Botany Specialist Report

Flagtail Restoration Project

Malheur National Forest
Blue Mountain Ranger District

Grant County, Oregon

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Prepared: August 21, 2003
Revised: February 26, 2004

Contents

GENERAL VEGETATION CONDITIONS

Forest Understory Vegetation, Juniper Woodlands, Riparian, Grasslands

There are four general understory vegetation types within the fire boundary: upland forest, juniper woodlands, riparian areas, and meadow habitats. This section discusses the relative abundance, distribution, and condition of understory vegetation within these types.

Upland Forest Understory Vegetation

The fire killed nearly all shrub, forb, grass, and sedge vegetation in the uplands within forested areas, although shortly after the fire, sprouts of Oregon grape, elk sedge, and unidentified forbs were seen. Since a major portion of the fire area was in the warm-dry and hot-dry potential vegetation groups, most of the understory species are adapted to fire to create favorable conditions for their regeneration. It is likely that many species may still be present as seed or portions of plants that survived the fire underground and are still capable of regenerating. Grass species such as Sandberg bluegrass (*Poa sandbergii),* blue bunch wheatgrass (*Pseudoroegneria spicata*), and pinegrass (*Calamogrostis rubescens*) are probably well represented as well as elk sedge (*Carex geyeri*). Among the forb species that are probably present are lupine (*Lupinus spp.*), western yarrow (*Achillea millefollium*), aster (*Penstemon globules*), arrowleaf balsamroot (*Balsamorhiza saggitata*), and common shrubs could be snowberry (*Symphorocarpus albus*).

Juniper Woodlands

Juniper woodlands occur on a small proportion of the project area (8%), but an estimated 80% of these areas are concentrated on or within a short distance of the Bald Hills. The remaining woodlands are located at the south end of the project area at the headwaters of Snow and Jack Creeks. Bluebunch wheatgrass is associated with this woodland type: on deeper soils, these woodlands contain a mix of dry understory site species, such as big sage (*Artemisia tridentata Nutt. ssp. vaseyana*), and, on shallow soils, mountain mahogany (*Cercocarpus ledifolius*) is found growing with juniper, a mix of juniper and ponderosa pine, or alone on the harshest sites. Most vegetation within sites were killed if they were adjacent to densely forested areas or if ponderosa pine had grown into these drier sites. However, on the harshest sites these species survived, because in such areas as the Bald Hills the vegetation was naturally sparse and far enough from the fire to escape ignition.

Riparian Areas

The fire burned an estimated 35% of the total length of Snow Creek riparian area, and only a small portion of the Jack Creek riparian area, near the intersection of the 2400048 and 2400050 roads, burned. Other valley bottom riparian areas were mostly unburned, preserving important hardwood species, such as willows, alder, and aspen.

The condition of most hardwoods located within riparian, valley bottom areas within the Silvies River, Jack Creek, Snow Creek riparian areas, is still declining, from lowered water table, lack of natural disturbance, increasing competition from noxious weeds and other exotic species, and

continued heavy domestic livestock grazing and wildlife browsing. They are old, decadent, and exhibit poor vigor, and reproduction, if any, is poor.

Animals have damaged many common hardwoods, such as willow, alder, dogwood, and aspen. Young plants are killed or unable to reproduce because domestic livestock and big game browse new growth to the point where the plant is unable to develop into a mature plant and reproduce. For example, aspen suckers are heavily browsed and cannot develop a mature stem, and bitterbrush, being heavily browsed, cannot produce seed (Upper Silvies Ecosystem Analysis at the Watershed Scale).

Grasslands

The numbers and distribution of once prominent native grasses such as tufted hairgrass (*Deschampsia cespitosa*), and native fescues, sedges, and forbs have declined since large scale domestic livestock grazing began and fires were routinely suppressed. (Upper Silvies Ecosystem Analysis at the Watershed Scale Report). Kentucky blue-grass (*Poa praetensis*) is now established and thriving within meadow areas, and has reduced the amount and distribution of once common native species (Flagtail Allottment EAR and Allottment Management Plan, 1981, Bear Valley Ranger District).

