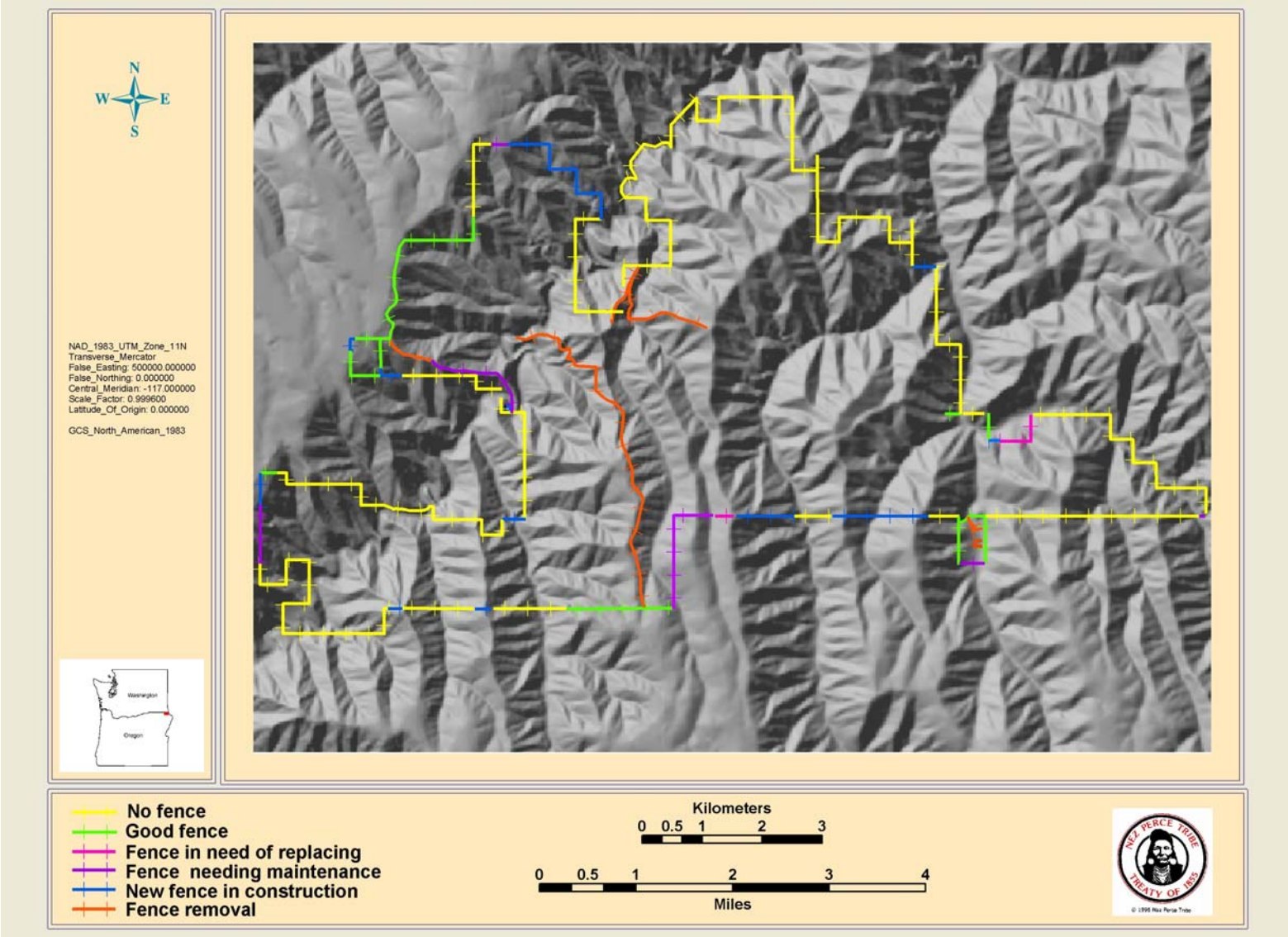


**Figure 12. Status and Location of Existing and Proposed Fences for the Joseph and Cottonwood Planning Units**



**Weed Control**

The following action items will be implemented as part of the weed control activities on the Precious Lands Area. Figure 13 and Figure 14 show the location of target weed species within the Buford and Joseph / Cottonwood Planning Units, respectively.

- -Identify and map new weed populations
- -Prioritize weed populations for treatment
- -Control weeds using herbicides, mechanical treatments, and biological control agents
- -Prevent new weed locations by minimizing disturbance, cleaning equipment and using weed-free feed and seed

**Facilities Maintenance**

The following action items will be implemented as part of the facilities maintenance activities on the Precious Lands Area.

Buildings:

The Buford Planning Unit has a main residence and 18 outbuildings that need to be repaired, salvaged or allowed to deteriorate naturally. Those buildings scheduled for salvage will be offered to the public for the materials contained therein. Those buildings scheduled for removal will be actively taken down by NPT staff. Figure 15 provides a schematic diagram of the existing buildings on the Buford Planning Unit. The Cottonwood Planning Unit contains a cabin, old blacksmith building and two deteriorated outbuildings. The Joseph Planning Unit contains a cabin, bunkhouse / generator shed, pole barn, and two storage container buildings as well as three deteriorated buildings associated with old farmsteads located on the west rim of Joseph Canyon. Table 6 lists all buildings, their condition, and proposed management direction for each.

General Maintenance:

- -Construct and / or maintain gates at all motorized access points
- -Perform routine road maintenance, including brush removal
- -Perform basic maintenance on buildings including painting, plumbing, electrical, and carpentry
- -Maintain informational signs at main access points

Specific Projects:

- -Establish disputed property lines and corners through a land survey
- -Finish walls and lighting in basement bathroom at Buford House
- -Replace cedar shake roof on Basin Cabin with fire resistant metal
- -Repair spring water system at Basin Cabin
- -Stabilize bridge footing on Cottonwood Creek
- -Establish permanent crossing over Cottonwood Creek at mouth of Basin Creek
- -Build corrals at Basin and Tamarack cabins to replace rotten ones

**Figure 13. Distribution of target weed species on the Buford Planning Unit.**

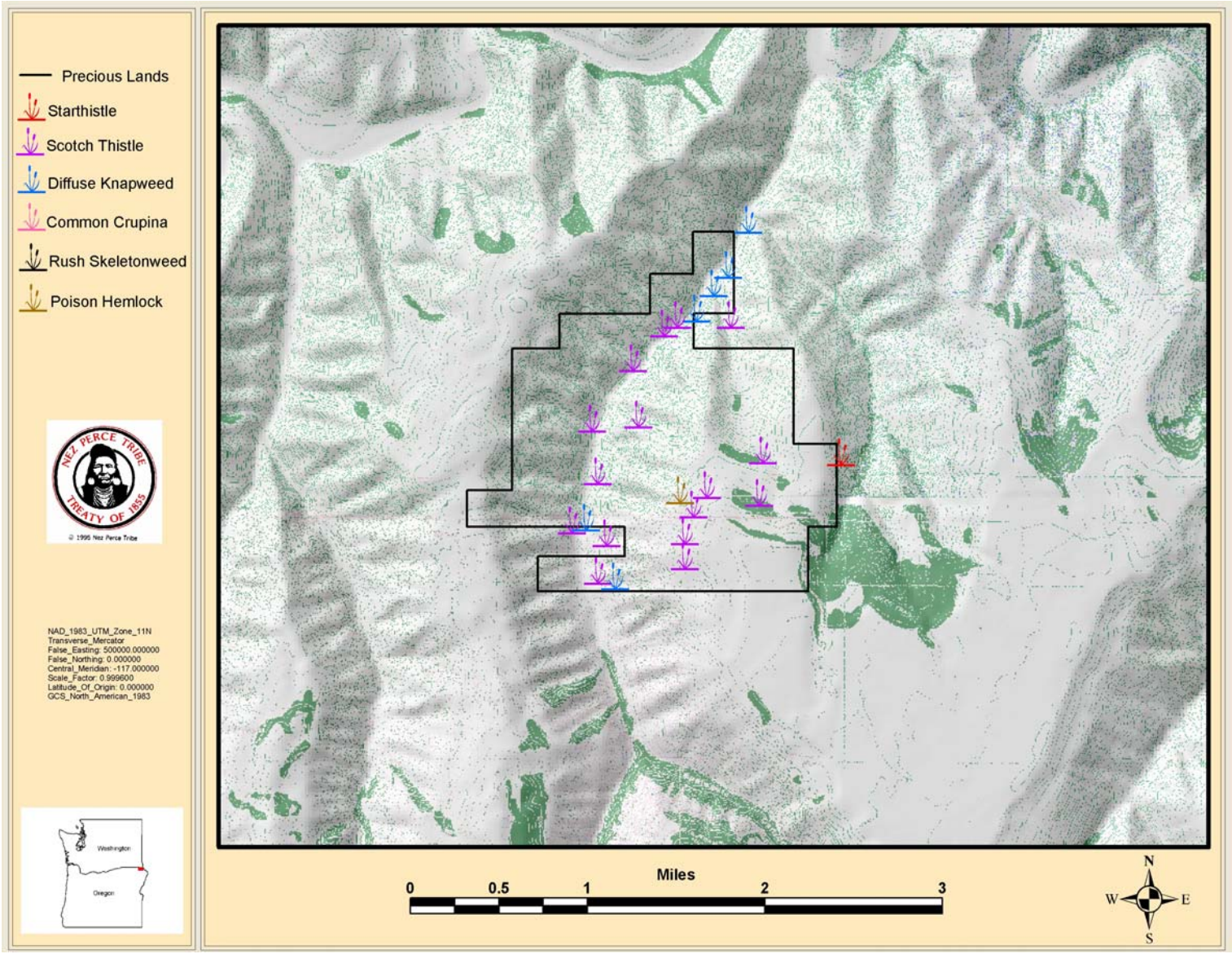


**Figure 14. Distribution of target weed species on the Joseph and Cottonwood Planning Units.**

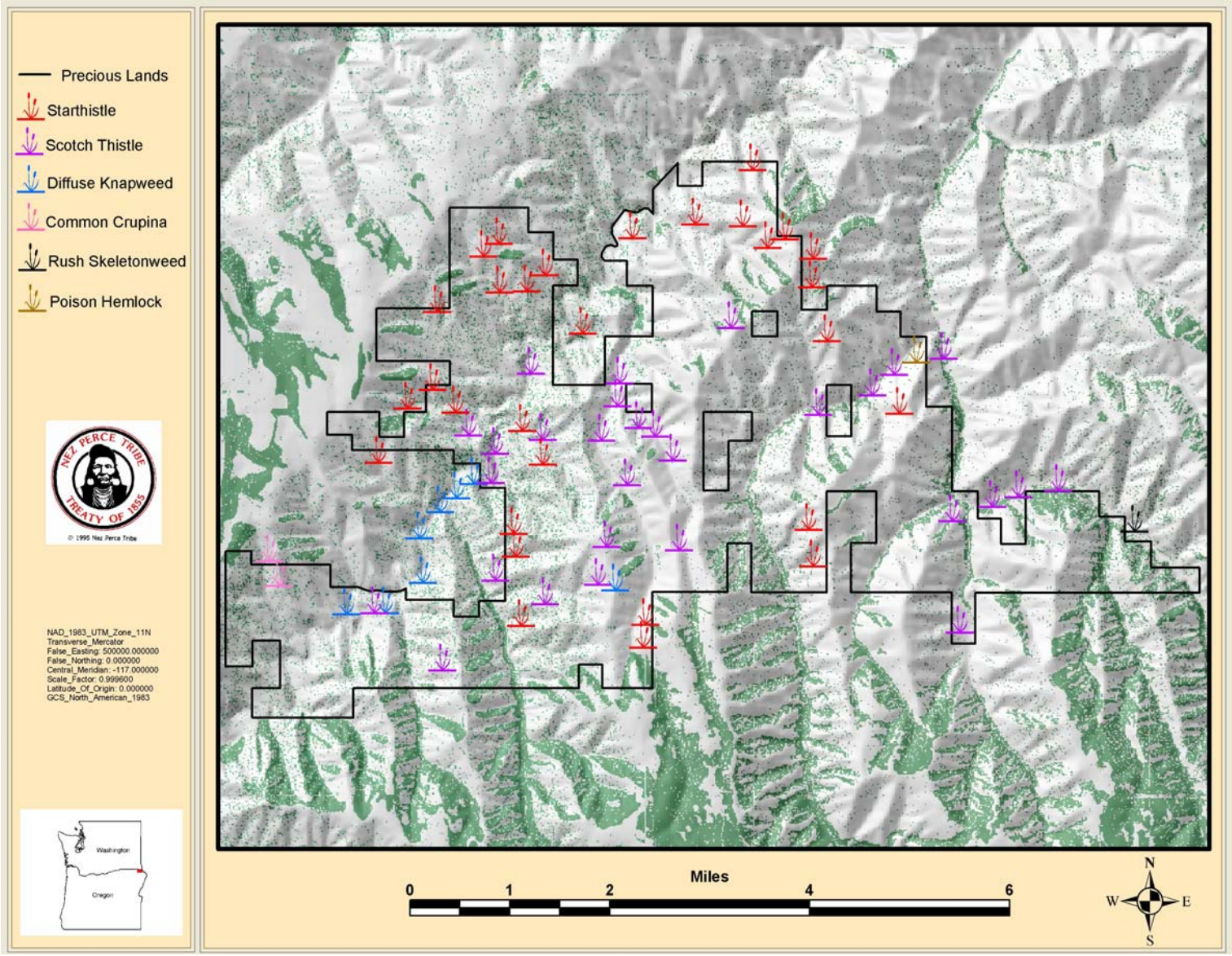


**Figure 15. Buildings on the Buford Planning Unit.**

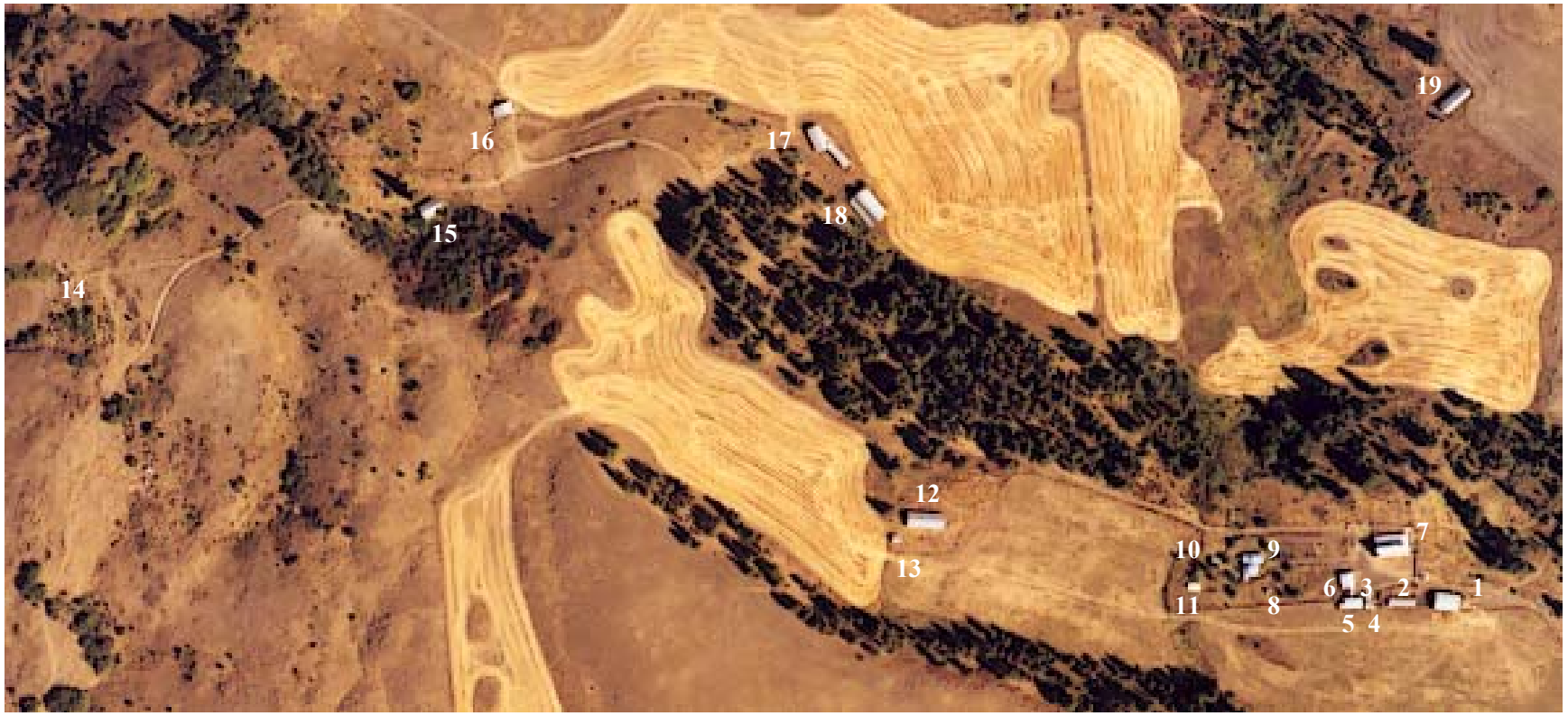



Table 6 identifies each building and provides information on existing condition and management direction.

**Table 6. Management Direction for Buildings on the Precious Lands Wildlife Area.**

| Location Name | Building Name | Condition | Management Direction |
|---|---|---|---|
| Buford Unit[1] | 1. Metal Shed | Excellent | Maintain & Use |
| | 2. Cattle Chute | Fair | Neglect |
| | 3. Fuel Shed | Good | Maintain & Use |
| | 4. Scale Shed | Fair | Neglect |
| | 5. Bunk House | Fair | Maintain & Use |
| | 6. Garage | Fair | Maintain & Use |
| | 7. Loft Barn | Good | Maintain & Use |
| | 8. Well House | Excellent | Maintain & Use |
| | 9. Main Residence | Excellent | Maintain & Use |
| | 10. Wood Shed | Good | Neglect |
| | 11. Chicken Coop | Fair | Salvage in 2003 |
| | 12. Hay Shed | Fair | Salvage in 2004 |
| | 13. Granary | Fair | Neglect |
| | 14. Spring House | Excellent | Maintain & Use |
| | 15. Hay Shed | Poor | Salvage in 2004 |
| | 16. Log Barn | Poor | Neglect |
| | 17. Hay Shed | Fair | Salvage in 2004 |
| | 18. Loft Barn | Good | Maintain & Use |
| | 19. Hay Shed | Good | Salvage in 2004 |
| Tamarack Creek | Cabin | Good | Maintain & Use |
| | Bunkhouse / Generator Shed | Fair | Maintain & Use |
| | Pole Barn | Fair | Maintain & Use |
| | Storage Container #1 | Fair | Maintain & Use |
| | Storage Container #2 | Poor | Remove in 2003 |
| Basin Creek | Cabin | Good | Maintain & Use |
| | Blacksmith Shop | Poor | Neglect |
| | Storage Shed | Poor | Remove in 2003 |
| | Storage Shed / Bunkhouse | Poor | Remove in 2003 |
| Joseph Unit | Old Farmstead Buildings | Poor | Neglect |

[1] Numbers correspond to those used in **Figure 15**.

**Staff Training**
The following annual training opportunities are considered necessary to ensure safe operation of the Facilities Crew working on the Precious Lands Area.

-First aid & CPR
-ATV safety
-Chainsaw operation and safety
-Herbicide use and safety
-Weed identification

Additional training may be needed for crew leaders and supervisors.
-Supervisory development
-Restricted use herbicide applicator licensing
-Discrimination and sexual harassment training

### 8.2 Habitat Improvement Projects
Through the HEP analysis and other inventory work, several habitat improvement opportunities have presented themselves. Most work will focus on restoration of plant communities damaged as a result of past agricultural practices, timber harvest, grazing, flood events, or fires. In particular, restoration of the agricultural fields in the Buford Planning Unit is seen as a priority project.

**Agricultural Field Restoration**
Currently, approximately 124 acres of rolling benches is under cultivation for wheat and hay production (Figure 16). We plan to seed those areas with native bunchgrasses, forbs, shrub seedlings, and ponderosa pine trees (where soils are deep enough). As much as possible, only native seed stock will be used since natives are often pre-adapted to local site conditions and the resultant community will more closely resemble the habitats lost through past management activities. Where feasible, seed will be gathered on-site and propagated by a commercial grower. This is a multi-year project that will be implemented in phases to spread out the workload and ensure greater success. Table 7 gives an overview of the timetable for restoration of these sites (Refer to Figure 16 for field letter designations). Hay fields (12.4 acres) are not scheduled for planting to native species at this time. They will be maintained as grass hay fields for the life of this plan, unless they can be enrolled in the Conservation Reserve Program (CRP).