CULTURALLY IMPORTANT PLANTS

This project area is an area of interest to the Confederated Tribes of the Warm Springs and lies within the boundaries of their ceded lands. The area is also an area of interest for the Burns Paiute Tribe and Confederated Tribes of the Umatilla. Each tribe has listed plants that are considered important for their cultural identity. These plants, which include trees, shrubs, forbs, root crops, sedges and grasses, supply such needs as food, tobacco, chewing gum, seed sources, teas, medicine, insect repellants, dyes, and materials for basketry and other building materials. The Upper Silvies Ecosystem Analysis at the Watershed Scale recognized that, in general, native grasses, woody plants, sedges are all declining. Camas, a plant that was once widespread and associated with meadows, has been declining as water tables within riparian areas declined.

Many hardwood species such as mountain mahogany, black cottonwood, quaking aspen, water birch, alders, chokecherry, willows, ceanothus, serviceberry, sagebrush, Oregon grape, dogwood, bitterbrush, rose, snowberry, spirea, and huckleberry, are now decadent and unable to reproduce successfully because of lack of fire and an increase in domestic grazing and big game browsing in riparian areas. Hardwood populations within riparian areas have fewer plants within remaining concentrations, these plant “clusters” are smaller, and there are fewer of them throughout the project area.

Culturally important tree species, ponderosa pine and western larch, found above the riparian areas (in the uplands) were greatly affected by the fire, and their distribution and conditions are described in the Affected Environment portion of Chapter I within the Forested Vegetation section. Generally, thin strips and patches of these species within the Silvies River and Jack Creek corridors were unburned, as were important hardwood species, such as willows, alder, and aspen, and other traditionally desirable plants such as sagebrush. However, the condition of these plants is still declining and may not be producing viable seed.

ROADED ACCESS

Access into the analysis area is fairly complete. Timber harvest and perhaps other management practices have constructed roads adjacent to most drainages and have accessed most forested areas for ground based yarding systems. Some of this access began as early railroad logging built track through the area. Many unimproved roads, many very short, have been created up small draws, so very little of the analysis area is without vehicle access. Short roads and skid trails have even been built just below or even into the Bald Hills area which is a juniper woodland site with little commercial timber. There are very few closed roads within the analysis area.

NOXIOUS WEEDS

Before the fire most weed populations were located near major roads: U.S. Highway 63 and Forest Road 2400. Surveys estimated 1.7 acres are infested. Since the fire surveys have documented 45 additional weed locations affecting an estimated 53 acres. Some of these locations are in old log landings and many are associated with roads, skid trails, and yarding within harvest units or off-road equipment use. Most weeds are adjacent to open roads and are probably a result of vehicles spreading weeds.

POTENTIAL ISSUES/CONCERNS

Culturally Important Plants

Desired Condition

Aspen

At higher elevations, within narrow ephemeral draws and intermittent and perennial stream channels, aspen (*Populus tremuloides*) form continuous stringers and develop into larger, sprawling stands, within valley bottoms in such places as Jack Creek, Dipping Vat Creek, the Silvies River and its' unnamed tributaries, east of the Bear Valley work center, and along the 2400017 road. Within headwater areas of Snow and Jack Creeks and on localized upland benches (Dipping Vat area), aspen are also found in denser stands surrounding seeps, springs, and localized water catchment areas, where they provide shade and physical protection for these riparian sites.

There is a varied distribution of age classes and downed wood is present to provide physical protection for new regeneration. Regeneration is abundant and vigorous. Existing stands, and downed and standing snags provide essential wildlife habitat. Downed snags also stabilize soil within small draws to limit erosion into downhill water sources. As a result of frequent disturbance from low intensity fires, conifers on drier sites are infrequently present within or near stands and juniper are only found as isolated individuals or small, scattered groups .