If possible, eligible fields will be enrolled in the Conservation Reserve Program, administered by the FSA. This program is designed to convert marginal farmland into wildlife habitat and provides cost-share funding for seed, nursery stock, and farm chemicals. An opening in the CRP program is anticipated in the spring of 2003. Should fields be eligible for this program, time frames for planting grasses, forbs, trees, and shrubs would have to be adjusted to meet CPR program requirements. Typically, planting would occur more rapidly.

The NPT did not anticipate that so much agricultural property would be included in the final mitigation project. Currently, no large farming equipment is available to the program for use on this project. The program does, however, own a flatbed trailer

capable of transporting a mid-sized tractor. Equipment used previously has been leased or contracted from local operators. Being forced to rely on contracted or rented equipment limits the flexibility needed to respond to management challenges in a timely fashion. It is also quite expensive to continually pay for equipment use. Seeding and harrowing fields has cost from $22.50 to $30.00 per acre. Application of herbicides costs approximately $10.00 per acre. These costs quickly add up. Over the last two years approximately $4,000.00 has been spent on equipment rental for chemical applications and seeding activities. Projecting these costs over the life of the project suggests that it would be more cost-effective to purchase a mid-size tractor.

A tractor with attachments could also be used for many other operations and maintenance activities including road repair, weed suppression, fence construction, and snow removal. Therefore, the NPT is requesting additional capital investment funds to cost-share purchase of a tractor. Funds from the NPT Dworshak Mitigation Program will be matched with those requested from BPA to purchase a medium sized tractor and implements for use in habitat restoration efforts by the NPT.

**Figure 16. Agricultural Fields on the Buford Planning Unit**

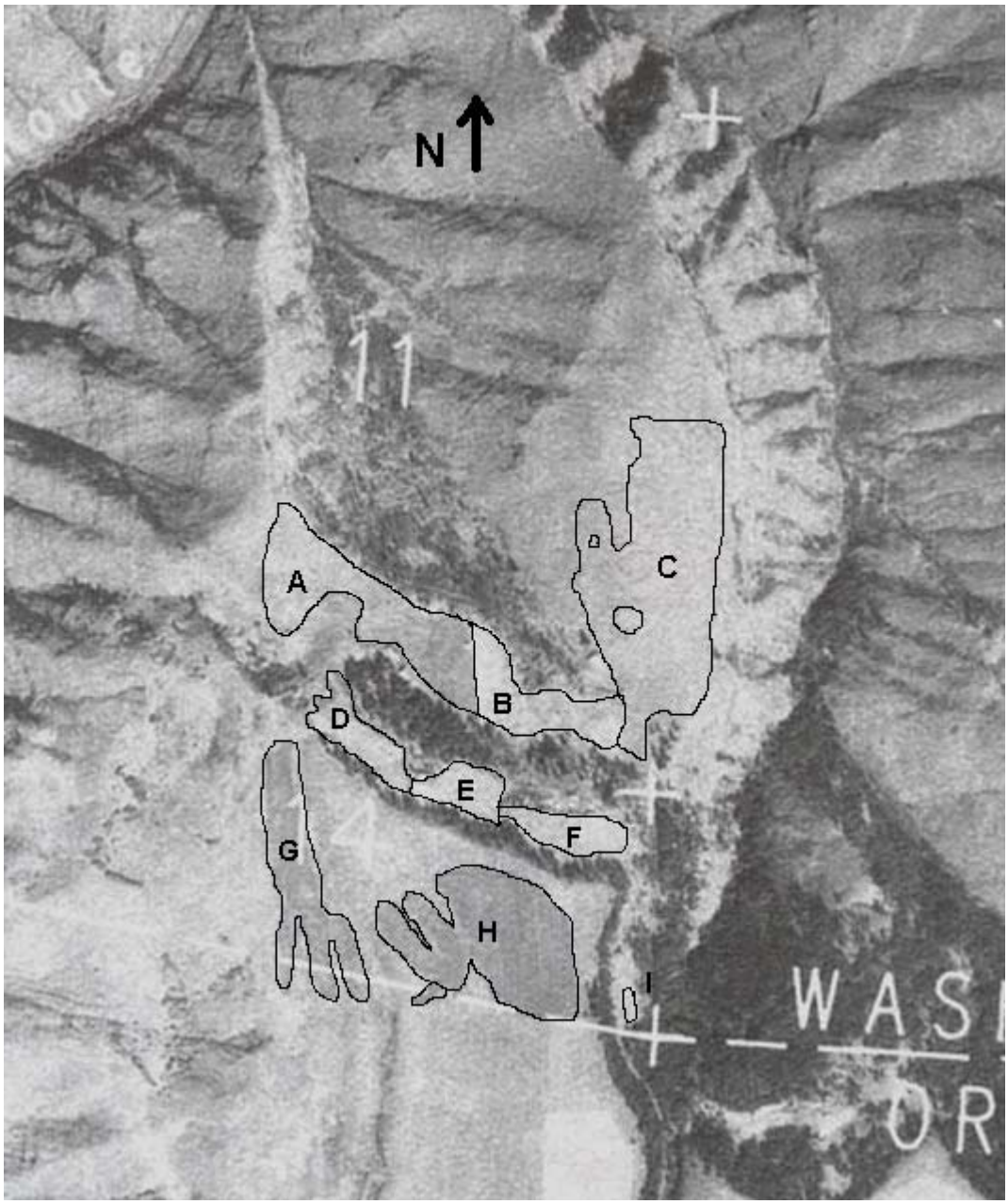


**Table 7. Restoration Schedule for Agricultural Fields**

| Activity | Field Designation and Size (Ac) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | A 23.6 | B 12.7 | C 30.0 | D 7.2 | E 5.2 | F 6.2 | G 12.3 | H 25.6 | I 1.0 |
| Annual Grain Crop | 2003 | 2003 | 2000 | 2003 | Hay Field | Hay Field | 2001 | 2001 | Hay Field |
| Summer Fallow | 2002 | 2002 | 2001 | 2002 | | | 2002 | 2002 | |
| Plant Native Grass | 2003 | 2003 | 2001 | 2003 | | | 2002 | 2002 | |
| Plant Forbs | 2005 | 2005 | 2001 | 2005 | | | 2003 | 2003 | |
| Plant Trees | 2005 | 2005 | 2003 | 2005 | | | ~ | ~ | |
| Plant Shrubs | 2005 | 2005 | 2004 | 2005 | | | 2004 | 2004 | |
| | | | | | | | | | |

**Forest Communities**

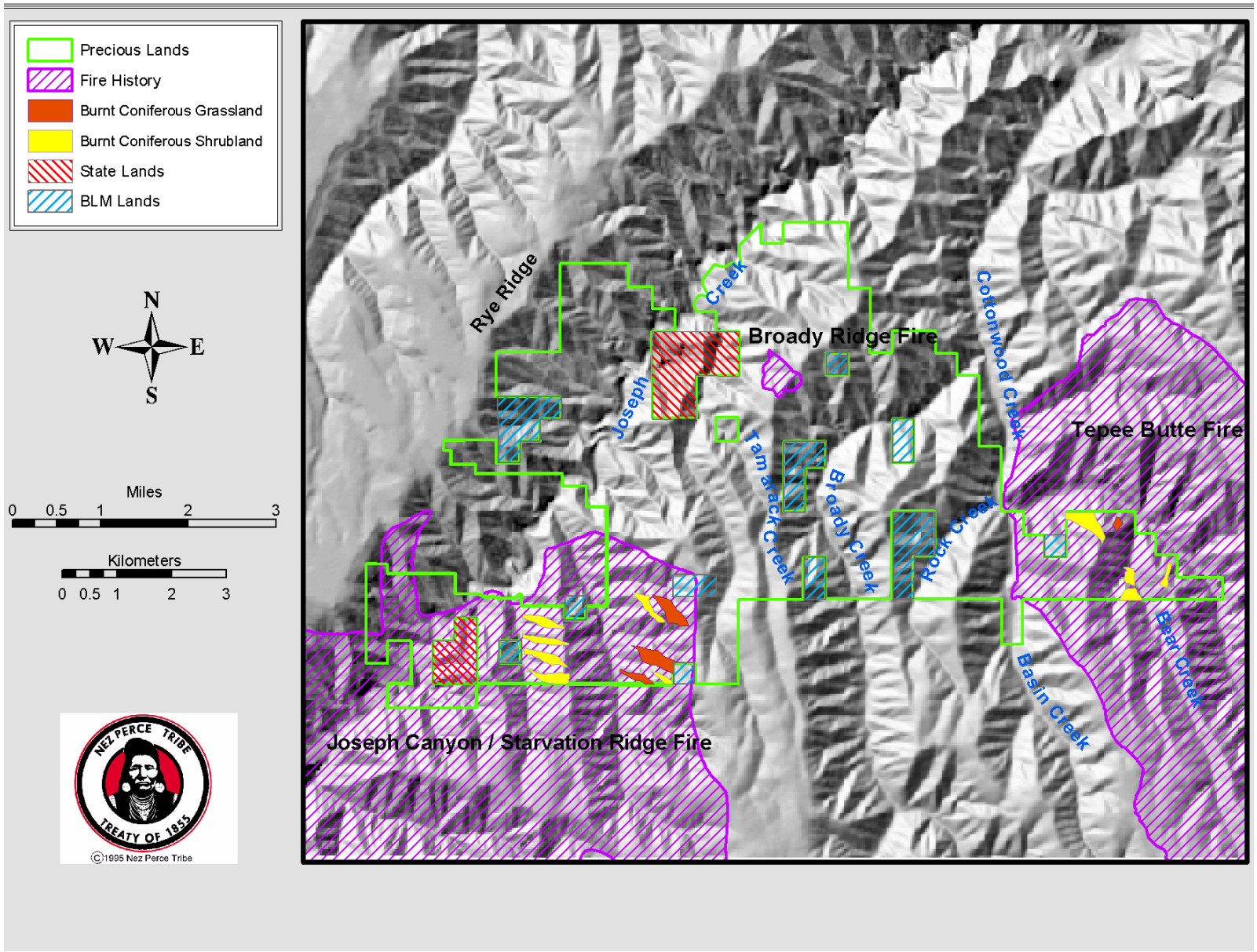
Depending on existing conditions, the following treatments may be applied to forested communities on Precious Lands.

-Understory burning to reduce shrub cover and improve fire resiliency
-Shrub removal by mechanical means
-Girdle trees to create snags
-Thin young ponderosa pine stands to increase spacing to 10-15 ft between trees
-Plant ponderosa pine on burned areas that are not regenerating naturally (312 ac)
-Plant ponderosa pine, Douglas fir and larch on agricultural fields A, B, C and D

Fire is a natural part of the ecosystem in the canyon grasslands of the Snake and Grande Ronde Rivers. Forests with heavy undergrowth or high stocking rates are especially susceptible to stand-replacing fires. Active management may be required to make conifer forests on Precious Lands more resilient to fire events. HEP analysis has also shown that understory shrub densities are too high to provide optimal blue grouse habitat. Where possible, stands will be treated to reduce understory shrub canopy cover and fine fuels. Small diameter trees may also be removed to reduce ladder fuels in some stands.

Fires during 1980's resulted in complete loss of forested stands in the Bear, Rush, and Joseph Creek drainages. Some of those burned sites have regenerated naturally but approximately 312 acres shows little or no sign of forest recovery. Because forest communities are so limited in distribution on Precious Lands, their biological importance increases. This Plan proposes to actively plant ponderosa pine on previously burned sites to re-create forested conditions (Figure 17). On some sites, pre-treatment of intermediate wheatgrass (planted after the fire to reduce soil erosion) may be necessary to ensure success of the planted trees. Trees will also be planted on approximately 50 acres of converted agricultural fields within the Buford Planning Unit.

**Figure 17. Sites Proposed for Conifer Tree Planting**



Changes in land use practices have resulted in some forest development within the Joseph Planning Unit. One site in particular has a vigorous, dense stand of 10-15 ft ponderosa pine trees. To promote development of an open stand structure, trees will be selectively thinned to reduce stocking levels. Similar stands will be treated as necessary.

**Riparian Communities**

Depending on existing conditions, the following treatments may be applied to riparian communities on Precious Lands.

- -Maintain existing stands of aspen
- -Plant aspen in appropriate locations to increase species diversity
- -In areas with <40% canopy cover plant site-appropriate trees
- -Plant hydrophytic shrubs in disturbed or degraded areas
- -In areas with >70% canopy cover create snags by girdling
- -Treat noxious weed infestations, particularly diffuse knapweed, Himalayan blackberry, and poison hemlock
- -Stabilize stream banks
- -Re-open braided stream channels to diffuse flows during flood events
- -Stabilize access road along Cottonwood Creek

Healthy riparian communities provide a multitude of resources to species inhabiting the Precious Lands Area. The goal of this plan is to have intact, functional riparian communities throughout the project area. Toward that end, tree and shrub plantings will be conducted in areas falling below management objectives for canopy cover. Wherever possible, locally collected plant materials (seeds, cuttings, or nursery grown stock) will be used in restoration work. When it is not possible to use site-collected materials, efforts will be made to locate nursery stock from the same ecoregion. In areas exceeding canopy cover objectives, snag creation will help provide nesting habitat for target species, increase the opportunity for woody debris recruitment into the stream, and open the canopy.

One of the most significant threats to healthy riparian communities is noxious weed invasion. Aggressive measures will be taken to eradicate or control weeds inhabiting riparian corridors. In particular, management efforts will concentrate on diffuse knapweed along Buford and Joseph Creeks, poison hemlock in Broady Creek, and Himalayan blackberry along Cottonwood Creek. Because of the proximity of running water, control efforts will largely be mechanical and biological rather than chemical.

The flood event of 1996-97 significantly impacted Cottonwood and Joseph Creeks by altering existing channels, downgrading, deposition of cobble, and loss of overstory vegetation. Some efforts may be required to facilitate recovery of those systems and make them more resilient to future flood events. Specifically, re-opening braided stream channels and stabilizing stream banks will improve riparian and in-stream conditions on the project area.

**Grasslands**

Depending on existing conditions, the following treatments may be applied to grassland communities on Precious Lands.

- -Treat noxious weeds with herbicides, bio-control agents, and mechanical means
- -Utilize livestock on localized areas as a tool in weed reduction activities
- -Re-seed or re-plant treated weed sites to restore bunchgrasses and native forbs
- -Minimize ground disturbance
- -Promote development of microbiotic crusts
- -Utilize prescribed fire or controlled grazing to reduce fuels and condition grasses for better forage quality

The number one management priority within grassland communities is to control and, if possible, eradicate noxious weed infestations. All tools available will be used in this effort including herbicides, controlled grazing, biological control agents, mechanical removal, and re-vegetation following weed treatment. Control efforts will be prioritized based on how aggressive the weed is, available tools, and consultation with local weed management authorities. For example, rush skeleton weed is considered a high priority for eradication because it is a new invader in Wallowa County, populations are currently small so control is possible, and has high potential for spread. Effective tools, however are limited for this species since bio-control agents aren't available, it's a perennial that doesn't respond well to mechanical measures, and it responds to only a few restricted-use herbicides. All of these factors must be considered in an integrated weed control action.

Prevention is a more desirable approach to noxious weeds than control efforts after establishment. Ground disturbance destroys or degrades microbiotic crust and vascular plant communities and opens germination sites for invasive species. Minimizing ground disturbance can be an effective tool to reduce establishment and retard weed spread. Toward that end, motorized vehicles will be restricted, and ground disturbance by humans and livestock kept to a minimum.

Once weeds have been successfully removed from a site, it is essential to re-vegetate the area with desirable species. Researchers and managers are still exploring methods to successfully re-establish grassland communities. This plan proposes to conduct experiments to better understand the restoration process and develop successful methods for use in this ecosystem. Of particular interest are methods to combat cheatgrass and recover microbiotic crust communities. See section 10.0 for more information.

Restoration efforts will require native grass seeds and or seedlings. Site-collected seed or propagules is generally considered optimal for restoration efforts because they preserve genetic diversity, provide site-adapted genotypes that have a greater chance of success, and reduces the potential for outbreeding depression (Wilson 2001). On Precious Lands our goal is to use native, site-adapted stock as much as possible given time and budgetary constraints. The five-year action plan and resultant budget reflect the need to collect and propagate local plant materials.

Precious Lands is an important big game wintering area for the Chesnimnus elk herd. Maintaining high forage value is critical for winter survival. It may be necessary to burn or selectively graze portions of the Management Area to promote production of high quality grass for wintering elk.

**Shrub Communities**

Depending on existing conditions, the following treatments may be applied to shrub communities on Precious Lands.

- Use prescribed burning or mechanical treatments to create a mosaic of successional stages across the project area
- Pile shrub cuttings to provide cover for quail and grouse

Shrub stands are important for a wide variety of species on Precious Lands. They provide vertical diversity as well as shade, hiding cover, forage, and nesting sites. Conditions that favor one species may be in opposition to conditions that are desired by other species or for different life requisites. For example, mule deer may require early seral conditions to provide high quality forage but need dense, late seral stands to provide thermal cover. Song sparrows need older, taller stands for nesting, but such stands are not optimal for blue grouse. Given these conflicting needs, the goal for shrub communities is to have a mosaic of seral stages across the project area. Specifically, 60% of the shrub communities support 60-75% canopy cover, 20% have >75% canopy cover, and 20% have <60% canopy cover.

Many of the shrub fields on Precious Lands are in the mature to decadent seral stage (>60% canopy cover) so will require some type of treatment to meet the goal of 20% of the area with <60% canopy cover. Treatments will consist of mechanical removal of shrubs using chainsaws and hand tools, or prescribed fire. Early seral conditions will also be created in some forested stands that undergo fuels-reduction treatments.

**Springs, Seeps and Ponds**

Depending on existing conditions, the following treatments may be applied to seep, spring and pond habitats on Precious Lands.

- Increase emergent vegetation along pond margins
- Improve water retention in ponds
- Where possible, develop new ponds
- Develop drinking water sources at select springs
- Maintain currently developed water sources
- Promote the development of overstory trees along seeps and spring margins

Water is a limiting factor for many species on Precious Lands. Access to drinking water is especially difficult during late summer when many streams and small ponds have dried up. Management activities will focus on maintaining existing water sources and developing new ones. The Buford Planning Unit has several developed springs that will need continued maintenance including plumbing, installation of small animal escape

ramps, weed control, and site hardening to minimize soil erosion. Aspen trees were planted at four sites in 2002 with additional plantings scheduled in 2003.

Pond habitats will be maintained and promoted to provide drinking water and good quality amphibian habitat. Existing ponds may need structural work to improve water retention or increase depth. Where possible and economically feasible, new ponds may be developed. Passive restoration will be used to promote development of emergent vegetation along pond margins. Noxious or unwanted vegetation (barnyard grass, reed canarygrass) may need to be controlled using mechanical means. As a general rule, chemicals will not be used in or adjacent to ponds to control vegetation

**In-Stream Habitat**

Until comprehensive stream surveys have been completed, site-specific recommendations for in-stream habitat improvements can not be made. However, based on existing knowledge of limiting factors within the Joseph Creek watershed the following management activities may be utilized.

-Plant trees and shrubs in riparian areas to improve stream shading
-Promote overstory development to increase woody debris recruitment
-Stabilize stream banks
-Re-open braided stream channels to diffuse flows during flood events
-Stabilize access road along Cottonwood Creek
-Control noxious weeds in floodplain areas

**Other Management Activities**

The establishment of nest and roosting boxes can be an interim measure to provide structural needs of wildlife while natural plant communities are recovering from disturbance or past management. Specifically, this Plan proposes to install nest boxes for western bluebirds, kestrels, house wrens, and possibly wood ducks as well as roosting boxes for bats (*Myotis* sp.). The CBFWA Wildlife Managers (1998) do not endorse expenditure of BPA funds to install and maintain artificial nesting structures so these activities would have to be cost shared with volunteer groups. For example, as part of an information and education effort, nest boxes could be built and installed by local scout groups. Monitoring of nest success could be conducted by local high school biology classes. Efforts such as this could provide interim habitat while educating youth in the importance of natural resource conservation.