Wildlife browsing and domestic livestock grazing allow sufficient aspen regeneration and vigor to provide for replacement trees and provide the density needed for beaver habitat, snag habitat, downed wood habitat and physical protection for stream areas.

Other Hardwood Shrub, Forb, and Gramminoid Species

Riparian areas along streams and in smaller meadow and seep areas, are in proper functioning condition with a diverse variety of native grasses, sedges, shrubs, hardwoods and conifers providing habitat for wildlife and fish. Desirable native species include:

aspen (*Populus tremuloides*),
western juniper (*Juniperus occidentalis*),
sagebrush (*Artemisia* spp.),
bittercherry (*Prunus emarginata*),
chokecherry (*Prunus virginianna*),
dogwood (*Cornus sericea sericea*),
willows (*Salix* spp.),
elksedge (*Carex gereyii*),
alder (*Alnus incana*),
rabbitbrush species(*Chrysothamnus*),
elderberry (Sambucus spp.),
huckleberries (Vaccinnium spp.),
wild roses (Rosa spp.),
kinnikinnick (Arctostaphylos uva-ursi),
yarrow (Achillea millefollium), and
wild onions (Alluim spp.)

These species are found throughout their habitat ranges. These and other species are reproducing successfully and are limited only by competition with other native species and local climate influences.

Roads

Road densities and location provide necessary access to allow Native Americans to reach traditional use areas, and are compatible with the needs of native plant habitats.

Survey Methodology

Aspen

A search of the GIS database displayed initial aspen locations which were supplemented by field searches. A preliminary locator map containing GIS locations, was updated after locating areas by driving roads and searching potential habitat. Forest Service district personnel provided most[1] of the new locations by mapping areas as these were encountered during various field surveys. The District Botanist, Ecologist, and Biological Technician[2] collected inventory data. Data field sheets described existing conditions, special information (location of improvements, private land, etc.), preliminary treatment recommendations, stand description, GPS location (Garmin and Trimble brands) and digital data[3], and digital pictures displaying the area vicinity and representative stand and tree conditions. GPS data was edited and positions corrected in the office, and then downloaded to the Forest GIS system (K:/bmrd/projects/Flagtail/covers).

Hardwood Shrubs, Grasses, Forbs

No formal surveys were performed. Species identification and condition were documented as field crews performed sensitive plant surveys or during aspen inventory surveys. Shrub condition and trend was primarily obtained by observing areas during hardwood cutting collection in preparation for producing planting stock for fire riparian areas.

[1] Blue Mtn. District Pre-Sale crew and Cheri Miller
[2] Nancy Hafer, Mike Tatum, and Cindy Kranich, respectively
[3] Malheur NF GIS Aspen Data Dictionary

Existing Conditions

Aspen

The fire burned nearly all ground vegetation outside riparian areas, and an estimated 1/3 of the Snow Creek riparian area. Most of Jack Creek and the Silvies River riparian and grassland areas were unburned, preserving important plant species. Within unburned riparian areas, a high percentage of shrub species are in fair to poor condition: They are old and are not reproducing successfully because of age and repeated animal browsing.

Table 1 - Frequency of Aspen Stand Size

Frequency of Aspen Stand Size		
Acreage Distribution	Number of Stands in Group	% Frequency
<0.5 acres	65	66
0.5 to <1 acres	14	14
1 to < 3 acres	14	14
< 6 acres	6	6
	99	100%

Source: Blue Mtn. GIS, 6/13/2003, J:\fsfiles\unit\bmrd\projects\flagtail\idt\resources\botany\aspen.xls

Present Distribution

Aspen distribution is discontinuous within small drainages and lower, valley bottom riparian areas. The largest continuous expanses of aspen are present in and adjacent to Jack Creek and Dipping Vat Creeks while scattered remnants are present near the Silvies River and its' small tributaries, Snow Creek, along the 2400055 road, and east of the Bear Valley work center, along the 2400017 road. Most of these scattered aspen stands are found near small seeps and springs or intermittent streams.