**Staff Training**

Specialized training may be needed for select staff to perform restoration and habitat improvement work. The following list outlines training needs that have been identified.

-Restoration techniques
-Statistical analysis
-Hydrology and stream geomorphology

### 8.3 Monitoring and Evaluation

The following activities will be performed annually on the Precious Land Area to ensure that management activities are having the desired outcome. Section 9.0 provides details on justification and methods of the monitoring efforts.

-Breeding bird surveys
-Pond amphibian monitoring
-Noxious weed monitoring and mapping
-Winter elk counts
-Rare species population monitoring (as needed)
-Restoration project monitoring (agricultural fields, tree plantings, etc.)

Additional specialized monitoring or survey projects may be initiated as needed.

-Fish population and habitat quality inventory (FY 2004 & 3-yr intervals)
-HEP transects (5-yr intervals)
-Bat population sampling (5-yr intervals)

**Staff Training**

Quality data collection is dependent on the training and expertise of the personnel conducting the investigation. The following training needs are considered the minimum needed for survey biologists to safely perform their duties.

-First aid & CPR
-ATV safety
-Breeding bird identification by sight and sound (annually)
-Noxious weed identification
-Rare plant identification
-HEP methodology
-GPS and GIS hardware and software

Additional training may be required for field supervisors.

-Supervisory development
-Discrimination and sexual harassment training

### 8.4 Five Year Budget Projection

The management of any large land holding requires recurrent costs associated with day-to-day activities. These costs include, but are not limited to, the following: employee salaries, fringe benefits, indirect costs, communications, travel, vehicle leases, utilities, etc. These costs are incurred while performing work such as administration, budgeting, coordination with other agency personnel, contract administration, wildlife surveys, monitoring and evaluation, weed suppression, staff supervision, data management, facility maintenance, public contacts, and other recurring duties associated with achieving the objectives of the wildlife management area. **Table 8** outlines the five-year budget for the Precious Lands Project.

Specific equipment needs identified during the planning process include upgraded GPS units, and a replacement ATV in FY '06. One ATV will be eight years old by FY '06 and we anticipate that its service life will be at an end. The GPS units currently used by the program are GeoExplorer II's, which are obsolete. The budget proposes $12,000 in FY '03 to purchase two Allegro CE units that have real-time differential correction and sub-meter accuracy. This budget also includes cost-share expenses to purchase a mid-sized tractor and implements to facilitate restoration work on the agricultural fields of the Buford Planning Unit. Costs would be shared with the NPT Dworshak Mitigation Program, which also needs a tractor to accomplish restoration work. If this equipment expenditure is not approved, those costs would shift into the supplies and service line because equipment would have to be leased or services contracted to perform the work. Expenditure records indicate that over the last two years the Precious Lands Project has spent approximately $4,000.00 on contracted seeding and spraying work. The NPT believes that investment in capital equipment would be a better use of program dollars than paying someone else to perform routine work.

Only those activities meeting the funding recommendations of the CBFWA Wildlife Managers (1998) will be funded from BPA. Any other identified activities will be funded through the NPT or other sources. For example: fee-in-lieu of tax payments to Wallowa and Asotin Counties, artificial nest structures, and recreational developments. Table 9 lists those costs identified through the planning process that will be funded through the NPT or other sources.

| Table 8. Precious Lands Wildlife Area Projected 5-Year Budget | | | | | |
|---|---|---|---|---|---|
| | **FY03** | **FY04** | **FY05** | **FY06** | **FY07** |
| **SALARIES** 5.4 FTE | | | | | |
| Project Leader, field technicians, wildlife aides, etc. | $178,381 | $183,898 | $189,585 | $195,449 | $201,493 |
| **FRINGE BENEFITS** | | | | | |
| Insurance, FICA, Worker's Comp, etc. (~33.5%) | $59,758 | $61,605 | $63,510 | $65,475 | $67,500 |
| **TRAVEL & VEHICLES** | | | | | |
| Training, per diem, vehicle leases & repairs, mileage | $30,460 | $30,560 | $30,660 | $30,760 | $30,860 |
| **COMMUNICATIONS** | | | | | |
| Cell Phones, radios, long distance | $2,160 | $2,160 | $2,230 | $2,230 | $2,230 |
| **UTILITIES** | | | | | |
| Power at Buford Ranch | $2,000 | $2,200 | $2,400 | $2,600 | $2,800 |
| **SUPPLIES & SERVICES** | | | | | |
| Field equipment, office supplies, computer rental, tool repairs, building maintenance | $21,100 | $21,050 | $22,160 | $23,330 | $24,560 |
| **MATERIALS** | | | | | |
| Fence posts and wire, trees, seed, data layers, lumber, herbicide, signs | $23,900 | $35,000[3] | $35,000[3] | $26,000 | $27,400 |
| **INDIRECT (22.6%)** | | | | | |
| | $71,813 | $76,042 | $78,093 | $78,160 | $80,646 |
| **EQUIPMENT** | | | | | |
| GPS unit(s) | $12,000 | | | | |
| Tractor cost-share | | $15,000 | | | |
| Tractor implements | | | $5,000 | | |
| Replacement ATV | | | | $5,500 | |
| **SUBCONTRACTS** | | | | | |
| Fire control agreement | ~[1] | $11,600 | $11,600 | $11,600 | $11,600 |
| Water quality monitoring | $2,500 | $2,500 | $2,600 | $2,600 | $2,600 |
| Helicopter weed spraying | ~[2] | $11,000 | | $11,000 | |
| Property boundary land surveys | $6,000 | | | | |
| Horse packing | ~[1] | $5,300 | | | |
| Fish Habitat Survey | | $25,000 | | | |
| Cultural Resource Inventory | | | $10,000 | | |
| **TOTAL BUDGET** | $410,072 | $482,915 | $452,838 | $454,704 | $451,689 |

[1]Carryover funding from FY '02 will be used to accomplish this task in FY '03
[2]Only required every second year due to residual herbicide activity.
[3]Increases in materials costs in FY 04 and 05 are associated with seeding and planting agricultural areas and burnt conifer sites.

**Table 9. Project Costs to be Funded by the NPT or Other Sources.**

| Item | Estimated Cost | Potential Funding Source |
|---|---|---|
| 1) Operation and Maintenance | | |
| Secretarial Support – (3 months) | $2,080 | NPT |
| Program Administration – (1 month) | $5,290 | NPT |
| Fee-in-lieu of Property Taxes | $4,200 | NPT |
| Artificial Nest Structures | $1,200 | NPT Salmon Corp<br>Boy Scouts of America |
| Noxious Weed Control Cost-Share | $3,000 | Wallowa Resources |
| 2) Recreational Developments | | |
| Joseph Creek Trail Head Development | $13,000 | ODFW Access & Habitat Program |
| Joseph Creek Trail Rehabilitation | $25,000 | Oregon Trails & Recreation |
| **Total** | $53,770 | |

## 9.0 MONITORING AND EVALUATION

Monitoring is the systematic collection and analysis of measurements to evaluate changes in environmental conditions and success in meeting management objectives. Resource monitoring focuses on the specific flora or fauna of concern, while habitat monitoring describes how well an activity meets the management standards for the habitat. In resource monitoring, the actual causes of population condition and trend are unknown, and it is usually more difficult to implement than habitat monitoring (Elzinga et al.1998). For some species, such as annual plants that fluctuate dramatically from year to year or long-lived perennials that change very little, habitat monitoring may be more sensitive to detecting undesirable change than monitoring the species directly (Elzinga et al. 1998). The Nez Perce Tribe has established a variety of habitat monitoring protocols to track the long-term changes and trends influencing the environmental condition on the wildlife areas in northeast Oregon and southeast Washington.

### 9.1 Neo-tropical migrant breeding bird surveys

3 yr rotation - currently implemented

Objective Significance: Point-count monitoring provides the relative abundance of all bird species and, over time, can detect trends in abundance with a relatively small amount of work compared to other methods (Huff et al. 2000). Point-count surveys help assess the conservation status of individual bird species and prioritize management efforts by monitoring long-term, community-specific changes. Data is submitted to the regional Partners in Flight database that is administered by the Rocky Mountain Bird Observatory (RMBO). The database includes global and local assessment scores for all bird species

breeding and wintering in the U.S. and for most areas in Canada (Panjabi 2001). A list of bird species found on the Precious Lands Area can be found in Appendix A.

Implementation: A survey site will consist of five count stations established within a given cover type. Each station will be spaced a minimum of 150m apart (Huff et al. 2000) along randomly chosen bearings. Surveys will be conducted at least twice a year for three continuous years and then rotationally sampled once every three years. A sample year will consist of two to three visits throughout the breeding season (mid May-early July), with at least 7 days between visits. Each visit is comprised of a 10-minute visual/auditory detection survey broken into 0-3 minute, 3-5 minute, and 5-10 minute segments in which adult breeding birds are tallied by species and abundance. Individual birds are noted as being in or out of a 50m radius circle from the center of the station, and whether they are flying over or actively using the cover type. Surveys begin 15 minutes before dawn and end by 10:00 am. Juveniles and bird species incidentally flushed outside of the 10-minute survey are noted separately from the tallied species.

Species diversity and average number of detections are monitored to evaluate avian population trends. Data are analyzed yearly by site and vegetation community parameters, and integrated into a collective database.

Evaluation Criteria: A 5% increase in avian species diversity and average number of detections is expected in grassland, shrub, and riparian habitat communities where livestock grazing has been discontinued. Many of the ungrazed and undisturbed forested sites are expected to maintain the current level of diversity and abundance. Should these criteria begin to show diminishing trends less than 15% of current levels, limiting factors for breeding birds will be assessed and managed to improve habitat quality.

A significant shift in species composition is expected at one burned site as it matures from a shrub-dominated community back to an open conifer habitat. Both avian diversity and average abundance should increase slightly with the successional changes. If the conifer seed source has been totally removed, some restoration efforts may be necessary to reestablish the historic tree component.

Species abundance data for the project site can be compared to RMBO global breeding birds species trends. The RMBO database enables users to monitor large-scale global effects that may alter local sampling data due to processes outside the management scope and region. This allows managers to separate local trends from regional or global effects.

### 9.2 Habitat Evaluation Procedures (HEP) Monitoring

5 yr rotation - currently implemented

Objective Significance: HEP is a standardized habitat-analysis model developed by the U.S. Fish and Wildlife Service. It uses a variety of Habitat Suitability Indices (HSI) for target wildlife species to evaluate the plant community as a whole (Anderson and Gutzwiller 1996). The HSI values range from 0.0 – 1.0 and are multiplied by potential acreage to determine amount and quality of habitat available to target wildlife species. While HSI models were initially used to evaluate the baseline condition of the Precious

Lands Area, long-term monitoring will be conducted based on HEP data collection procedures, but not limited to particular wildlife variables. For example, percent microbiotic crust cover and percent bare ground are recorded for microplots in grasslands while the number of woody debris >4" diameter is recorded for transects in riparian and conifer cover types. Surveys will be used to assess long-term trends in plant community health, weedy encroachment, limiting factors for wildlife and identify/monitor areas of habitat degradation. A summary of the 2000- 2001 HEP data collection results can be found in Appendix D.

Implementation: During baseline assessment sampling, 35 HEP plots were established in various cover types. For the purpose of long-term monitoring, 24 of the 35 plots have been selected to represent each of the 13 major habitat communities, and each of these permanently established HEP plots would be surveyed rotationally every five years. Sampling will be conducted using the standard USFW protocols (USFWS 1980a, 1980b). Two plots in each of the vegetative classes will be sampled to monitor succession and community health trends. Recently burned classes represent a relatively small classification type and have only a single plot to characterize them. Vegetation class categories: Excellent, Good, Fair, and Poor Grasslands; Short Shrub; Tall Shrub; Riparian Shrub; Riparian Hardwood; Riparian Conifer; Open Conifer; Conifer; Burnt Conifer Shrub - one site only; Burnt Conifer Grass - one site only.

HEP plot establishment protocol: Random starting points are established using a random number grid. Transects are divided into 100 ft. segments, and transect length is determined using a "running mean" to estimate variance (95% probability of being within 10% of the true mean for percent tree canopy cover, percent herbaceous cover and percent shrub canopy cover).

$$\text{Sample size equation: } n = \frac{t^2 \times s^2}{E^2}$$

Where: t = value at 95 percent confidence interval with suitable degrees of freedom
s = standard deviation
E = desired level of precision, or bounds

Minimum transect length is 600 ft, and patches of cover will be large enough to contain a minimum transect length without extending past a 100 foot buffer along the inside the edge of the cover type.

To establish a transect, a 5 ft tall metal post or 2.5 ft length of rebar will be pounded into the ground at the random starting point. The post will be painted orange and marked with pink flagging plus pink/black stripe flagging to distinguish HEP plots from other study plots. An aluminum tag will be wired onto the post indicating date, location, and transect number. A plastic orange safety cap will be pressed onto the top of the rebar markers. Aspect, slope, and other site information are filled out on the cover sheet at this time. All plant species encountered along the transect are listed on the cover sheet as native/naturalized, or weed species. A random number table is used to select an azimuth

between 0 and 360 degrees. The tape is run along the chosen azimuth and will continue for each 100 ft. segment until the cover type changes or obstacles are encountered, i.e. inaccessible terrain. Transects are run at least 100 ft inside the edge of the cover type when possible to avoid edge-affect variation. Any time azimuth is changed, the new distance and azimuth are noted, and flagging is placed at the point of change. Pink plus pink/black stripe flagging is to be placed at the end of each 100 ft. segment and marked with plot number and transect length up to that point. A photograph is taken of the transect from the starting point, sighting down the length of the tape. An information plaque should be placed unobtrusively in the frame of the photo indicating plot name, date, time of day, photograph number, azimuth, and data collector's initials. Note the photo number on the data sheet. All transects will have GPS locations and be entered into a GIS database.

Grassland protocol: Herbaceous measurements will be taken every 20 ft. on the right side of the tape (the right is always determined by standing at 0 ft and facing the line of travel). The sampling quadrat will be a rectangular $0.5m^2$ microplot, placed perpendicular to the tape with the lower right corner on the sampling interval.

Grassland variables to be monitored:

- *Total herbaceous cover* is the percent of the microplot shaded by any grass and forb species. Plant material that hangs over into the plot but is rooted outside the frame is still included in cover totals.

- *Total percent palatable cover* is determined by visually estimating the area covered by the select palatable grasses and forbs listed on the data sheet, and any species known by the data collector to be palatable to mule deer i.e. clover. (Note: Palatable cover is not a percent of the total herbaceous cover, it is a stand-alone measurement of area covered. Percent palatable cover will never exceed total herbaceous cover.)

- *Cover of significant forbs* is broken down by three forb species known to be palatable to mule deer. Cover is estimated for each of these select species within the plot. Select forbs are: Balsamroot (*Balsamorhiza sagittata*), Buckwheat (*Eriogonum spp.*), and Lupine (*Lupinus spp.*).

- *Cover of significant grasses* is broken down by select grass species known to be palatable to mule deer. Cover is estimated for each of these select species within the plot. Select grasses are: Bluebunch Wheat (*Agropyron spicatum*), Idaho Fescue (*Festuca idahoensis*), Sandberg's Bluegrass (*Poa sandbergii*), and Prairie Junegrass (*Koeleria cristata*). A "T" is used to indicate a trace amount (<1%) of a particular species found in the plot.

- *Percent cover target weedy species* is the total area covered by particular undesirable plant species. Currently, the undesirable plant list includes Cheat Grass (*Bromus tectorum*), Kentucky Bluegrass (*Poa secunda*), Medusahead (*Taeniatherum caput-medusae*), Red Threeawn (*Aristida longiseta*), Yellow Starthistle (*Centaurea solstitialis*).

Other species may be added in the future to better monitor the health of plant communities.

- *Herbaceous height* is measured with a pocket rod to the nearest $^{1}/_{10}$ ft and 2 measurements are taken in the microplot to determine an average.

- *Number of herbaceous species* is a count of the unique herbaceous species represented in the microplot, whether they are rooted in or not. (Note: Lone fragments are not counted due to their unknown origin, but stalks hanging over into the plot are counted).

- *Percent grass* is the total area covered by all grass species within the microplot, without regard to palatability.

- *Cover pole* data were gathered every 20 ft along the transect. Cover pole readings are a percentage of a 1.5m (5 ft) pole that is totally obscured from sight at a distance of 10 ft. Four readings were taken at each sampling position – 2 parallel and 2 perpendicular to the line of the transect.

- *Percent bare ground* is a visual estimation of the area within the microplot that is exposed rock or soil and not covered by litter, duff, microbiotic crust, or herbaceous vegetation.

- *Percent crust* is a visual estimation of the area within the microplot that is covered by a microbiotic crust. Crusts form from cyanobacteria and lichen growth on undisturbed soil and are usually darker than non-crusted soil.

<u>Shrub protocol:</u> Herbaceous variables as listed above are collected in addition to the following shrub-specific variables. Shrub measurements are taken as a 5 ft "hit or miss" (20 possible "hits" per 100 ft segment) if the shrub canopy cover is >20%. If shrub canopy cover is <20%, measurements are taken every 2 ft (50 possible "hits" per 100 ft segment). Only the tallest shrub that crosses the plane of the tape at the sampling interval is measured. Shorter shrubs are listed and circled on the data sheet to provide an accurate representation of species composition and canopy structure.

<u>Shrub variables to be monitored:</u>
- *Shrub height* is measured in $^{1}/_{10}$ of feet where the tallest shrub crosses the plane of the transect at the sampling interval.

- *Shrub species* of the "hit" vegetation is noted using the standard 4 letter code comprised of the first two letters of the genus name and the first two letters of the species name. I.e. – Pacific Ninebark (*Physocarpus malvaceus*) is coded as PHMA.

- *Age class* of the "hit" shrub is noted as:
Y – young, non-reproductive seedlings
M – mature, produced fruit or flowers that year
D – decadent, 25-50% dead
VD – very decadent, >50% dead

DD – dead
The age class is applied to the plant as a whole, not just the piece of the shrub that intersects the tape. If the measured stem were an offshoot of new growth from an older, 30% dead shrub, the age class would be "decadent".

Conifer / Riparian protocol: Both herbaceous and shrub variables as listed above will be monitored in addition to tree-specific variables. Tree measurements will be taken on both the transect and within a $^{1}/_{10}$ acre circular plot at the end of each 100 ft segment. The center point of the circular plot is the 100 ft mark of the transect tape, and the radius of the circle is 37.2 ft. Stream Gradient (% slope) is measured at the initial establishment of riparian surveys.

Conifer / Riparian variables to be monitored:
- *Tree canopy cover* is measured using a densitometer and is recorded as a "hit or miss" every 10 ft along the transect (10 possible "hits" per 100 ft segment). Diameter Breast Height (DBH), and species are noted for each canopy "hit" tree.

- *Tree height* is measured on a single tree (>15 ft tall) closest to the 50 ft and 100 ft marks along the transect. Standing at the same contour elevation as the tree base, use a logger's tape to measure a distance out from the tree approximately the same length as the tree is tall. From that point, use a clinometer to measure the angle (in % slope) to the top of the tree. The tree height is calculated by: (distance from tree) x (% slope), then adding the observer's height.

- *Down woody debris* is counted as a running total for each 100 ft segment, and a single tally mark is made on the data sheet for each down log/debris that crosses the transect. The debris must be >4" DBH at the point where it intersects the tape to be counted.

- *Snags* are counted in the $^{1}/_{10}$ acre circle plot located at the end of each 100 ft segment. DBH and snag condition are noted for each snag that is >4" DBH and >6 ft tall. Snag condition scale follows Parks et al. (1997):
1 = newly dead, still has branches and bark, top still intact
2 = recently dead, some branches and bark missing, broken topped
3 = old dead, branches and bark gone, heartwood decay, bayonet top

- *Basal area* is measured with a 10-factor prism in the $^{1}/_{10}$ acre circle plot at the end of each 100 ft segment. Standing with the prism held directly over the center of the circle (the 100 ft mark of the transect segment) a count is made by pivoting around the prism and tallying basal "hits" for the $^{1}/_{10}$ acre plot.

- *Age class* of trees within the $^{1}/_{10}$ acre plot are tallied by hardwood/conifer category and size classes. Size classes are defined as follows:
Sapling = trees <4" DBH and <15 ft tall
Pole = trees 4"< 8" DBH
Mature = trees >8" DBH

Evaluation Criteria: Simple trend estimations throughout the entire project landscape are difficult to assess due to the high range of variability within each of 13 cover types resulting from floods, fires, grazing, and extreme topographical influences. Conditions often vary greatly throughout the plots, even when located within similar cover types. Percent tree canopy closure, percent shrub cover, and percent herbaceous cover will be used as general indicators of plant community health.

Increasing trends for tree, shrub and herbaceous cover are expected in areas where livestock grazing has been discontinued. Herbaceous and shrub cover should increase 5-10% within the first 5 years. A similar trend in tree canopy closure may not be evident for 15-20 years as saplings are not considered a component of the over story until greater than 15 feet tall.

Buford and Cottonwood Creeks experienced flooding events in 1996 that greatly altered riparian vegetation structure. These areas are expected to show an increase of 15-20% tree canopy and shrub cover over a 20-year period, and should exhibit an increasing trend at each of the 5-year monitoring intervals. The 1996 flood also affected Joseph Creek but it is a naturally 'flashy' system, experiencing extreme flow changes annually, and is therefore not expected to exhibit the same level of increases in tree, shrub and herbaceous cover. Vegetation on Joseph Creek should increase by 5-10%, but will continually be set back from high spring runoff. Restoration efforts may be implemented if it is determined through stream surveys that revegetation and channel modification could effectively reduce the annual spring flooding events. Riparian communities that were not affected by the flooding are expected to maintain current levels of tree, shrub and herbaceous cover.

Bear Creek, Cottonwood Creek, and portions of the southeastern corner of the project site burned in the 1998 Teepee Butte fire. The extensive burn removed a large percentage of the mature conifers that would have functioned as seed sources for the re-establishment of the historic open conifer communities. Initial baseline HEP surveys have shown very little conifer regeneration in the Bear Creek drainage. Restoration plantings and/or understory burning may be implemented to increase the tree canopy cover to previous levels as determined by aerial photographs.

Grassland communities cover the majority of the project area and vary greatly in health and quality. Currently, healthy grasslands comprise over 70% of the total grassland cover types. 'Excellent' grassland communities contain less than ten percent cheatgrass, and 'Good' grasslands contain less than 30 percent cheatgrass. The invasion of noxious weeds and non-native species degrade the quality of native bunchgrass communities, especially when those communities are converted to near-monocultures of one or just a few species (Schmid et al. 2001). However, due to the rugged terrain and inaccessibility of many areas, full restoration is not cost effective at this time. The healthy grassland communities should not show an increase of more than 10% cheatgrass or noxious weeds within the herbaceous understory, and these areas will be actively managed to contain the spread of noxious weed species by mechanical means such as spraying, spading or hand pulling. Various techniques will be investigated on small, weedy plots to find the most

effective and least expensive methods of maintaining and restoring the poorer grassland communities.

Both short shrub and tall shrub communities are valuable as thermal and hiding cover for many species of wildlife, and management by removal or burning is not anticipated at this time. Some shrub communities have been subject to disturbance by livestock, fire, flood, etc. as were mentioned above, but little change is anticipated in tree, shrub, or herbaceous cover of the climax stage shrub fields. Restoration practices may be implemented if the shrub cover shows a downward trend exceeding 15% loss of cover.

### 9.3 Amphibian Monitoring

Yearly observation (2x per yr) – 3yrs partial data collection

Objective Significance: Population declines due to pollution, habitat degradation and unknown causes make some amphibian species significant indicators of habitat quality. Over the last 50 years, many species of amphibians (frogs, toads, salamanders and newts) throughout the world have declined markedly in numbers; some species have become extinct. In many instances, these declines are attributable to adverse human influences acting locally, such as deforestation, draining of wetlands, and pollution. In 1988, however, herpetologists from many parts of the world reported declines in amphibian populations in protected, apparently pristine habitats, where such local effects could not be implicated. This led to the suggestion that there may be one or more global factors that are adversely affecting amphibians. Possible candidates for such influences are climatic and atmospheric changes, such as increased UV-B radiation, widespread pollution, such as acid rain, and disease (DAPTF 2002).

Amphibian monitoring data will be submitted yearly to the Declining Amphibian Populations Task Force (DAPTF), which maintains a regional as well as international amphibian population database.

Implementation: Surveys will be conducted twice yearly during the summer months to inventory presence/absence of amphibians and monitor population trends according to standard DAPTF protocols. Monitoring will take place on standing bodies of water or wetlands, and timed to observe egg production and juvenile development. Due to the significant influence of weather and climate, particularly recent rainfall events, a rain gauge will be established in close proximity to the monitoring site. All locations will be located with GPS and entered into a GIS database.

Amphibian protocol and variables: Surveys should be conducted in the evenings or early mornings to best observe calling and breeding behavior. A team of two observers walks the margin of a pond or marsh and records species and habitat characteristics. A map is drawn on the back of the data sheet to denote changes in margin vegetation, shore erosion, or any significant habitat alterations. Data collection is divided into four sections – Location, Species data, Physical and chemical data, and Habitat description.

- *Location* information notes date, start and end time, observers, state, county, exact physical location by GPS or UTM coordinates, elevation, and Township/Range/Section location.

- *Species Data* is an account of all amphibian species seen (in addition to garter snakes), noted by 4-letter genus-species code, a tally of adult and juvenile individuals, how the species were observed, the presence/absence of egg masses, the presence of fish, and if any amphibian species were calling at the time of the survey.

- *Physical and Chemical Data* is a characterization of the climatic conditions at the time of the survey. Wind speed, air temperature, water temperature, water color, and turbidity are all monitored and recorded.

- *Habitat Description* variables are important for understanding changes in amphibian abundance. Origin of the water source (man-made or natural), seasonal drainage characteristics, general habitat description (includes signs of beaver activity), maximum length and width, maximum depth, stream order (an index of stream size), primary substrate, emergent vegetation, north shoreline characteristics (important in evaluating breeding habitat), and forest characteristics (if present).

Evaluation Criteria: Maintain or increase species diversity at all monitoring locations (i.e. no net loss of native species, and no new exotics). Meters of shoreline vegetation should increase by 10% over the 5-year planning period. Relative abundance of adults, egg masses, and juveniles should increase.

### 9.4 Weed Monitoring

3yr rotation of maintenance surveys - partial data collection in place.

Objective Significance: The purpose of the noxious weed monitoring protocol is to 1) assess long-term trends in plant community health and new weedy encroachment, 2) identify extent and density of weedy communities, 3) identify/monitor areas of habitat degradation, 4) identify significant erosion sources and other disturbances that may lead to weed establishment, and 5) implement the most practical and economical measures to reduce noxious weeds. A critical component of weed management is a current and updated inventory of infestations. Inventory provides necessary information for establishing site-specific priorities, management objectives, and prescribing treatment methods (CWMG 1999).

Weeds often create dense monocultures that hinder management programs aimed toward increasing biodiversity. Many weedy invaders are poisonous or detrimental to wildlife, decrease forage quality, increase erosion, out-compete rare native plant species, and reduce property values (Asher 1995). Aggressive weeds of concern include Yellow starthistle (*Centaurea solstitialis*), Cheatgrass brome (*Bromus tectorum*), various knapweeds (*Centaurea spp.*), Rush skeletonweed (*Chondrilla juncea*), Leafy spurge (*Euphorbia esula*), Sulfur cinquefoil (*Potentilla recta*) and various thistles (*Cirsium arvense, Cardus spp.*, and *Onopordum acanthium*).

On the Washington-Oregon border yellow starthistle has increased over 100,000 acres in the last 30 years (Asher 1995). Many other weedy species continue to be spread by forestry practices, wildlife, livestock, recreational use, wind, water, and vehicles. Weeds may colonize any cover type, but disturbances such as erosion, recreational use, and livestock trampling create sites where they become established and spread quickly. Healthy, contiguous communities with native vegetation and good management practices are the first defense against widespread weed invasion. Prevention of large-scale outbreaks through inventory and monitoring efforts is the cheapest and easiest way to contain the spread of noxious weeds before they become extensive. Once an infestation becomes widely established, management by herbicides and biological controls become expensive, impractical, or often unavailable, making early detection imperative.

Weed infestations will be monitored or eradicated as time and budget permit. Each infestation site will be surveyed upon initial discovery and after eradication treatments have been implemented. Follow-up treatments will depend upon distribution, location, and density of weed population. Due to the costly nature of weed eradication measures, a few select communities will be dealt with each season as delineated by size and priority. Some species of weeds, such as Rush skeletonweed, are aggressive and difficult to eradicate once established and will be given a higher priority than other species. Some communities may need to be monitored for years before active removal methods are applied. Yearly monitoring will consist of tracking changes in the community perimeter with GPS.

Over the last three years, both mechanical and physical removal methods have been implemented to control weedy populations. Aerial herbicide treatments of Tordon have been applied to approximately 400 acres on the NEOR Precious Lands Wildlife Management Area. Field crews applying Curtail have treated approximately 35 acres on the Precious Lands by backpack and ATV sprayers, and hand-pulling smaller infestations.

<u>Implementation</u>: Weed communities >1 ac. will be aerial sprayed with herbicide or treated with biological control agents while communities <1 ac. will be eradicated by mechanical means (backpack sprayers, horseback sprayers, physical removal, etc.). Optional methods of noxious weed control that may be utilized in the future include prescribed burns and rotational livestock grazing. The use of these alternative eradication methods shall be considered as budgets and weed response dictates. Protocols for these methods will need to be developed to minimize negative impacts to wildlife and habitats and maximize eradication of specific weed species. Using all available options in combination will create the most successful eradication program.

If native vegetation is greatly reduced in the treatment process (herbaceous cover less than 50% of healthy community), these areas will be reclaimed with native plant species to limit recolonization by other weedy invaders. Re-vegetation may be accomplished through hand seeding or planting bunchgrass plugs, and will be monitored for successful native reestablishment.

The weed monitoring program will utilize three tracking methods: HEP monitoring, ridgeline observation points, and sampling transects.

HEP protocol: The 5-year rotational HEP data collection program, as described above, will identify new weed invasions and distribution throughout the management area. The presence and densities of target weed species will be tracked on herbaceous microplots over all cover types sampled using the HEP protocol.

Ridgeline Observation Point protocol: The establishment of 10-12 ridgeline monitoring points will allow a single observer to quickly and inexpensively overlook large expanses of land in a small amount of time. These point samples are practical tools in targeting at-risk habitats, documenting initial signs of erosion, and are useful in prioritizing management needs. Each site will be visited yearly, and all suspected weed infestations, erosion sources, new disturbances or trespass livestock will be marked on a topographic map. At-risk sites will be visited and distribution boundaries of weed communities and erosion sources will be delineated with GPS.

Noxious weed transect protocol: Monitoring transects will be established at known locations of weedy infestations to track the status and trend of weed population densities. Upon initial discovery of a weedy community, the perimeter will be mapped with GPS and a population density will be estimated. Populations covering 2500m$^2$ (50m x 50m) or more will be estimated with a double transect sample. Smaller populations, less than 2500m$^2$, will be visually estimated.

Two 100m transects will be randomly established at each monitoring site. Standing in the middle of the weed community, a random number between 0-360 is chosen from a random number table, indicating the azimuth of travel to establish the start of the transect. Another random number is selected from 0-50, which indicates the distance to travel along the chosen azimuth. After reaching the starting point, a third random number between 0-360 will be chosen as the azimuth of the sampling transect. A 2-3 ft length of rebar is pounded into the ground to mark the start and end of each transect and a 100m tape is laid between the rebar stakes. It is important to pull the tape taut, but without stretching, to make relocation as precise as possible during successive monitoring efforts. The rebar stakes are wired with aluminum tags indicating start or end, transect number, and site identification name. A photograph will be taken of the transect from 0m facing the line of travel. Site information such as transect number, photo number, township, range, and section, is filled out at the start of each plot.

Rectangular 0.5m$^2$ microplots will be used to permanently locate 20 sample quadrats per transect. The quadrats are positioned on the right hand side of the tape, starting at 0m and continuing at 5m intervals for the length of the transect. (The right hand side is determined by standing at 0m and facing the line of travel). The long side of the microplot is positioned perpendicular to the tape, with the lower right corner placed on the sampling interval. All plants rooted within the quadrat frame will be counted, but vegetation rooted outside the plot with canopy extending over the plot frame will not be counted. For larger bunchgrasses, only a portion of the rooted area need fall inside the

plot to be included. Plants will be tallied into one of three categories – Weed species of interest (e.g. starthistle), Perennial grass, or Forb. Microplots may be split into segments if vegetation is particularly dense, and the total number of plants tallied among all segments is then compiled to reach a final count.

Repeat the same protocol for a second transect within the weed community.

Evaluation Criteria: Known populations of more aggressive or noxious weeds of concern will be given a higher priority of treatment. High priority populations that increase in area by greater than 20% in a single year will be considered a candidate for early eradication or control measures. A minimum of 20 acres per year will be treated by the most effective or efficient means possible to curtail the establishment or spread of weedy species. Similar standards apply as were discussed in the HEP section for weed encroachment into otherwise viable plant communities.

### 9.5 Big Game Counts

Data from ODFW or WDFW flyovers – partial data collection

Objective Significance: Ungulate populations are major contributors to the function and succession of ecosystems. Ruminants tend to feed selectively, which can alter the composition of plant communities by suppression some plant species, and thereby conveying competitive advantage to other plants (Riggs et al. 2000). Effective habitat management relies on monitoring the changes in ungulate populations that may effect both vegetation and wildlife trends. Coordination with local wildlife agencies to establish baseline counts for deer, elk, and bighorn sheep populations on mitigated lands has already been implemented. Aerial surveys have been conducted in the past, and we will work together with cooperative agencies in the future to share data without duplication of effort. In addition to aerial surveys, pellet count stations may be established on restoration sites to monitor the change in use over time by large herbivores.

Implementation: Oregon Department of Fish and Wildlife conduct surveys every year during the winter and early spring. Additional surveys may be conducted to specifically track bighorn sheep populations within the Joseph Creek watershed, especially in response to disease episodes. Aerial count data will be acquired for the Wildlife Management Area and utilized in creating and maintaining a population trend database.

Establish pellet count stations within reclaimed plots to assess ungulate response to reclamation. Run pellet count stations in conjunction with small mammal trapping efforts – 4 day sample run, conducted for the first 3 years after re-vegetation.

Evaluation Criteria: Due to the migratory nature of large ungulates, a wide range of variables may affect changes in populations over a large spatial scale. Elk and deer predominantly use the shrub and conifer cover types on the project area as wintering habitat. If all managing parties (NPT, ODFW, and WDFW) have evidence to suggest that downward trends of the local elk and deer herds are directly correlated to a lack of wintering habitat, then actions such as burning, thinning, or planting will be used to alter

the existing cover type conditions. Baseline HEP studies indicate that overall, the project site has low quality winter habitat for mule deer due to the large expanses of open grasslands, but the shrub and conifer communities offer good cover and moderate forage.

### 9.6 Permanent Photo Points

5 yr rotation – not currently implemented

Objective Significance: Photographs of habitat status can help monitor long-term trends in plant cover, weed invasion, and disturbances. Plant height, size, flowering effort, and levels of herbivory are some of the conditions that will be used to document general health trends of vegetative communities. Photo points can be useful in documenting effects and subsequent succession after flood, fire, grazing, or mass wasting events, and can quantitatively monitor habitat and long-term plant growth (Skovlin and Thomas 1995). They will be used to establish baseline conditions and stature of plant communities.

Implementation: Photo points will be located along fence lines and boundaries to document plant response to livestock herbivory. Communities strongly impacted by grazing, erosion, or natural disturbances will be considered a higher monitoring priority than undisturbed sites. All photo points will be located with GPS and entered into a GIS database.

Methodology follows the recommendations of Hall (2001). A permanent photo azimuth and location marker will be established at each site. A natural object is best to act as a site marker, such as a tree, rock, etc., but if none are present, a metal fence post will be installed. Each site will be revisited on a 5-year rotational basis. A photo from a previous year should be taken into the field to help identify old site markers and surrounding reference points in the event of landscape-scale environmental changes such as fire, flood, etc. Multiple pictures should be taken at each point, using various exposures, to ensure quality replication. Indicate date, time of day, location, azimuth from location marker, exposure, and photo point number on a placard within the photo frame. Photographs should be taken at the same height, and on approximately the same date each year to maintain consistent observations of phenological conditions.

In addition to general habitat trends, succession on newly reclaimed sites will be documented photographically annually for the first 3 years, and every 5 years thereafter.

Evaluation Criteria: An upward trend in vegetation height, diversity, and successional changes are expected in areas where livestock grazing has been removed or where vegetation is recovering from disturbance events such as fires or floods. Healthy communities should not show an increase of more than 15% cheatgrass or other noxious weeds within the herbaceous understory, and these areas will be actively managed to contain the spread of noxious weed species by mechanical means such as spraying, spading or hand pulling.

### 9.7 Aquatic surveys

5 yr rotation – to be implemented in FY 2003

Objective Significance: Physical habitat characteristics (water depth, current velocity, substrate, etc.) are important factors influencing fish community composition. In general, stream fish community structure is strongly influence by both habitat composition and stability (Bain, Finn, and Booke 1988).

Implementation: There is still a need to establish baseline habitat quality and conduct an inventory of fish and aquatic invertebrate species.

Sites will be surveyed in 2003 and then resurveyed every 5 years for steelhead habitat quality and use. A long-term monitoring program will be developed if rare or sensitive species are found.

Evaluation Criteria: Restoration efforts may be implemented if it is determined through surveys that re-vegetation and channel modification could effectively reduce annual spring flooding events or improve physical habitat characteristics. Upward trends in stream stability, current velocity, and substrate would be expected if restoration efforts were applied. Stream conditions are expected to maintain their current state or improve slightly in areas where livestock have been removed.

### 9.8 Water Quality

Monthly, April-October – currently implemented

Objective Significance: Toxic or harmful materials can threaten an aquatic ecosystem by diminishing water quality. Contaminants are usually found in one of four categories: sediment, thermal, organic, or toxic chemicals (Krueger et al. 1988), that can cause reduced reproductive capabilities, physical defects, reduced resistance to disease, blood imbalances, or behavioral changes that make organisms more susceptible to predation.

Implementation: Aquatic monitoring efforts on the Precious Lands over the past two years have focused on water quality assessment. Data such as temperature, dissolved oxygen, pH, specific conductivity, turbidity, bacteria and stream flow have been collected continuously during the summer months using HOBO data recorders at eight sites along major streams: Joseph, Horse, Cottonwood (2), Tamarack, Broady, Basin, and Bear Creeks. Personnel make monthly site visits to all eight monitoring locations to download data and maintain equipment. When time and personnel allow, data on total suspended solids (TSS) and bedload is collected at all sites, with a minimum of two readings per site per year. If possible, data collection for these variables will coincide with heavy rain events, or spring flows.

Evaluation Criteria: Water quality parameters such as temperature, turbidity, and bacteria should decrease over the planning period through removal of livestock and increased streamside vegetation. Concurrently, dissolved oxygen and stream flow should increase. Because these factors are influenced by management activities outside the control of BPA or the NPT, specific numerical reductions cannot be estimated. However, a general positive trend in water quality parameters is expected.

### 9.9 Fencing

Yearly maintenance and construction – currently implemented

Objective Significance: Grassland and riparian communities are particularly susceptible to livestock impacts, and some of these communities within the mitigation lands have had a history of heavy grazing, trampling, reduced species diversity, and diminished microbiotic crusts. Fences are being constructed on management areas to increase habitat quality by excluding trespass livestock. At present, continuing efforts are being made to secure lands bordering neighboring livestock operations and protect at-risk resources.

Implementation: Fences are constructed with 4 strands of wire, consisting of 3 barbed and a single strand of smooth wire on the bottom. Wire is attached to metal t-posts placed every 12 feet, with wire spaced at heights of 12, 21, 30, and 40 inches from the ground. Fence lines are interspersed with cedar A-frame rock jacks at corners and along the length of the fence at not less than 156 foot intervals (every 13$^{th}$ metal post). All brush and down woody material will be cleared from the sides of the fence for a minimum distance of 2 feet. No live trees shall be used to attach wire or wooden supports.