Stand Conditions

Most aspen stands still have two age groups: mature, which are declining or decadent, and regeneration, which are usually heavily browsed and declining. A majority of inventoried acres, 51 acres (68%), are in danger of disappearing because there are few live mature trees to supply energy reserves to sustain root sprouting. The intense heat has killed mature trees and regeneration. The fire burned most intensely on the south portion of the "bald hills" area. Stands, which have been more intensely burned, also have no or little downed wood that could increase survival and development of future regeneration.

Approximately 76 acres of aspen, at 99 locations, have been located and mapped within the fire boundary.

Patch size of these remnant stands ranges from .01 to nearly 6 acres, but most of these stands are less than 1 acre. The following table displays the frequency of stand acres in 4 size groups.

Fire has in some way affected 88 of these locations (70 acres, 93% of all acres).

Surveys indicate fourteen stands had been fenced to protect regeneration, and conditions within these stands are good: regeneration is vigorous and, in some stands, two or three age classes are present. Although some areas fenced using buck and pole construction have lost portions of these fences, 8 separate fences have been repaired, and there are plans to repair the remaining fences as funds become available.

Conifer Encroachment

Conifers are present within nearly all aspen stands. Many of the mature aspen trees in some stands were killed because of fire moving from the more flammable conifer crowns to the aspen, or because of the intense heat produced as the conifers burned. The conifers have also reduced

the amount and vigor of aspen sprouting by increasing the amount of shade, which reduces the temperature at ground level. Increased conifer densities have probably lowered the water table, further weakening the already declining health of the mature aspen and their root systems. Because of these changed conditions, some aspen stands may not be able to regenerate because clone vigor was poor before the fire and now all mature trees, which could have produced food reserves, have been killed.

Wet Meadows

Within the perennial Jack Creek stream reaches, there are small groups of mature aspen, no saplings, and generally abundant regeneration that extends far from the mature trees, indicating these "stands" were once much larger. The lower portion of the Snow Creek drainage has small, scattered remnant stands adjacent to roads. Many of these stands have little regeneration.

Many of these lower reaches have also been adversely affected by past timber harvest and grazing practices. Landings were often located within meadows and existing aspen stands, compacting the soil; roads have interrupted water flow. Concentrated grazing and wildlife use within the riparian areas has reduced the amount of mature trees by eating or trampling regeneration, preventing them from developing into mature stands with different age groups.

Upland Stands

Most of the ephemeral and intermittent stream reaches contain few, mature individuals and limited regeneration . There are many small stringers adjacent to the "Bald Hills" area with low to moderate amounts of regeneration, and small patches along the southern portion of the 2400865 road and in the Jack Creek area.

Adjacent to seeps and spring areas, aspen stands are denser and more vigorous, and may even have a sapling component, and somewhat vigorous regeneration. However, big game browsing and domestic livestock trampling still limit vigor, age class distribution, and site productivity. There are two large seeps with vigorous aspen stands up a small tributary of Snow Creek in section 26; small seeps along the northern portion of the 2400017 road; and small seep just south of the 2400 road in section 24.

Other Hardwood Species

Other hardwood species provide species, structural, and age, diversity as well as providing diverse and complex habitat . Common species such as willow (*Salix spp.*), mountain alder (*Alnus incana*), and water birch (*Betula occidentalis*) are often found in association with aspen stands, on more moist sites. Willows are found in broader valley bottom areas along Jack Creek and the Silvies River.

In drier, upland sites, upland willows, snowberry (*Symphoricarpos alba* and *S. oreophilis*), are commonly found, and on the harshest sites, shrubs such as mountain mahogany (*Cerocarpus ledifolius*) endure.