In addition to fencing out livestock, large herbivores will be excluded from field and pond restoration sites where vegetation will be reestablished. Young tree transplants will be protected with individual wire cages to reduce girdling and herbivory.

Evaluation Criteria: Miles of fence in "good" condition should increase by 10% per year for the first 5 years, and by 5% thereafter. The incidence of trespass livestock grazing should diminish to fewer than two incidents per year.

### 9.10 Restoration of Agricultural Lands

Annually year 1-3, 5-year intervals thereafter

Many old agricultural fields on the management areas will be converted to native grassland, shrub, and conifer cover types. Native plant establishment and outbreaks of weedy invaders will be monitored on reclaimed fields to evaluate reclamation success and community trends. Sampling will be conducted once a year for the first 3 years after restoration, and then reduced to once every 5 years. Restoration will be considered successful when reclaimed sites have met the criteria as stated below for each cover type.

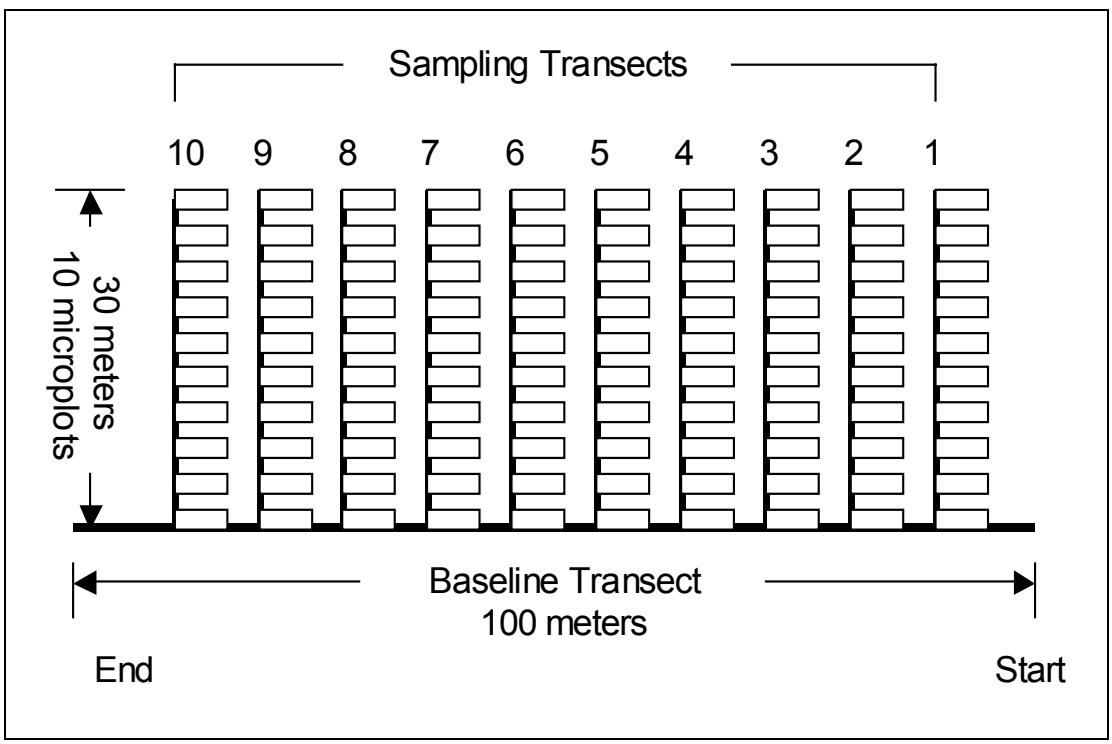
Reclamation Monitoring Protocol: A baseline transect will be randomly established in each reclaimed cover type. Standing in the middle of the planted area, a random number between 0-360 is chosen from a random number table, indicating the azimuth of travel to establish the start of the baseline transect. Another random number is selected from 0-50, which indicates the distance to travel along the chosen azimuth. After reaching the starting point, a third random number between 0-360 will be chosen as the azimuth of the transect. A 2-3 ft length of rebar is pounded into the ground to mark the start and end of the baseline transect and a 100m tape is laid between the rebar stakes. The rebar stakes are wired with aluminum tags indicating 'baseline start' or 'baseline end', and site

identification name. A photograph will be taken of the transect from 0m facing the line of travel.

Ten sampling transects, 30m in length, will be established perpendicular to the baseline transect (90 degrees from the baseline on the right hand side). The first sampling transect is located by selecting a number from 0-10 from a random number chart. The selected number is the measurement in meters along the baseline transect to the start of the first sampling transect. All subsequent sampling transects will be spaced at 10m intervals along the length of the baseline. Start and end point of both baseline and sampling transects will be permanently marked with rebar and aluminum tags. Site information such as transect number, photo number, township, range, and section, is filled out at the start of each baseline transect.

Herbaceous measurements are sampled by establishing ten $0.5m^2$ microplots along the length of each sampling transect. The initial sampling number is located between 0-3m, chosen randomly, and all subsequent sampling positions are placed at 3m intervals until 10 samples have been collected. For example, if the selected random number is 1, then the first sample transect is located at 1m, the second sample is at 4m, the third is at 7m, etc. (Figure 18).

**Figure 18. Restoration Monitoring Transect Diagram**




Each plot will have 100 microplots measured per sampling effort (each baseline has 10 sampling transects containing 10 microplots each = 100 samples.) The right hand side of

the transect is always determined by standing at the start, or 0m, and looking along the line of travel. Rectangular microplots will be positioned with the long side perpendicular to the line of the transect, and with the lower right corner placed on the sampling interval.

Frequency, density, and cover will be measured in each microplot. Plants are considered "in" if any part of the rooted plant boundary is touching the plot boundary along two adjacent sides of the microplot, and considered "out" if any portion of the rooted plant boundary is touching the other two side of the plot. This provides an accurate estimate of density and is the recommended approach for reducing boundary bias (Elzinga et al. 1998). The short side of the microplot touching the transect tape and the long side on the right of the microplot will be the "in" sides.

Frequency measurements are especially sensitive to changes in spatial arrangement, and are a good technique for monitoring invasions of undesirable species (Elzinga et al. 1998). Frequency is the percentage of possible plots in a sample area occupied by the target species. For example, if the target species is found in 30 out of 100 microplots, frequency is 30 percent. Abundance is not taken into consideration, only presence. A list of all target species present in the plot will be documented on the data sheet and frequencies will be totaled after all 100 microplots have been sampled.

Density is the number of defined units of a plant within a unit of area. The number of plants within the microplot will be divided into 5 classes, but the class parameters may be adjusted based on target species growth form (Ashley 2000):

Class 1) 1-5 individual plants,
Class 2) 6-10 individuals
Class 3) 11-15 individuals
Class 4) 16-20 individuals
Class 5) 20 or more

Only densities of perennial native plants and other targeted species of interest will be tracked. Bunchgrasses will be counted as separate individuals when the interspaces between mature clumps is 3 inches or greater. In addition to a density count, average age class will be noted for each species in a given microplot as an indicator of natural recruitment. Natural recruitment and reproduction cycles are important indicators that self-sustaining ecological processes are being restored by reclamation efforts. Age classes will be broken down by three categories:

Seedling: emerged in the current sampling year
Vegetative: not producing flowers or seed
Mature: produced flowers or seed in the current year.

Cover is the measure of ground surface area shaded by vegetation canopy. Cover is a good measure of vegetation composition because it equalizes the weight of species that are small and abundant with those species that are large, but scarce. Cover measurements are subject to wide seasonal changes due to plant vigor and phenology, and it is therefore

important to sample at a similar time of year during successive monitoring efforts. Cover will be measured within a $0.5m^2$ microplot for herbaceous plants in all cover types, with additional line intercept measurements taken along the sampling transects within shrub and tree communities. Point intercept measurements of shrubs and trees will be taken every 2m along the sampling transect, starting at the 2m mark, yielding 15 sample points per transect, or 150 points per plot. The height, species and age class of each intercepted shrub will be documented as per HEP data collection parameters noted above. Tree canopy will be measured with a moosehorn densitometer every 2m along the sampling transect. Age class and species (as noted above in HEP conifer protocols) will be documented for each intercepted tree. One tree height will be measured on the tree closest to the 30m mark at the end of each sampling transect.

In addition to monitoring plant variables, site characteristics such as animal use, erosion, crust formation, bare ground, and litter accumulation will be documented. Weather conditions will also be monitored at three sites on Precious Lands.

Evaluation Criteria: Cover types within the project area are highly variable due to past disturbances and extreme aspect and elevation ranges. Few cover types exhibit uniform characteristics that may be used as a standard; therefore restoration projects will be evaluated based on criteria that optimize habitat needs for the greatest number of target species. Each of the four general cover types (Grassland, Shrub, Conifer, and Riparian) has associated species chosen from the HEP process that assess community health and production trends. A range of success was chosen from the habitat requirements of the associated wildlife, and an attempt was made to span the highest range of quality habitat for the greatest number of species. This broad target range will allow for site-specific modifications, fluctuating budgets, and catastrophic changes such as fires and floods, while still providing a guideline to meet diverse wildlife habitat needs.

Grassland communities will be considered ‘successful’ when they attain:

- 60-75% herbaceous cover
- < 30% cheatgrass
- 30-35 cm average herbaceous height

Herbaceous cover within a healthy bunchgrass community will have established grass hummocks with interspaces that are free of cheatgrass or other weedy species. Cheatgrass is typically shorter than bunchgrass; therefore the height of the community may be an indicator of weedy species and quality nesting or hiding cover. Mule deer, chukar, and Western meadowlark are used to evaluate grassland communities.

Shrub communities will be considered ‘successful’ when they attain:

- 40-65% shrub canopy cover
- 50-75% herbaceous cover

Shrub fields support a wide variety of wildlife and function as travel corridors between the low elevation riparian areas and upper grassland communities. The moderate range of both shrub and herbaceous canopy cover offers a high quality mix of concealment, roost, thermal protection, and browse opportunities for various wildlife species. The

species use to evaluate shrub communities are: mule deer, Western meadowlark, blue grouse, California quail, and song sparrow.

Conifer communities will be considered 'successful' when they attain:

- 50-80% tree canopy cover
- 25-45% shrub canopy cover
- $\geq$ 2 snags (4-10" dbh) per acre

The forested communities offer cover in all seasons and fill many life requisites for wildlife. Because use varies so greatly among species, the success criteria range was left broad to accommodate differing sites and wildlife needs. Some conifer patches may be maintained at either the higher end of the range or the lower, depending on site-specific goals and funding. Mule deer, blue grouse, and black-capped chickadee are used to assess conifer community trends.

Riparian communities will be considered 'successful' when they attain:

- 40-70% tree canopy cover
- 35-65% shrub canopy cover
- $\geq$ 3.5 snags (6-10" dbh) per acre

Riparian communities are not easily characterized due to fluctuating water supplies, extreme elevation changes, and natural catastrophic events of the past. These communities can range from dry-bed drainages in hawthorn scrub to intermittent streams within open Ponderosa pine forests, to year-round streams in Birch/ syringa communities. This cover type was given a broad success criteria range to allow for the extremely different community conditions while still maintaining a standard for management practices. More site-specific considerations will be taken into account depending on the target wildlife needs and the goal of the individual project. Mule deer, blue grouse, song sparrow, downy woodpecker, beaver, yellow warbler, and black-capped chickadee are used to assess changes in riparian communities.

Management will decide on a site-specific basis the needs of the habitat and the resources available to achieve a cost effective restoration or enhancement protocol. These success criteria figures allow for a variety of management practices, at a range of intensity, depending on the resources available. Other community characteristics or limiting factors may be added to a site-specific protocol to better fit the unique needs of different communities.

**Weather**

Soil moisture, precipitation, and max/min temperature will be recorded at each project area to document climatic trends that may affect restoration results and plant/wildlife response. Seed production, growth, and recruitment within plant communities can be greatly altered on a seasonal basis due to climate and weather trends. Weather can have a significant impact on reproduction and survivorship within small mammal and amphibian populations. Weather indices should be recorded at each site twice a month during the growing season: April-September. All locations will be located with GPS and entered into a GIS database.

**Small Mammal Trapping**

Small mammals are important indicators of community health and help gauge the restoration success of biological diversity on disturbed sites. Rodents serve to create seed caches, aerate soil, and provide a food base for higher predator species within the community. Restored agricultural fields will be monitored for immigration and use over time by various small mammal species. Some small mammal inventory work has been implemented on various parts of the Precious Lands management area, but animal use and population changes over time associated with reclaimed areas have not been assessed. Monitoring relative abundance, species diversity, and population trends will help determine the effectiveness of the agricultural restoration program and natural cyclic population fluctuations on mitigation lands. A transect will be created within each of the cover types being planted on the restored agricultural fields (grassland, shrub, and conifer). A control plot will be established in a cover type that resembles the habitat characteristics of the treated plot as closely as possible.

Small Mammal Sampling Protocol: Snap trapping does not capture all small mammal species or age classes equally, and has the potential to disrupt social structure, age structure, behavior, reproductive parameters and immigration rates of a population (MELP 1998). To determine the relative abundance between two or more habitat types or areas for multiple species inventory, the use of live traps in combination with pitfall traps is recommended (MELP 1998). Small mammal trapping on the Nez Perce Mitigation Lands will consist of a 285m transect established with 20 stations per line at 15m spacing. There will be 2 traps per station and five arrays of four pitfall traps regularly spaced along the trapping transect (e.g., at stations 1, 6, 11, 16, 20) (Figure 19). A pitfall array will consist of a central pitfall trap with three radiating drift fences 10m long, each ending in a second outer pitfall trap (Figure 20). A pair of Sherman live traps will be placed at each trap station.

A mark-recapture program will be implemented to sample small mammal populations 2-3 times a year for the first 3 years after restoration. After the initial 3 years of data collection, sampling shall be reduced to once every 3 years to track long-term population trends. One year's data collection will consist of running one trap session in spring to try and sample during the high reproduction period and another in summer and/or fall to document juvenile dispersal and mortality. A session will consist of 4 days of trapping and require 2 field personnel to alternate trapping duties on each grid. Ambient air temperature and weather conditions will be noted at the beginning of each days trapping effort. Two 6-hour trapping cycles will be run each trapping day – traps will be opened and baited by 5am, checked and re-baited if necessary at 8am, and then checked and closed at 10am. The same trapping schedule will be repeated at 5pm in the evening of the same day. Traps will be provided with carrots and mealworms to reduce mortality of shrew species, and baited with a mixture of rolled oats and peanut butter. This protocol is designed to minimize trap mortality of small mammals, particularly shrews, due to dehydration, starvation, stress, and thermal extremes.

**Figure 19. Small Mammal Transect Diagram**

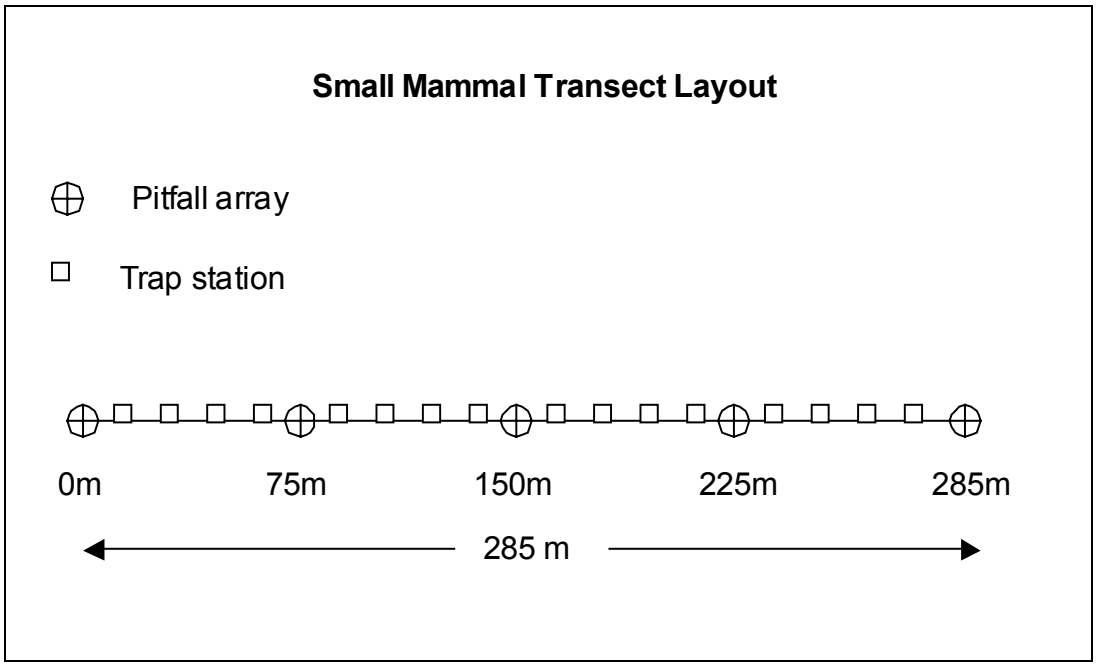
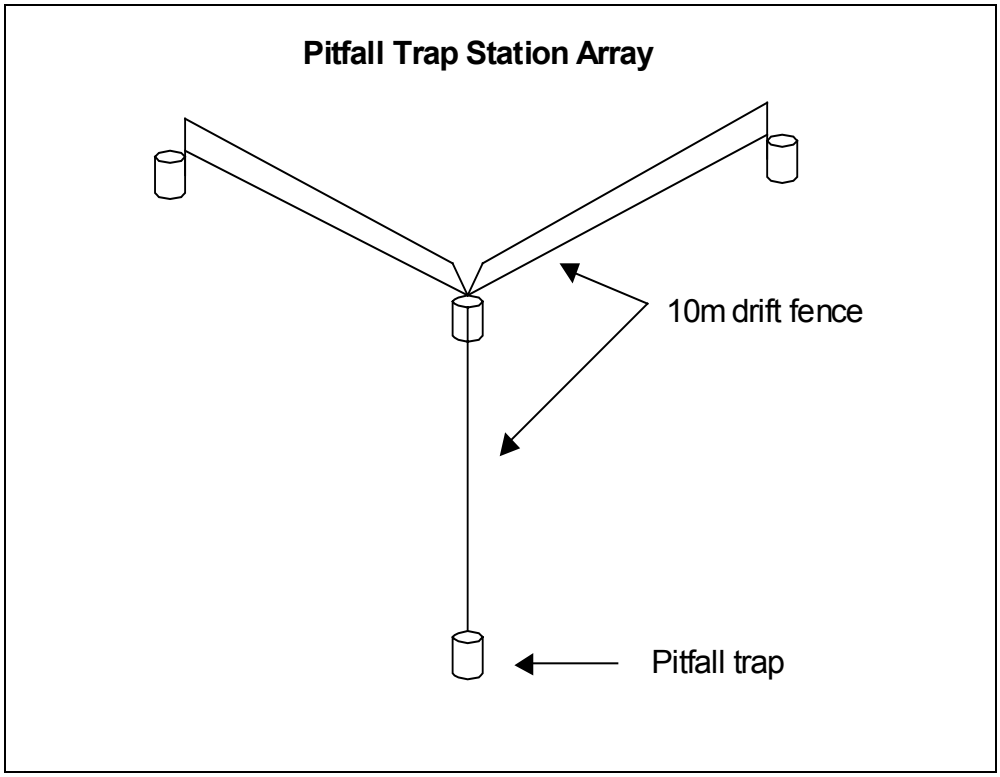



**Figure 20. Pitfall Trap Diagram**



All trapping sessions will be run within a narrow time frame to limit weather effects and maintain the assumption of a closed small mammal population. An initial baseline trapping session will be needed to estimate trap saturation and collect voucher specimens of each species. Trap saturation will initially be light to allow for population increases as the cover type develops over time. All trapping sites will be located with GPS and entered into a GIS database, along with all subsequent trapping data.

Population estimates will be derived using a bias-adjusted Lincoln-Petersen estimator (White et al. 1982):

$$N' = \frac{(n_1+1)(n_2+1)}{m_2+1} - 1$$

Where:
$N'$ = estimated population
$n_1$ = number of animals initially marked and released back into the population
$n_2$ = number of animals captured on a second trapping effort
$m_2$ = number of animals captured during the second trapping effort that had been previously marked

In theory, the ratio of marked animals to unmarked in the second sampling effort is comparable to the ratio of captured animals in the first trapping effort to the estimated overall population.

Evaluation Criteria: Sites will be considered successful when abundance and diversity of small mammals on the restored plots reaches or exceeds 80% of the control area. Although small mammal species may react quickly to new vegetation, restored areas are not expected to be mature for many years. Grassland and shrub communities may be self-sustaining and reproducing within 3-5 years, but the conifer cover types may take decades to reach maturity. In these cases, the small mammal species are expected to reflect the changes and may show increasing or decreasing trends as the cover type matures.

**Pellet Count Stations**

Fecal pellet count stations will be established within reclaimed plots to assess ungulate response to reclamation. A pair of pellet count stations will be established for each cover type – one at a reclaimed site, and a second at the same control plot as used to determine a baseline for small mammals. Stations will be run 2-3 times per year in conjunction with small mammal trapping efforts.

Evaluation Criteria: Reclamation plots will be considered successful when they meet or exceed 80% of the deer abundance on the control plot. Count stations will consist of a series of circular plots spaced at a regular interval along the transect. Both the size of the circular plots and the length of the transect will need to be determined by a preliminary sampling run.

### 9.11 Rehabilitation or Development of Natural Water Sources

Spring development
Water is a limiting factor in the grasslands and reestablishment of natural water sources may increase habitat quality, diversity, and use for many wildlife species. GPS all locations and enter into a GIS database.

Revegetation of pond margins
Intense cattle grazing in the past has greatly damaged or reduced vegetation along the shorelines of many small ponds and seeps. Lack of shade and cover along pond margins increases water temperature and decreases pond productivity and value to wildlife.

Restoration of morphology and vegetation along damaged streams
Riparian corridors are a highly productive cover type and damage due to grazing, fires and floods can degrade the quality of riparian habitats. Impacts to aquatic species are still unknown, but lack of cover and resulting temperature increases reduce quality of aquatic habitats. Erosion due to flooding and cattle trampling may be mitigated with bank stabilization and revegetation at stream margins.

### 9.12 Exclosure Establishment

Monitor succession trends in plant diversity and growth as affected by the removal of grazing and browsing species. Create photo points within exclosures to qualitatively measure plant communities and establish a baseline for habitat production potential. Create vegetation sampling protocol to quantitatively measure plant growth, diversity, and rate of rehabilitation after the removal of grazing species. Monitor succession after fire or flood events. GPS all locations and enter into a GIS database.

### 9.13 Human Use Monitoring

Establish registration sites at all primary access points into the management area. Ask property users to sign in and provide basic information such as date, number in party, primary activity, and other comments. Develop a database to track seasonal and activity-based use patterns. Additionally, instruct project staff to interview all property users to acquire similar data. Increase staff presence during high use periods (spring and fall) to monitor activities, conduct interviews, and ensure compliance with use restrictions.

Additional protocols may need to be developed for extractive uses allowed by this Management Plan. For example, if tribal members utilize the area for gathering traditional foods, plant population monitoring may be warranted to ensure that such use is conducted in a sustainable way that does not unnecessarily impact other resource values.

## 10.0 RESEARCH NEEDS

### 10.1 Predator Inventory

Continue inventory efforts initiated in 2001 to target forested habitat types rather than riparian. Attempt to document *mustelidae* and other carnivores that were uncounted or

previously observed in low numbers during the earlier inventory. Use scent and sight baits that will be more specific to mustelids and carnivores.

### 10.2 Bat Inventory

Inventory presence/absence of bat species during a single season of netting and/ or recording. Possible bat species of interest – Townsend's Big-eared Bat has an historic record of presence in the area; Spotted bat: potential habitat is present. Monitor population trends of any rare or sensitive species found, and use a multi-year sampling rotation as per the nature of the species and the susceptibility to habitat degradation.

### 10.3 Owl Inventory

Inventory presence/absence of owl species in a single season. Sample by playing call-back tapes and recording responses (Johnson et al. 1981). Monitor population changes of any rare or sensitive species found, specifically Great Gray and Flammulated owls.

### 10.4 Reptile Inventory

Inventory herpetological species presence by creating a trapping methodology and sampling a minimum of one summer.

### 10.5 Fish Habitat and Population Inventory

Conduct a systematic stream habitat and fish population evaluation of important fish-bearing streams in or adjacent to the Precious Lands Area. Prioritize survey efforts based on stream order, existence of steelhead, proportion of stream under public ownership, and cooperation of adjacent landowners. Utilize a standardized methodology so that data can be compared among streams and other agencies.

Approximately 6 miles of Joseph Creek will be surveyed from the southern boundary of Precious Lands in T5N, R45E, Section 2 to the BLM boundary in T6N, R46E, Section 19. A 1.5 mile section of the stream crosses Oregon Division of State Lands property in Section 36 and will be included in the survey. The lower 4 miles of Broady Creek will be surveyed from the Wallowa Whitman National Forest Boundary to its mouth on Cottonwood Creek. Approximately 0.25 miles of BLM property in this section (T5N, R46E, Section 5) will also be included in the survey. A level III habitat survey based on Hankin and Reeves (1988) will be employed with an emphasis on water quality (turbidity, temperature, and flow), stream bank stability, substrate and pool characteristics, and riparian vegetation. Snorkeling surveys of selected transects will be used to estimate fish population structure.

In 1999, the Bureau of Land Management conducted a Hankin and Reeves survey of approximately 6.2 miles of Joseph Creek directly downstream of the Precious Lands Wildlife Management Area (Stein 2000). The current proposal would complement that study by adding data for an additional 6 miles of Joseph Creek directly upstream of the BLM boundary. Together, these two assessments should provide an accurate depiction of water quality, fish habitat, and population data for that portion of lower Joseph Creek outside private ownership. Perhaps more importantly, these surveys represent the first assessment of fish habitat available since the significant flooding of 1996-97.

Data from the survey will be used to develop site specific watershed improvement projects designed to improve water temperature, increase stream shading, and reduce erosion.

A comprehensive fish habitat survey of Broady Creek has never been completed. A habitat assessment would provide baseline data that could be used to develop habitat improvement projects, and evaluate future management activities. A fish population sample conducted by Oregon Department of Fish and Wildlife in 1991 (ODFW, unpublished data) indicates that the stream supports redband trout and native sculpins. Benefits to water quality and fish habitat within the Broady Creek watershed will also benefit T&E fish species within Joseph Creek and the Lower Grande Ronde River.

### 10.6 Grassland Restoration Research

Restoration of degraded plant communities in arid and semi-arid environments is challenging at best and may seem impossible in significantly altered environments. The existence of non-native species can be especially problematic because many times, native species do not posses the adaptive strategies to compete with exotics. Restoration efforts often rely on trial and error, which can be quite expensive and may ultimately lead to unsatisfactory results. A better understanding of restoration techniques and 'recipes' for success are sorely needed in the canyon grassland ecosystem.

This plan proposes to initiate experiments to evaluate the efficacy of various techniques in restoration of cheatgrass infested bunchgrass communities. A randomized block design will be used to test various site preparation techniques and seeding/replanting treatments. For example, a comparison may be made between broadcast seeding and plug planting on sites treated by herbicide application, livestock trampling, or raking. Additional work will be done to evaluate techniques to establish forbs in newly restored bunchgrass communities. Such experiments will provide managers with better tools to adaptively manage grassland communities on the Precious Lands Area and beyond.

## 11.0 Supplemental Materials

### Abbreviations and Acronyms Used in the Text

ATV – All Terrain Vehicle
BIA – Bureau of Indian Affairs
BLM – Bureau of Land Management
BMP's – Best Management Practices
BPA – Bonneville Power Administration
CBFWA – Columbia Basin Fish and Wildlife Authority
CPR – Cardiopulmonary resuscitation
CRP – Conservation Reserve Program
DAPTF – Declining Amphibian Populations Task Force
DBH – Diameter at Breast Height
DFC – Desired Future Condition
DOE – Department of Energy
FONSI – Finding of No Significant Impact
FSA – Farm Services Agency
GIS – Geographic Information System
GPS – Global Positioning System
HEP – Habitat Evaluation Procedure
HU's – Habitat Units
MOA – Memorandum of Agreement
NEPA – National Environmental Policy Act
NPT – Nez Perce Tribe
NPTEC – Nez Perce Tribal Executive Council
NRCS – Natural Resources Conservation Service
NWPPC – Northwest Power Planning Council
ODFW – Oregon Department of Fish and Wildlife
USDA – United States Department of Agriculture
WDFW – Washington Department of Fish and Wildlife
WWNF – Wallowa-Whitman National Forest

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# Appendix A

## Wildlife Species of the Precious Lands Wildlife Management Area

### Birds

During the early summer of 1999 a series of nine (9) point count monitoring stations were established throughout the Precious Lands area (Map B). A tenth survey route was established within the Buford Planning Unit during May 2000. Methodology followed the protocol developed by the Bureau of Land Management and the Partners in Flight Program, and is consistent with what other land management agencies are using to monitor landbirds (Huff et al., 1999). Two transects each were placed in shrub fields and grasslands, with an additional three transects located in both riparian areas and conifer stands. Each transect was surveyed twice during 1999 and once during 2000. In 2001 eight stations were each sampled twice. Four of the original stations were discontinued due to difficulties with accessibility, and two new grassland stations were established as replacements. Establishment of one to two new stations is being considered in 2003 to maintain replicate stations in both conifer and shrub cover types. Table 10 displays the list of species confirmed for the area through the point count monitoring surveys or incidental observation by tribal staff. The bald eagle is the only Federally listed species known to occur in the area. Nomenclature taken from Sibley, 2000.

**Table 10. Bird Species of the Precious Lands Area**

| Name | Species | Family |
|---|---|---|
| **WATERFOWL** | ANSERIFORMES | |
| Mallard | *Anas platyrhynchos* | Anatidae |
| Common Merganser | *Mergus merganser* | Anatidae |
| **RAPTORS** | **FALCONIFORMES** | |
| Turkey Vulture | *Cathartes aura* | Cathartidae |
| Bald Eagle | *Haliaeetus leucocephalus* | Accipitridae |
| Northern Harrier | *Circus cyaneus* | Accipitridae |
| Sharp-shinned Hawk | *Accipiter striatus* | Accipitridae |
| Red-tailed Hawk | *Buteo jamaicensis* | Accipitridae |
| Golden Eagle | *Aquila chrysaetos* | Accipitridae |
| American Kestrel | *Falco sparverius* | Falconidae |
| Merlin | Falco columbarius | Falconidae |
| **GAME BIRDS** | GALLIFORMES | |
| Chukar | *Alectoris chukar* | Phasianidae |
| Gray Partridge | *Perdix perdix* | Phasianidae |
| Blue Grouse | *Dendragapus obscurus* | Phasianidae |
| Ruffed Grouse | *Bonasa umbellus* | Phasianidae |
| Turkey | *Meleagris gallopavo* | Phasianidae |
| California Quail | *Callipepla californica* | Odontophoridae |
| **SHOREBIRDS** | **CHARADRIFORMES** | |
| American Coot | *Fulica americana* | Rallidae |
| Killdeer | *Charadrius vociferus* | Charadriidae |

| | | |
|---|---|---|
| Common Snipe | *Gallinago gallinago* | Scolopacidae |
| **PIGEONS & DOVES** | **COLUMBIFORMES** | |
| Rock Dove | *Columba livia* | Columbidae |
| Mourning Dove | *Zenaida macroura* | Columbidae |
| **OWLS** | **STRIGIFORMES** | |
| Great Gray Owl* | *Strix nebulosa* | Strigidae |
| Barred Owl | *Strix varia* | Strigidae |
| Great Horned Owl | *Bubo virginianus* | Strigidae |
| **GOATSUCKERS** | **CAPRIMULGIFORMES** | |
| Common Nighthawk ‡ | *Chordeiles minor* | Caprimulgidae |
| **HUMMINGBIRDS** | **APODIFORMES** | |
| Calliope Hummingbird | *Stellula calliope* | Trochilidae |
| Rufous Hummingbird | *Selasphorus rufus* | Trochilidae |
| **TROGONS** | **TROGONIFORMES** | |
| Belted Kingfisher | *Ceryle alcyon* | Alcedinidae |
| **WOODPECKERS** | **PICIFORMES** | |
| Lewis Woodpecker ‡ | *Melanerpes lewis* | Picidae |
| Downey Woodpecker | *Picoides pubescens* | Picidae |
| Hairy Woodpecker | *Picoides villosus* | Picidae |
| Northern Flicker | *Colaptes auratus* | Picidae |
| Pileated Woodpecker* | *Dryocopus pileatus* | Picidae |
| **SONGBIRDS** | **PASSERIFORMES** | |
| Olive-sided Flycatcher* | *Contopus cooperi* | Tyrannidae |
| Western Wood-Pewee | *Contopus sordidulus* | Tyrannidae |
| Dusky Flycatcher | *Empidonax oberholseri* | Tyrannidae |
| Cordilleran Flycatcher | *Empidonax occidentalis* | Tyrannidae |
| Say's Phoebe | *Sayornis saya* | Tyrannidae |
| Western Kingbird | *Tyrannus verticalis* | Tyrannidae |
| Eastern Kingbird | *Tyrannus tyrannus* | Tyrannidae |
| Warbling Vireo | *Vireo gilvus* | Vireonidae |
| Red-Eyed Vireo | *Vireo olivaceus* | Vireonidae |
| Stellar's Jay | *Cyanocitta stelleri* | Corvidae |
| Gray Jay | *Perisoreus canadensis* | Corvidae |
| Black-billed Magpie | *Pica hudsonia* | Corvidae |
| American Crow | *Corvus brachyrhynchos* | Corvidae |
| Common Raven | *Corvus corax* | Corvidae |
| Horned Lark | *Eremophila alpestris* | Alaudidae |
| Violet-green Swallow | *Tachycineta thalassina* | Hirundinidae |
| Cliff Swallow | *Petrochelidon pyrrhonota* | Hirundinidae |
| Barn Swallow | *Hirundo rustica* | Hirundinidae |
| Black-capped Chickadee | *Poecile atricapilla* | Paridae |
| Red-breasted Nuthatch | *Sitta canadensis* | Sittidae |
| White-breasted Nuthatch | *Sitta carolinensis* | Sittidae |
| Rock Wren | *Salpinctes obsoletus* | Troglodytidae |
| Canyon Wren | *Catherpes mexicanus* | Troglodytidae |
| House Wren | *Troglodytes aedon* | Troglodytidae |
| American Dipper | *Cinclus mexicanus* | Cinclidae |
| Western Bluebird ‡ | *Sialia mexicana* | Muscicapidae |
| Swainson's Thrush | *Catharus ustulatus* | Muscicapidae |
| American Robin | *Turdus migratorius* | Muscicapidae |
| Cedar Waxwing | *Bombycilla cedrorum* | Bombycillidae |

| | | |
|---|---|---|
| European Starling | *Sturnus vulgaris* | Sturnidae |
| Orange-crowned Warbler | *Vermivora celata* | Parulidae |
| Yellow Warbler | *Dendroica petechia* | Parulidae |
| Yellow-rumped Warbler | *Dendroica coronata* | Parulidae |
| Townsend's Warbler | *Dendroica townsendi* | Parulidae |
| MacGillivray's Warbler | *Oporornis tolmiei* | Parulidae |
| Wilson's Warbler | *Wilsonia pusilla* | Parulidae |
| Yellow-breasted Chat ‡ | *Icteria virens* | Parulidae |
| Western Tanager | *Piranga ludoviciana* | Thraupidae |
| Lazuli Bunting | *Passerina amoena* | Cardinalidae |
| Spotted Towhee | *Pipilo maculatus* | Emberizidae |
| Chipping Sparrow | *Spizella passerina* | Emberizidae |
| Brewer's Sparrow | *Spizella breweri* | Emberizidae |
| Vesper Sparrow | *Pooecetes gramineus* | Emberizidae |
| Fox Sparrow | *Passerella iliaca* | Emberizidae |
| Song Sparrow | *Melospiza melodia* | Emberizidae |
| White-crowned Sparrow | *Zonotrichia leucophrys* | Emberizidae |
| Dark-eyed Junco | *Junco hyemalis* | Emberizidae |
| Western Meadowlark ‡ | *Sturnella neglecta* | Icteridae |
| Brewer's Blackbird | *Euphagus cyanocephalus* | Icteridae |
| Brown-headed Cowbird | *Molothrus ater* | Icteridae |
| Cassin's Finch | *Carpodacus cassinii* | Fringillidae |
| American Goldfinch | *Carduelis tristis* | Fringillidae |
| Evening Grosbeak | *Coccothraustes vespertinus* | Fringillidae |
| Black-headed Grosbeak | *Pheucticus melanocephalus* | Cardinalidae |

* Denotes sensitive species with an Oregon state rank of critical or vulnerable (Oregon Natural Heritage Program, 1998).
‡ Denotes species of concern from the Oregon state watch and review lists (Oregon Natural Heritage Program, 1998).

**Small Mammals**

An inventory of small non-game mammals was conducted during 1998-1999 using pitfall traps, shooting, Sherman live traps, and mist-netting (bats). Table 11 provides a list of small mammals known to occur on Precious Lands. Nomenclature taken from Verts and Carraway, 1998.

**Table 11. Small Mammals Documented for the Precious Lands Area.**

| Name | Species | Family |
|---|---|---|
| **SHREWS** | **INSECTIVORA** | |
| Vagrant Shrew | *Sorex vagrans* | Soricidae |
| **BATS** | **CHIROPTERA** | |
| Big Brown Bat | *Eptesicus fuscus* | Vespertilionidae |
| Silver-Haired Bat* | *Lasionycteris noctivagans* | Vespertilionidae |
| Hoary Bat | *Lasiurus cinereus* | Vespertilionidae |
| Small-Footed Myotis* | *Myotis ciliolabrum* | Vespertilionidae |
| Little Brown Bat | *Myotis lucifugus* | Vespertilionidae |
| Long-Legged Myotis* | *Myotis volans* | Vespertilionidae |
| **RABBITS** | **LAGOMORPHA** | |
| Mountain Cottontail | *Sylvilagus nuttallii* | Leporidae |
| **RODENTS** | **RODENTIA** | |
| Yellow-Pine Chipmunk | *Tamias amoenus* | Sciuridae |
| Yellow-Bellied Marmot | *Marmota flaviventris* | Sciuridae |
| Red Squirrel | *Tamiasciurus hudsonicus* | Sciuridae |
| Columbian Ground Squirrel | *Spermophilus columbianus* | Sciuridae |
| Northern Pocket Gopher | *Thomomys talpoides* | Geomyidae |
| Western Harvest Mouse | *Reithrodontomys megalotis* | Muridae |
| Deer Mouse | *Peromyscus maniculatus* | Muridae |
| Bushy-Tailed Woodrat | *Neotoma cinerea* | Muridae |
| Long-Tailed Vole | *Microtus longicaudus* | Muridae |
| Montane Vole | *Microtus montanus* | Muridae |
| Western Jumping Mouse | *Zapus princeps* | Dipodidae |

* Denotes sensitive species with an Oregon state rank of critical or vulnerable (Oregon Natural Heritage Program, 1998).

**Carnivores**

Several predator species have been documented on the site since 1997. Black bears are particularly common while other species are seen only rarely. Table 12 lists those species known to inhabit Precious Lands. Nomenclature follows Verts and Carraway, 1998. A bait station using canned tuna and cat food and monitored by a motion detecting camera was used during the 2000 field season at one location on the Buford Planning Unit to further document the kinds of carnivores found on Precious Lands. Difficulties with batteries and domestic cattle tripping the device resulted in rather poor results. We did detect one black bear at the station but no smaller carnivores. A more extensive baiting effort was implemented in 2001 using three cameras, a wide variety of baits, and stations spread throughout various cover types. This resulted in documentation of four predator species: black bear, bobcat, striped skunk, and spotted skunk. A third season of camera bait station surveys was utilized in 2002 to target species most commonly found

in conifer cover types. Bait was primarily fresh fish. Those efforts resulted in the addition of mink, coyote, and long-tailed weasel to the list of documented species.

Species also known to occur, or expected to occur, but not yet documented on film: badger, raccoon, river otter, and mountain lion. A winter camera survey may be started in the winter of 2002-2003 to take advantage of evident tracks and trails, and a lack of foraging bears.