Roads

Road placement limits aspen regeneration and ultimately recovery of aspen clones because they interrupt water flow and impede regeneration by compacting the soil. Many roads and log landings have been placed in the midst of existing aspen stands.

Concerns for Culturally Important Plants

Tribal members of the Confederated Tribes of the Warm Springs Indian Reservation, Burns Paiute Tribe, and Confederated Tribes of the Umatilla Indian Reservation are concerned that road closures or decommissioning could reduce access to traditional use areas.

The tribes are concerned that populations of culturally important native species, especially hardwood shrubs and aspen, are in decline, and that non-native species are taking their habitats.

Tribal members are also concerned that treatments associated with reforestation activities to prevent animal damage could damage traditional use areas or plants if chemical treatments are used.

Effects on Culturally Important Plants

Measuring Proposed Management Activity Impacts

Available access for tribal members was evaluated by using the number of miles of open road in the subwatersheds and distribution of roads. Locations of important sites are not known, so the discussion of vehicle access was the primary consideration.

To evaluate improvements for native species, the miles or area planned for planting with culturally important plants, or acres of aspen stand improvements were measured. These measures were used because information was available.

The effects of animal damage activities was not included because there are no chemical or other lethal methods proposed for this or other projects in the Flagtail Fire boundary.

Units of Measure:

- Miles of open road in the fire area and distribution
- Acres or miles of area planned to plant with culturally important plants and species planted
- Expansion of aspen stands

Effects Common To All Alternatives

Cumulative Effects

Other Flagtail Fire Recovery Analyses or Activities (Categorical Exclusions)

Aspen Enhancement and Planting Projects

There are plans to plant additional hardwoods in riparian areas during the 2004 field season. Planting and protection activities would improve vegetation recovery and develop larger distribution for hardwood shrub and trees by extending boundaries around existing, remnant aspen stands, planting hardwoods in riparian areas; planting conifers within riparian habitat conservation areas.

Cottonwood seedlings and cuttings from five species of willow were planted the spring of 2003 on 25 acres (6.3 miles) along Snow Creek, the Silvies River, and Jack Creek. Native conifers have also been planted on 380 acres of upland sites and riparian habitat conservation areas. Seed and planting materials, planted and proposed for planting, were collected within this watershed to increase their numbers and develop young, healthy patches. Dogwood and willow seedlings produced from cuttings will be planted spring of 2004.

Aspen Enhancement

There are plans to cut competing conifers, reduce slash, and fence aspen. Aspen fencing would protect an estimated 250 acres, expanding the 76 acres of remnant stands that were identified during the 2002/2003 aspen inventory. These protection measures would increase regeneration by excluding large animals until trees are large enough to be browsed.

Effects That Differ Between Alternatives

Indirect Effects

Alternative 1

There will be no change to existing access to important sites, since there would be no access changes. . This alternative would have the best access, leaving nearly 47 miles of road open.

Alternatives 2, 3, and 5

These alternatives reduce available access from 36 to 37 percent, leaving approximatley 30 open road miles. Roads would remain open for vehicle access along the Silvies River; the lower portion of Snow Creek; and along the 2400017 road on the eastern fire boundary. Jack Creek access would be available by permit. Only two roads would allow vehicle access to the Bald Hills area: Forest Roads 2400865 would access this area from the west and Forest Road 2400024 from the east.

Vehicle Access Changes - Alternatives 2, 3 and 5

Area Name	**Proposed Road Access Changes (Decommissioned roads = Access Eliminated)**
Snow Creek	**Access eliminated** from the junction with Forest Road 2400137 to the upper reaches of Snow Creek
Jack Creek	**Access eliminated** from the intersection with Forest Road 2400050, to most of the Jack Creek riparian and meadow areas
Bald Hills	**Access eliminated** from Forest Road 2400011 to the north, between Forest Roads 2400865 and 2400013 **Access restricted** on Forest Road 2400013 (closure)

Alternative 4

In this alternative, vehicle access would remain for the entire length of the Snow Creek road (2400133). If tribal members desire to access this area, this alternative provides better access than Alternatives 2 or 3.

Cumulative Effects

Alternative 1

Aspen stands would be most negatively impacted by this alternative since no roads would be decommissioned to improve aspen recovery. Roads that currently access small drainages pass through 14 decadent aspen stands, impeding regeneration and stand recovery.

Alternatives 2, 3, 4 and 5

Aspen stands would recover more quickly because vehicle access would be eliminated through 14 existing aspen stands. When these roads are decommissioned, aspen regeneration should

improve because compaction would decrease and water distribution should improve to a larger area of the stand.

All Alternatives

Other Flagtail Fire Recovery Analyses (Categorical Exclusions)

Hardwood and Conifer Planting

There are plans to plant additional hardwoods in riparian areas during the 2004 field season. Planting and protection activities would improve vegetation recovery and develop larger distribution for hardwood shrub and trees by extending boundaries around existing, remnant aspen stands, planting hardwoods in riparian areas; planting conifers within riparian habitat conservation areas.

Cottonwood seedlings and cuttings from five species of willow have been planted in 2003 on 25 acres (6.3 miles) along Snow Creek, the Silvies River, and Jack Creek. Native conifers have also been planted on 380 acres of upland sites and riparian habitat conservation areas. Seed and planting materials planted and proposed for planting, were collected within this watershed to increase their numbers and develop young, healthy patches. Dogwood and willow seedlings produced from cuttings will be planted within riparian areas the spring of 2004.

Aspen Enhancement and Protection

Aspen would be fenced, competing conifers would be cut and could be removed, and fuels would be reduced to protect an estimated 240 to 250 acres, expanding the 76 acres of remnant stands that were identified during the 2002/2003 aspen inventory. These treatments would increase regeneration and allow clones to develop desirable structure and age classes, by excluding large animals until trees are large enough to be browsed.

Sensitive Plant Species

Desired Condition

Healthy, sustainable ecosystems provide for all life stages for threatened, endangered, and sensitive plant species. Uncommon plants are found in suitable habitat.

Survey Methodology

A review of the corporate database displayed locations of existing sensitive plant species (Malheur N.F.GIS, May 2003) These areas were monitored on September 25, 2002 to verify conditions and locate any additional species or habitat. Using a 1:12000 scale topographic map, surveyors identified additional potential habitat areas and surveyed Proposed Action (Alternative 2) project areas for suspected sensitive species in those locations.

Existing Condition

Monitoring surveys to determine effects of the burn on previously documented sensitive plants populations were completed September 25, 2002. These sites were relatively unburned. Three locations have been documented within the Flagtail Fire project boundary: two species of botrychiums (related to ferns), *Botrychium crenulatum* and *Botrychium minganese Victorin*, and *Carex interior* (sedge). *Botrychium minganese* and *Carex interior* are located within Snow Creek drainage and *Botrychium crenulatum* within the Jack Creek drainage. In some areas

burned trees fell across the riparian area or downed logs burned in place, but few plants in these locations were killed by the fire (Flagtail Sensitive Species Survey, September 25, 2002).

Additional surveys were completed July 2003 and covered proposed harvest units and roads proposed to be decommissioned by Alternative 2 (most harvest acreage and road construction alternative). No additional habitat was found within harvest units and no additional species were found adjacent to roads or near culverts that would be removed during decommissioning. The Bald Hills area was also surveyed during late spring and early summer, but no harsh site species or habitats were found. A biological evaluation documents these surveys, methodology, and findings.

Concerns for Sensitive Plant Species

Timber harvest, road work and use, log skidding, and other associated activities could affect habitat or plants. Specifically, road decommissioning, road construction, and felling hazard trees within riparian areas could harm habitat or plants.