**Table 12. Flesh-eating Mammals Known to Occur on Precious Lands.**

| Name | Species | Family |
|---|---|---|
| Coyote | *Canis latrans* | Canidae |
| Black Bear | *Ursus americanus* | Ursidae |
| Mink | *Mustela vison* | Mustelidae |
| Long-Tailed Weasel | *Mustela frenata* | Mustelidae |
| Spotted Skunk | *Spilogale gracilis* | Mephitidae |
| Striped Skunk | *Mephitis mephitis* | Mephitidae |
| Cougar | *Puma concolor* | Felidae |
| Bobcat | *Lynx rufus* | Felidae |
| River Otter | *Lutra canadensis* | Mustelidae |

**Ungulates**

Elk (*Cervus elaphus)*, bighorn sheep (*Ovis canadensis)*, and mule deer (*Odocoileus hemionus*) all occur on Precious Lands. Each of these species is an important game animal for both tribal and non-Indian hunters. The Nez Perce People have a long association with these species and continue to exercise treaty hunting rights in the area. The state fish and wildlife departments of Oregon and Washington regulate harvest by non-Indians.

Bighorn sheep populations in the area immediately surrounding Precious Lands are relatively low in number but are increasing. Individual animals have been seen in the Tamarack Creek and lower Joseph Creek drainages and it's possible that some animals use the area throughout the year. Tribal staff routinely sees small herds of animals throughout the Joseph Planning Unit, particularly on the property acquired from Mr. Jackman in 2000. Table 13 shows bighorn population data for the Joseph Canyon/ Chesnimnus-East Sled Springs Units obtained from ODFW. Numbers have slowly increased since 1986 but the herd experienced a *Pasteurella* outbreak during 1996, from which they have been slow to recover.

**Table 13. Upper Joseph Canyon/ Chesnimnus-East Sled Springs Units Bighorn Sheep Population and Herd Composition Data, 1986-2001.**

| Year | Ewes | Lambs | Rams | Total | Pop. Estimate |
|---|---|---|---|---|---|
| 1986-87 /1 | 4 | 4 | -- | 8 | 11 |
| 1987-88 /2 | 8 | 4 | 2 | 14 | 15 |
| 1988-89 /3 | 8 | 7 | 2 | 17 | 17 |
| 1989-90 | Unable to get composition count | | | | 25 |
| 1990-91 /4 | 11 | 10 | -- | 21 | 30 |
| 1991-92 | 4 | 3 | 1 | 8 | 25 |
| 1992-93 | 2 | 5 | 5 | 12 | 25 |
| 1993-94 /5 | 8 | 6 | 6 | 20 | 30 |
| 1994-95 /6 | 12 | 6 | 4 | 22 | 30 |
| 1995-96 /7 | 10 | 3 | 4 | 17 | 25 |
| 1996-97 /8 | 14 | 2 | 2 | 18 | 25 |
| 1997-98 /9 | 15 | 8 | 0 | 23 | 30 |
| 1998-99 /10 | 14 | 5 | 3 | 22 | 30 |
| 1999-00 /11 | 16 | 8 | 4 | 28 | 35 |
| 2000-01 /12 | 19 | 6 | 8 | 33 | 40 |
| 2001-02 /13 | 17 | 6 | 8 | 31 | 35 |

/1 – This group of bighorns moved from the Wenaha Wildlife Area herd (3 tagged ewes), probably because of Joseph Canyon fire-fighting activity.
/2 – Rams seen in February, ewe and lambs seen June 1987.
/3 – August count
/4 – June ground count
/5 – July ewe/lamb + 2 Nov ¾ curls.
/6 – Oct/Nov, 1994 count – ground and helicopter.
/7 – Nov 16, 1995 –10 ewe, 3 lamb, 1- ½ curl, 3 - ¾ curl. Pasteurella outbreak found in this herd March 26, 1996 – 17 live sheep, 1 dead, 2 sick found.
/8 – Nov 26, 1996 helicopter survey.
/9 – April 9, 1998 helicopter survey.
/10 – Nov 20, 1998 helicopter survey.
/11 – Nov 17, 1999 helicopter survey.
/12 – Nov 15, 2000 rams and August 18, 2000 ewes & lambs - ground and air combined.
/13 – March 3, 2002 supercab survey

Table 14 summarizes ODFW winter elk herd count data for the seven major ridge systems located within or adjacent to the Precious Lands area. All counts were obtained from helicopter surveys conducted during February or March. These data demonstrate the importance of the Precious Lands area for wintering elk herds. An average 18% of all elk in the Chesnimnus Unit can be found on or adjacent to the wildlife area in any given year. Teepee Ridge, Teepee Spur Ridge, Hunting Camp Ridge, and Allen Springs Ridge (mostly Forest Service land) are the primary wintering sites for elk in this area.

The target population for elk is 3,500 animals in the Chesnimnus Unit. Total population estimates, and the number of calves per 100 cows for years 1969 through 2002 are shown in Figure 21. This figure clearly shows the declining trend in both overall numbers and calf recruitment in the last 10 years.

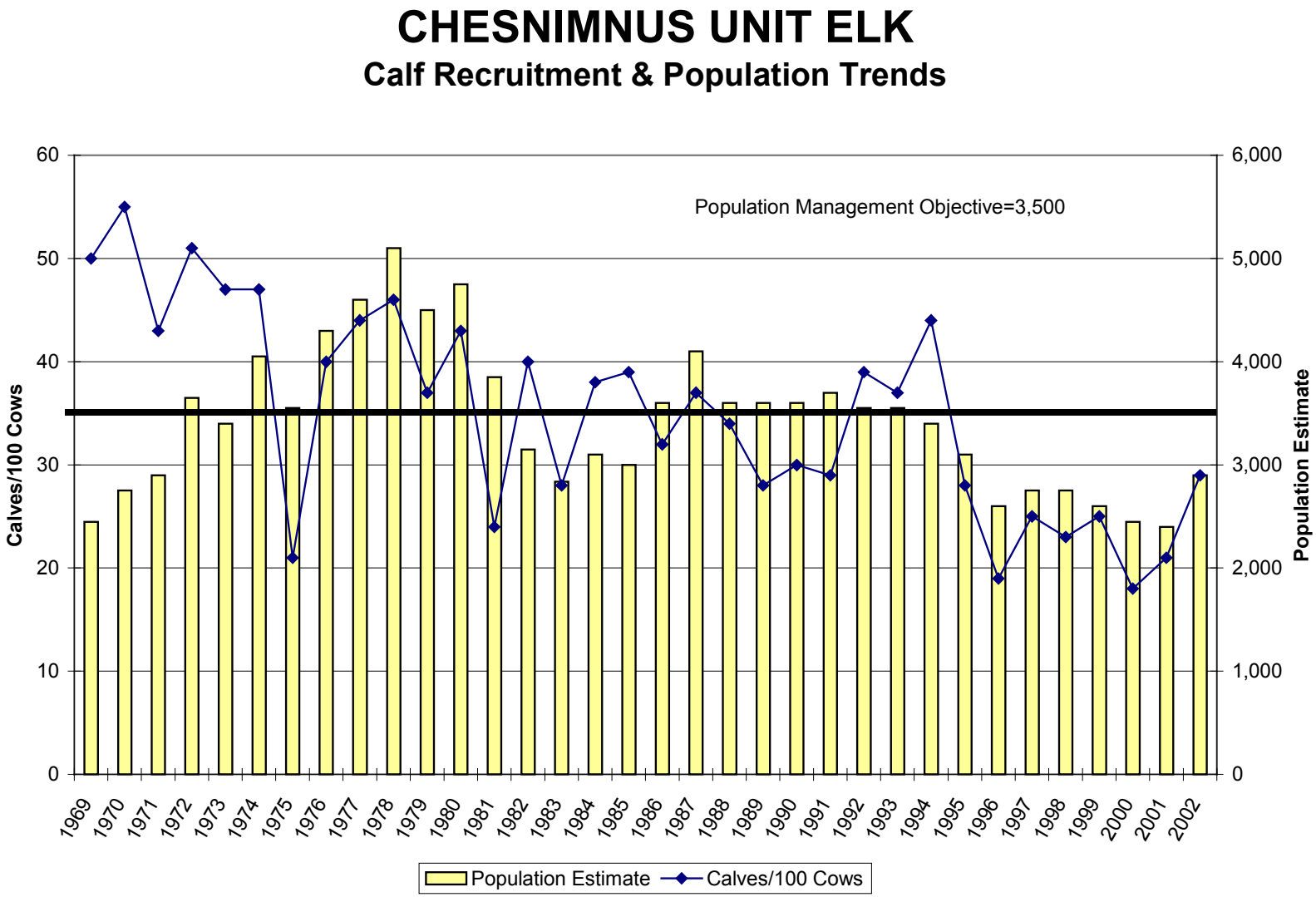
No historic population trend data has been acquired for mule deer on the Precious Lands.

**Table 14. Winter Elk Count Data for Areas Within or Adjacent to the Precious Lands Wildlife Area.**

| Site | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Bear Ridge | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 20 | 0 | 11 | 5 | 12 | 0 | 21 | 0 | 0 | 0 | 0 |
| Wildhorse Ridge | 97 | 10 | 31 | 34 | 0 | 25 | 59 | 35 | 64 | 130 | 87 | 0 | 93 | 104 | 166 | 148 | 0 | 0 | 54 |
| Teepee Spur Ridge | 0 | 1 | 0 | 0 | 79 | 0 | 0 | 0 | 49 | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 0 |
| Teepee Ridge | 124 | 61 | 52 | 60 | * | 113 | 0 | 112 | 128 | 185 | 217 | 125 | 155 | 130 | 27 | 94 | 243 | 75 | 140 |
| Hunting Camp Ridge | 219 | 295 | 133 | 83 | 166 | 9 | 140 | 120 | 52 | 306 | 38 | 178 | 64 | 209 | 85 | 32 | 37 | 109 | 6 |
| Tamarack Ridge | 88 | 0 | 289 | 281 | 5 | 204 | 0 | 0 | 0 | 130 | 13 | 4 | 53 | 0 | 0 | 0 | 4 | 0 | 60 |
| Allen Springs Ridge | 66 | 35 | 41 | 80 | 80 | 117 | 223 | 189 | 169 | 70 | 116 | 64 | 153 | 137 | 171 | 106 | 90 | 136 | 212 |
| Total | 594 | 402 | 546 | 538 | 330 | 468 | 422 | 456 | 482 | 821 | 482 | 376 | 530 | 580 | 470 | 384 | 374 | 320 | 472 |
| % of Chesnimnus Unit Total | 24 | 17 | 17 | 16 | 12 | 15 | 14 | 16 | 20 | 24 | 18 | 15 | 25 | 26 | 21 | 18 | 19 | 15 | 17 |

* Cayuse Ridge included in count.

**Figure 21. Chesnimnus Elk Herd Composition Data, 1969-2002**



**Amphibians and Reptiles**

Table 15 displays the reptile and amphibian species known to occur on the Management Area. Caudata and Anura nomenclature taken from Leonard et al., 1993, and Ophidia and Lacertilia nomenclature taken from Brown et al., 1995.

**Table 15. Reptiles and Amphibians on the Precious Lands Area**

| Name | *Species* | Family |
|---|---|---|
| **Salamanders** | **Caudata** | |
| Long-Toed Salamander | *Ambystoma macrodactylum* | Ambystomatidae |
| **Frogs and Toads** | Anura | |
| Spotted Frog | *Rana pretiosa* | Ranidae |
| Western Toad* | *Bufo boreas* | Bufonidae |
| Pacific Tree Frog | *Pseudacris regilla* | Hylidae |
| **Snakes** | **Ophidia** | |
| Rubber Boa | *Charina bottae* | Boidae |
| Racer | *Coluber constrictor* | Colubridae |
| Gopher Snake | *Pituophis catenifer* | Colubridae |
| Western Terrestrial Garter Snake | *Thamnophis elegans* | Colubridae |
| Western Rattlesnake | *Crotalus viridis* | Viperidae |
| **Lizards** | **Lacertilia** | |
| Western Fence Lizard | *Sceloporus occidentalis* | Iguanidae |
| Western Skink | *Eumeces skiltonianus* | Scincidae |

* Denotes sensitive species with an Oregon state rank of critical or vulnerable (Oregon Natural Heritage Program, 1998).

Additional reptilian species are expected to occur on the Precious Lands area but no documented sightings have been made to date. For example, the night snake (*Hypsiglena torquata*) and common garter snake (*Thamnophis sirtalis*) should both occur there. Continued effort will be made to document new species.

## Appendix B

### Special Status Plants that may occur Within the Precious Lands Wildlife Management Area

Special status plants that may occur within the planning area, including scientific and common name, and a description of their habitat are displayed in Table 16. This list was generated using information provided by the Oregon Natural Heritage Program (1998), the Washington Natural Heritage Program (1997), Flora of the Pacific Northwest (Hitchcock and Cronquist, 1973), and consultations with knowledgeable individuals. This list simply indicates the species that MAY be present and in no way infers that all these species are found within the planning area.

**Table 16. Special Status Plants that may occur on the Precious Lands Area**

| Common Name | Scientific Name | Habitat |
|---|---|---|
| Geyer's onion | *Allium geyeri* var. *geyeri* | Low meadows and along streams. |
| Hell's Canyon Rockcress | *Arabis hastatula* | Basalt cliffs and bluffs, often east aspect. |
| Oregon Bolandra | *Bolandra oregana* | Moist rocks in river canyons. |
| Upswept Moonwort | *Botrichium ascendens* | Fairly moist sites in grassy fields. |
| Dainty Moonwort | *Botrichium crenulatum* | Marshy and springy areas, 3900-8200' elev. |
| Bupleurum | *Bupleurum americanum* | Rock outcrops and open grasslands. |
| Green-band Mariposa | *Calochortus macrocarpus* var. *maculosa* | Open, perennial bunchgrass types (particularly blue-bunch wheatgrass) from 800-4800' elev. on basalt. |
| Broad-fruit Mariposa | *Calochortus nitidus* | Upper canyon rims and forest openings. Usually flat basalt slopes at 3500-5500' elev. |
| Back's Sedge | *Carex backii* | Moist woods or thickets. |
| Porcupine Sedge | *Carex hystericina* | Wet ground near streams. |
| Meadow Sedge | *Carex praticola* | Moist to wet meadows, streambanks, and moist woods; lowlands to midmontane. |
| Pyrenaean Sedge | *Carex pyrenaica* | Meadows, ledges and rock crevices. |
| Parsley Fern | *Cryptogramma acrostichoides* | Dry cliff faces, outcrops, and talus at all elevations |
| Male Fern | *Dryopteris felix-mas* | Moist woods and streambanks. |
| Bolander's Spike-rush | *Eliocharis bolanderi* | Wet places, foothills to midmontane. |
| Engelman's Daisy | *Erigeron engelmannii* var. *davisii* | Woods, meadows and open hillsides. |
| Diffuse Stickweed | *Hackelia diffusa* | Cliffs and talus slopes. |
| Palouse Goldenweed | *Haplopappus liatriformis* | Palouse Prairie grasslands transitioning to Ponderosa Pine. Moderate slopes, 2000-4800' elev., mostly in Fescue sites. Usually N |

| | | |
|---|---|---|
| | | aspects. |
| Hazel's Prickly-phlox | *Leptodactylon pungens* ssp. *hazeliae* | Dry places from deserts to mid elevation. |
| Cusick's Desert Parsley | *Lomatium cusickii* | Rocky places, either open or woody; montane. |
| Rollin's Desert Parsley | *Lomatium rollinsii* | Open slopes |
| Salmon River Desert Parsley | *Lomatium salmoniflorum* | Open rocky slopes and embedded sand at low elevation in river canyons. |
| Snake Canyon Desert Parsley | *Lomatium serpentinum* | Open, rocky slopes in or near the Snake River Canyon. |
| Bank Monkeyflower | *Mimulus clivicola* | Moderately dry slopes in grasslands and conifer openings, on mineral soils at low elev. |
| | *Mimulus hymenophyllus* | Seep areas on basalt cliffs |
| | *Mimulus patulus* | Moist crevices and ledges on basalt cliffs, often with poison ivy. |
| Macfarland's Four-o'clock | *Mirabilis macfarlanei* | Sandy sites on rocky slopes in canyon grasslands at low elevation. |
| Wallowa Rice Grass | *Oryzopsis wallowensis* | Ridgetops |
| Simpson's Hedgehog Cactus | *Pediocactus simpsonii* var. *robustior* | Open, rocky sites from 1600-8500' elev. Shallow soils on stable, warmer exposures. |
| Goldback Fern | *Pentagramma triangularis* ssp. *triangularis* | Mossy outcrops and rock crevices in Idaho fescue habitat types. |
| Spalding's Silene | *Silene spaldingii* | Palouse Prairie Grasslands, 2600-3900' elev. Often in Festuca sites or near Ponderosa Pine. NW aspect. |
| Malheur Wirelettuce | *Stephanomeria malheurensis* | |
| Arrowleaf Thelypody | *Thelypodium eucosmum* | Lower canyons on open dry slopes. 2900' elev. |
| Purple Thick-leaved Thelypody | *Thelypodium laciniatum* var. *streptanthoides* | Crevices of canyon cliffs or other rocky outcrops. |
| Plumed Clover | *Trifolium plumosum* var. *amplifolium* | Dry hillsides to meadowlands. 3200-4400' elev. |

# Appendix C

## Common and scientific names for plant species mentioned in the text

Nomenclature of plants in Table 17 follows Hitchcock and Cronquist (1973) except for the grasses, which follows Hickman (1993).

### Table 17. Common and Scientific Names for Plant Species Mentioned in the Text

| Common Name | Scientific Name |
|---|---|
| Barnyard grass | *Echinochloa crusgalli* |
| Black hawthorn | *Crataegus douglasii* |
| Bluebunch wheatgrass | *Pseudoregneria spicatum* |
| Cascara | *Rhamnus purshiana* |
| Cheatgrass | *Bromus tectorum* |
| Chokecherry | *Prunus virginiana* |
| Common crupina | *Crupina vulgaris* |
| Common snowberry | *Symphoricarpos albus* |
| Dalmation toadflax | *Linaria genistifolia* |
| Diffuse knapweed | *Centaurea diffusa* |
| Douglas-fir | *Pseudotsuga menziesii* |
| Dwarf mistletoe | *Arceuthobium spp.* |
| Elderberry | *Sambucus cerulea* |
| Engelmann's daisy | *Erigeron engelmannii* |
| Himalayan blackberry | *Rubus discolor* |
| Idaho fescue | *Festuca ovina var. ingrata* |
| Intermediate wheatgrass | *Elytrigia intermedia* |
| Larch | *Larix occidentalis* |
| Leafy spurge | *Euphorbia esula* |
| Macfarlane's four O'clock | *Mirabilis macfarlanei* |
| Male fern | *Dryopteris felix-mas* |
| Ninebark | *Physocarpus malvaceus* |
| Oceanspray | *Holodiscus discolor* |
| Poison hemlock | *Conium maculatum* |
| Ponderosa pine | *Pinus ponderosa* |
| Prairie junegrass | *Koleria macrantha* |
| Quaking aspen | *Populus tremuloides* |
| Red osier dogwood | *Cornus stolonifera* |
| Red threeawn | *Aristida longiseta* |
| Reed canarygrass | *Phalaris arundinaceae* |
| Rose | *Rosa spp.* |
| Rush skeletonweed | *Condrilla juncea* |
| Sandberg's bluegrass | *Poa sandbergii* |
| Serviceberry | *Amelanchier alnifolia* |
| Smooth sumac | *Rhus glabra* |
| Spalding's catchfly | *Silene spaldingii* |
| St. John's wort | *Hypericum perforatum* |
| Syringa | *Philadelphus lewisii* |
| Thimbleberry | *Rubus parviflorus* |
| Tumblemustard | *Sisymbrium spp.* |
| Water birch | *Betula occidentalis* |
| White alder | *Alnus rhombifolia* |
| Yellow starthistle | *Centaurea solstitialis* |

## Appendix D

### Summary of Habitat Evaluation Procedure (HEP) data collection during 2000-2001 seasons

Tables 17-22 summarize the 2000-2001 HEP data collection effort. An explanation of variable symbols (i.e. - *, **, ^, etc.) and model criteria can be found in Table 24 at the end of all the data tables.

**Table 18. Summary of HEP Data for 2000-2001 on Good Grassland Vegetation Communities.**

**GOOD GRASSLANDS**

**Associated species - Western Meadowlark, Chukar, Mule Deer, Blue Grouse**

| | DESCRIPTIONS & VARIABLES | | | | | |
|---|---|---|---|---|---|---|
| | Plot | **GF-1** Buford | **G-3** Tamarack | **G-4** Tamarack | **G-5** Tamarack | **G-8** Tamarack |
| | Area description | Wheat field | Saddle W of cabin | E side Central Rdg | W side Central Rdg | E Jsph Crk, SW of cabin |
| | Year established | 6/29/00 | 7/10/00 | 7/11/00 | 7/11/00 | 7/25/00 |
| **HERB** | # Herb spp | 2.6 | 6.6 | 6 | 7.3 | 5.8 |
| | % Herb cover | 97.8 | 78.5 | 61.2 | 55.1 | 67.3 |
| | % Grass cover | 100 | 70.7 | 57.4 | 44.4 | 58.3 |
| | Avg herb height (cm) | 57.7 | 34.2 | 34.9 | 33.8 | 35.1 |
| | % Cover palatable herb | 99.4 | 71.5 | 57.8 | 45.8 | 64.9 |
| | % Cheatgrass | <1 | 30 | 10 | 9 | 13 |
| | # Preferred shrub spp ≥ 10% total cover | 0 | 0 | 0 | 0 | 0 |
| **SHRUB** | % Cover preferred shrubs <1.5m | 0 | 0 | 0 | 0 | 0 |
| | % Cover shrubs <1.5m | 0 | 0 | 0 | 0 | 0 |
| | % Canopy cover of shrubs <6m | 0 | 0 | 0 | 0 | 0 |
| | Avg shrub height (m) | 0 | 0 | 0 | 0 | 0 |
| | Distance to shrub cover (km) | 0.1 | 0.4 | 1.0 | 0.9 | 0.7 |
| **TREE** | % Evergreen canopy >1.5m | 0 | 0 | 0 | 0 | 0 |
| **MISC** | Dist to forest/ tree savanna (km) | 0.1 | 0.5 | 1.0 | 1.0 | 1.0 |
| | Distance to exposed rocks (km) | 1.0 | 0.1 | 0.1 | 0.5 | 0.1 |
| | Distance to perch (m) | 50 | 6.6 | 41.1 | 12.5 | 13.8 |
| | Crops within 1.6 km (Y/N) | Y | N | N | N | N |
| | Aspect (degrees) | 5 | 122 | 104 | 220 | 233 |
| | Road density (km rd/ $km^2$ habitat)* | 1.24 | 0 | 0 | 0 | 0 |
| | Topo class (per Chukar model)** | 2 | 4 | 4 | 4 | 4 |
| | Topo diversity (per M Deer model)*** | D | D | D | D | D |

## DEGRADED GRASSLANDS

**Associated species - Western Meadowlark, Chukar, Mule Deer, Blue Grouse**

| | DESCRIPTIONS & VARIABLES | | | | | | |
|---|---|---|---|---|---|---|---|
| | Plot | **DG-1** Buford | **G-2** Buford | **G-6** Tamarack | **G-7** Tamarack | **G-9** Basin | |
| | Area description | Disturbed grass | Crest to creek | Tamarack ridge | E of Jsph Crk, N of cabin | 3/4 mi NE of cabin | |
| | Year established | 6/28/00 | 7/6/00 | 7/12/00 | 7/18/00 | 8/7/00 | Averages |
| **HERB** | # Herb spp | 7.4 | 6.4 | 6.4 | 5.8 | 7.2 | 6.6 |
| | % Herb cover | 81.7 | 53.9 | 46.8 | 74.7 | 81.3 | 67.7 |
| | % Grass cover | 73.9 | 42.8 | 37.6 | 62.6 | 70.9 | 57.6 |
| | Avg herb height (cm) | 16.5 | 31.4 | 29.7 | 30.4 | 29.1 | 27.4 |
| | % Cover palatable herb | 73.9 | 44.7 | 39.3 | 72.2 | 71.2 | 60.3 |
| | % Cheatgrass | 69 | 80 | <1 | 33 | 39 | 55.3 |
| | # Preferred shrub spp ≥ 10% total cover | 0 | 0 | 0 | 0 | 0 | |
| **SHRUB** | % Cover preferred shrubs <1.5m | 0 | 0 | 0 | 0 | 0 | |
| | % Cover shrubs <1.5m | 0 | 0 | 0 | 0 | 0 | |
| | % Canopy cover of shrubs <6m | 0 | 0 | 0 | 0 | 0 | |
| | Avg shrub height (m) | 0 | 0 | 0 | 0 | 0 | |
| | Distance to shrub cover (km) | 1.0 | 0.4 | 0.5 | 1.2 | 0.4 | |
| **TREE** | % Evergreen canopy >1.5m | 0 | 0 | 0 | 0 | 0 | |
| **MISC** | Dist to forest/ tree savanna (km) | 0.5 | 1.0 | 1.0 | 1.0 | 1.0 | |
| | Distance to exposed rocks (km) | 0.1 | 0.1 | 1 | 0.1 | 0.7 | |
| | Distance to perch (m) | 79.2 | 6.3 | 22 | 27.2 | 31.7 | |
| | Crops within 1.6 km (Y/N) | Y | Y | N | N | N | |
| | Aspect (degrees) | 265 | 249 | 220 | 234 | 254 | |
| | Road density (km rd/ $km^2$ habitat)* | 1.24 | 1.24 | 0 | 0 | 0 | |
| | Topo class (per Chukar model)** | 3 | 4 | 1 | 3 | 4 | |
| | Topo diversity (per M Deer model)*** | D | D | D | D | D | |

Average distance to shrub cover over all grassland sites is .66 km.
No shrub data was gathered in the field when sampling grassland plots during 2000 and 2001.
All shrub data were estimated in the office from topo maps or personal recollection.
All estimates are made to the best of our knowledge and are conservative approximations.

Degraded and Good classifications of grassland plots were assigned according to % Cheatgrass, % Grass, and Average Herbaceous Height.
High % Cheat indicates disturbance, low % Grass indicates lack of native bunchgrasses.
Native grasses are taller than cheat, so height may indicate range condition.
G-6 has low % Cheat, but also has the lowest % Grass of all plots, indicating a bare ridge-top site. % Cheat is a misleading indicator on this site

**Table 19. Summary of HEP Data for 2000-2001 on Degraded Grassland Communities.**

## SHRUBLANDS

**Associated species - Western Meadowlark, Mule Deer, Blue Grouse, California Quail, Song Sparrow**

| | DESCRIPTIONS & VARIABLES | | | | | | |
|---|---|---|---|---|---|---|---|
| | Plot | **SS-1** snowberry | **SS-2** snowberry | **SS-3** snowberry | **S-1** ninebark | **S-3** sumac | **S-4** ninebark |
| | Area description | Tamarack 1mi N of gate | SE of Paradise tr. farm | E of Basin cabin | Rye Shrub | 1.5 mi up Broady | Basin cabin saddle |
| | Year established | 6/26/00 | 8/14/01 | 8/20/01 | 6/14/00 | 8/16/00 | 8/2/01 |
| **HERB** | # Herb spp | 4.5 | 5.2 | 3.5 | 5.6 | 4.3 | 2.5 |
| | % Grass cover | 58.2 | 58.3 | 44.4 | 68.0 | 77.0 | 40.7 |
| | % Herb cover | 76.6 | 79.0 | 57.3 | 72.7 | 80.5 | 45.7 |
| | % Cover palatable herb | 72.0 | 45.9 | 29.8 | 87.6 | 77.1 | 37.9 |
| | Avg herb height (cm) | 25.7 | 30.3 | 31.0 | 20.1 | 22.9 | 20.0 |
| **SHRUB** | % Cover shrubs | 78.1 | 50.0 | 82.5 | 63.9 | 36.7 | 88.3 |
| | % Cover shrubs <1.5m | 77.5 | 50.0 | 80.8 | 50.0 | 34.2 | 51.7 |
| | % Cover preferred shrubs <1.5m | 76.9 | 50.0 | 80.0 | 43.1 | 7.5 | 51.7 |
| | % Canopy cover of shrubs <6m | 78.1 | 50.0 | 82.5 | 63.9 | 36.7 | 88.3 |
| | # Preferred shrub spp ≥ 10% total cover | 2 | 2 | 3 | 3 | 1 | 1 |
| | Avg height shrubs <6m (m) | 0.4 | 0.3 | 0.6 | 1.0 | 0.7 | 1.4 |
| | Avg shrub height (m) | 0.4 | 0.3 | 0.6 | 1.0 | 0.7 | 1.4 |
| **TREE** | % Evergreen canopy >1.5m | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| **MISC** | Crops within 1.6 km (Y/N) | N | N | N | N | N | N |
| | Aspect (degrees) | 230 | 97 | 266 | 42 | 95 | 311 |
| | Distance to forest/ tree savanna (km) | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 | 0.2 |
| | Distance to escape cover (m) | 100 | 500 | 250 | 500 | 100 | 200 |
| | Distance to perch (m) | 50 | 100 | 50 | 25 | 25 | 25 |
| | Distance to roost cover (m) | 100 | 500 | 250 | 400 | 100 | 200 |
| | Distance to potable water (km) | 1.6 | 0.7 | 0.2 | 0.7 | 0.1 | 0.3 |
| | Road density (km rd/ $km^2$ habitat)* | 0 | 0 | 0 | 0 | 0 | 0 |
| | Topo diversity (per M deer model)*** | D | D | D | D | D | D |

Only maximum height of shrubs was measured in the field. The breakdown into <1.5m and <6m was done in the office. To estimate average shrub height and cover <1.5m, all shurbs 50 tenths of a foot or taller were thrown out. Shrubs 197 tenths of a foot or more were thrown out to estimate <6m. This method eliminates the possibility of understory shrubs being counted, but is a conservative estimate that could be derived from the data collected.

Distance to forest, escape cover, perch, and roost were estimated from maps and the data collectors recollection.

Distance to potable water was measured from maps.

% Grass was estimated for plots SS-1 and S-1 where the data was not collected in the field. Estimation was derived by figuring the average ratio of % grass : % herb from the other two samples in each cover type (SS and S) and applying that same ratio to the estimated plot.

**Table 20. Summary of HEP Data for 2000-2001 on Shrubland Vegetation Communities.**

**RIPARIAN**

**Associated species - Mule Deer, Blue Grouse, Song Sparrow, Downy Woodpecker, Yellow Warbler, Beaver and Black-Capped Chickadee**

| | DESCRIPTIONS & VARIABLES | | | | | | |
|---|---|---|---|---|---|---|---|
| | Plot | **R-1** | **R-2** | **R-3** | **R-4** | **R-5** | **R-6** |
| | Area description | Upper Tmrk Crk | Lwr Tmrk Crk | Basin Creek | Broady Creek | Cottonwood Crk | Buford Creek |
| | Year established | 8/1/2000 | 8/2/2000 | 8/8/2000 | 8/15/2000 | 8/17/2000 | 8/22/2000 |
| **HERB** | # Herb spp | 4.5 | 4.12 | 1.9 | 3.7 | 3.5 | 2.6 |
| | % Herb cover | 74.4 | 63.9 | 44.5 | 61.9 | 30.6 | 21 |
| | Avg herb height (cm) | 18.4 | 24.4 | 24.1 | 35.3 | 19.7 | 24.4 |
| | % Cover palatable herb spp | 1.97 | 30.9 | 0 | 0 | 11.6 | 7.9 |
| **SHRUB** | % Cover shrubs | 65.8 | 74.1 | 78.8 | 62.5 | 22.4 | 25.6 |
| | % Cover shrubs <1.5m | **39.2** | **37.3** | **44.4** | **37.5** | **11.7** | **15.3** |
| | % Canopy cover of shrubs <6m | **65.8** | **72.3** | **78.8** | **62.5** | **22.1** | **25.6** |
| | % Cover preferred shrubs <1.5m | **34.2** | **26.8** | **29.4** | **13.8** | **8.6** | **6.3** |
| | Avg height shrubs <6m (m) | **1.4** | **1.9** | **1.6** | **1.8** | **1.5** | **1.3** |
| | Avg shrub height (m) | 1.4 | 1.9 | 1.6 | 1.8 | 1.6 | 1.3 |
| | # Preferred shrub spp ≥ 10% total cover | 4 | 1 | 2 | 1 | 3 | 1 |
| | % Shrubs consisting of hydrophytic spp | 35 | 59 | 44 | 84 | 41 | 67 |
| | Species composition of woody veg ^^ | C | no trees | C | A | A | A |
| **TREE** | % Tree canopy cover | 12.5 | 0 | 66.3 | 28.6 | 1.4 | 42 |
| | % Evergreen canopy cover | 10.8 | 0 | 32.5 | 2.9 | 0.59 | 0 |
| | % Evergreen canopy >1.5m | 10.8 | 0 | 32.5 | 2.9 | 0.59 | 0 |
| | % Deciduous trees 1-6" DBH (1-4" sapling class) | **19.1** | **0** | **12.1** | **28.1** | **79.1** | **81.8** |
| | Sq ft basal area/ acre | 15.8 | 0 | 43.8 | 27.1 | 8.2 | 39.4 |
| | # Snags >6" DBH/ acre | 0 | 0 | 3.8 | 17.1 | 3.5 | 16.9 |
| **WATER** | Distance to potable water (km) | **2.0** | **1.0** | **0.0** | **0.0** | **0.0** | **0.0** |
| | % Lacustrine surface dominated by water lily | 0 | 0 | 0 | 0 | 0 | 0 |
| | Avg ann. water fluct. (per Beaver model) ^ | **C** | **C** | **C** | **B** | **C** | **C** |
| | Stream gradient (% slope) | 25 | 8 | 13 | 2 | 3 | 4 |
| **MISC** | Crops within 1.6 km (Y/N) | N | N | N | N | N | Y |
| | Distance to forest / tree savanna (km) | 0 | 1 | 0 | 0 | 0.1 | 0.1 |
| | Distance to roost cover (m) | 10 | 10 | 10 | 10 | 40 | 10 |
| | Distance to escape cover (m) | 10 | 10 | 10 | 10 | 25 | 20 |
| | Road density (km rd/ $km^2$ habitat)* | 0 | 0 | 0 | 0 | 0 | 1.24 |
| | Aspect (degrees) | 320 | 332 | 359 | 296 | 244 | 5 |
| | Topo diversity (per Mule deer model)*** | D | D | E | D | D | D |

Only maximum **height of shrubs** was measured in the field. The breakdown into <1.5m and <6m was done in the office.

**% Deciduous trees** 1-6" DBH was estimated from the standard measurement of 1-4" deciduous saplings.

**Distance to potable water**, roost cover and escape cover were measured from maps.

Average **annual water fluctuation** was estimated from personal knowledge of the stream systems in the study area. Most are "flashy" and experience high spring runoff events and occasionally dry up in the summer months

**Table 21. Summary of HEP Data for 2000-2001 on Riparian Vegetation Communities.**

**Table 22. Summary of HEP Data for 2000-2001 on Conifer Vegetation Communities.**

## CONIFER
## Associated species - Mule Deer, Blue Grouse, Black-Capped Chickadee

| | DESCRIPTIONS & VARIABLES | | | |
|---|---|---|---|---|
| | Plot | **C-2** (conifer) | **C-3** (conifer) | **C-5** (conifer) |
| | Area description | 2nd Buford pilot | Tamrck - Upbroady bird plot | Broady Crk - S ridge |
| | Year established | 6/15/00 | 7/19/00 | 8/21/01 |
| **HERB** | # Herb spp | 4.3 | 4.6 | 2.2 |
| | % Herb cover | 61.5 | 53.2 | 42.7 |
| | Avg herb height (cm) | 18.1 | 13.0 | 13.7 |
| | % Cover palatable herb spp | 70.8 | 7.3 | 23.3 |
| **SHRUB** | % Cover shrubs | 65.8 | 70.8 | 82.5 |
| | % Cover shrubs <1.5m | 61.3 | 51.7 | 68.3 |
| | % Cover preferred shrubs <1.5m | 60.4 | 50.8 | 68.3 |
| | # Preferred shrub spp ≥ 10% total cover | 4 | 3 | 2 |
| | Avg shrub height (m) | 0.7 | 0.4 | 1.0 |
| **TREE** | % Evergreen canopy >1.5m | 54.6 | 72.5 | 48.3 |
| | % Tree canopy closure | 54.6 | 72.5 | 48.3 |
| | Avg height of overstory trees (m) | 21.0 | 17.6 | 19.2 |
| | # Snags 4-10" DBH/ acre | 3.1 | 35.0 | 6.0 |
| **MISC.** | Aspect (degrees) | 10 | 28 | 320 |
| | Crops within 1.6 km (Y/N) | Y | N | N |
| | Distance to potable water (m) | 300 | 900 | 1100 |
| | Dist. to forest/ tree savanna (km) | 0 | 0 | 0 |
| | Road density (km rd/ $km^2$ habitat)* | 1.24 | 0 | 0 |
| | Topo diversity (per M deer model)** | C | E | E |

**Table 23. Summary of HEP Data for 2000-2001 on Open Conifer Vegetation Communities.**

## - Mule Deer, Blue Grouse, Black-Capped Chickadee

| NS & VARIABLES | | | | |
|---|---|---|---|---|
| | **OC-1** (Open conifer) | **OC-3** (Burn conifer shrub) | **OC-4** (Burn conifer grass) | **OC-5** (Open conifer) |
| n<br>ed | 1st Buford pilot<br>6/8/00 | Bear Creek - burn<br>7/26/01 | Tamarack Ridge - burn<br>8/15/01 | Tmrck- N Central Rdg<br>7/26/00 |
| | 4.8 | 4.4 | 2.9 | 4.9 |
| | 52.5 | 76.5 | 81.2 | 68.9 |
| t (cm) | 21.9 | 27.0 | 61.0 | 24.7 |
| able herb spp | 54.2 | 18.2 | 1.0 | 5.5 |
| s | 67.2 | 47.5 | 16.3 | 60.6 |
| s <1.5m | 56.9 | 37.5 | 16.3 | 50.0 |
| red shrubs <1.5m | 56.8 | 19.2 | 16.3 | 50 |
| rub spp ≥ 10% total cover | 4 | 3 | 3 | 5 |
| ht (m) | 1.0 | 1.1 | 0.3 | 0.9 |
| anopy >1.5m | 11.7 | 0.0 | 0.0 | 31.1 |
| closure | 11.7 | 0.0 | 0.0 | 31.1 |
| verstory trees (m) | 15.6 | 20.8 | 23.2 | 17.4 |
| DBH/ acre | 6.7 | 11.7 | 0.0 | 0.0 |
| es) | 40 | 327 | 352 | 30 |
| 6 km (Y/N) | Y | N | N | N |
| able water (m) | 500 | 300 | 3500 | 2000 |
| tree savanna (km) | 0 | 0.2 | 0.2 | 0 |
| km rd/ $km^2$ habitat)* | 1.24 | 0 | 0 | 0 |
| (per M deer model)** | C | D | E | E |

**Table 24. Explanation of Symbols, Criteria, and Model Classes Used to Evaluate HEP Data.**

^ Annual water fluctuation
A - Small fluctuation
B - Moderate fluctuation
C - Extreme fluctuation or lack of water during some part of the year

^^ Species composition of woody vegetation
A - Aspen, Willow, Cottonwood, Alder dominant (>50%)
B - Other deciduous species dominant
C - Coniferous species dominant

* Buford property is appx 2.3 sq. mi. = 3.7 sq. km
Road is appx 3 mi = 4.6 km.
4.6 km rd/ 3.7 sq.km range = 1.24 km rd/ sq km
All other areas are not accessed by roads in winter

** Chukar Topo class:
1 - Level ground
2 - Rolling
3 - Ridges and rims
4 - Mountainous

*** Mule deer Topo diversity:
A - Level terrain, <5% slope
B - Level, w/ drainages
C - Rolling terrain, 5-25% slope
D - Rolling - rims, ridges and drainages
E - Mountainous terrain, slopes >25%

List of shrubs preferred by mule deer:

| | |
|---|---|
| ACGL - Rocky Mountain Maple | PHMA - Ninebark |
| Alder spp. | Plum |
| Apple | PRVI - Chokecherry |
| AMAL - Serviceberry | RICE - Wax currant |
| BERE - Oregon Grape | RILA - Prickly currant |
| CESA - Redstem Ceanothus | ROSA - Rose spp. |
| COST - Red Osier Dogwood | SASC - Scouler willow |
| HODI - Oceanspray | SYAL - Snowberry |