Road construction (both system and temporary) were not included in the discussions because none exists within or near to potential habitat or known sensitive plant populations.

Units of Measure

- Roads decommissioned near existing populations or potential habitat
- Impact of felling hazard trees and treating fuel levels on sensitive species and potential habitat.

Effects of Proposed Management Activities to Sensitive Plant Species

Direct Effects Common To All Alternatives

There would be no effect on known sensitive plant species, *Botrychium crenulatum, Botrychium minganese Victorin*, and *Carex interior*, which have been documented in Jack and Snow Creek riparian areas because no activities are planned near these populations. Hazard trees may be felled within riparian areas, but the downed wood should protect sensitive species habitat by forming a barrier to animals that could eat or trample plants. Surveys have been completed for proposed activities described in Alternative 2. No additional sensitive plant species were located in appropriate habitat. A more detailed discussion is presented in the Biological Evaluation.

Effects That Differ Between Alternatives

Indirect

Alternative 1

This alternative would not improve habitat conditions for known sensitive species because it would not decommission any roads within riparian areas where botrychium and sedge species have been located. Water flow and distribution would not improve or expand to perhaps provide larger habitat for these species.

As designated hazard trees and other dead trees fall naturally within riparian areas, they would eventually provide physical barriers to protect sensitive plants or their habitat from animal trampling. However, fuel levels would not be reduced and future fire severity could damage habitat or plants.

Alternatives 2, 3, and 5
These alternatives would improve habitat conditions for sensitive plants. As part of the access management plan, these alternatives would decommission roads adjacent to the Jack Creek and Snow Creek riparian areas. Culverts would be removed as the Snow Creek road (2400133) is decommissioned near its junction with Forest Road 2400203. Two sensitive species, *Botrychium minganese* (related to ferns) and *Carex interior* (a sedge), are located above this area. By removing the culvert, water flow and distribution would improve and perhaps expand to perhaps provide larger habitat for these species.

Downed wood that remains after hazard trees are felled and fuels are treated, should enhance habitat by providing shade and would protect sensitive species habitat by providing physical protection. By treating areas with high fuel levels, fuel treatments would reduce future impacts and fire severity on riparian habitats and sensitive plant populations.

Alternative 4
This alternative would be slightly less effective than the other action alternatives in increasing riparian habitat for sensitive species. The only difference between this alternative and the other action alternatives is this alternative would not increase habitat for sensitive species within the Snow Creek drainage. This alternative would not decommission the upper portion of the Snow Creek road (2400133) and would not remove culverts to restore natural water drainage.

Cumulative Effects

Planting native species, placing large wood in draws, and fencing aspen areas would provide protection for riparian areas and might create habitat for sensitive plant species by improving habitat and watershed function.

Planting native species would restore native vegetation that is important to maintaining desirable site conditions for sensitive species by establishing plants that are adapted to local conditions and disturbances, and reduce the extent and distribution of exotic plant populations. Placing large wood in draws would improve soil productivity by holding soil in place until native plants could colonize. Some sensitive plants, such as *Thelypodium eucosmum,* grow in such localized areas where only spring moisture is available. Fencing aspen areas could also protect spring sources and increase potential habitat for riparian dependant species.

Consistency with Direction and Regulations

All alternatives are consistent with the Forest Plan and other direction with respect to botanical resources.

Invasive Species

Desired Condition

In the short-term, existing populations are regularly treated and monitored to prevent further spread. In the long-term, small populations of noxious weeds and non-native, invasive species grow in only in localized areas near major travel routes: Grant County Highway 63 and Forest Road 2400. Weeds are treated quickly to prevent further spread and restrictions to management activities, and control over permitted or public uses, prevents weeds and non-native species populations from expanding. By using native seed and planting native vegetation, non-native

plants species are uncommon in both riparian and upland areas, leaving diverse and healthy native plants to occupy their traditional habitats.

Survey Methodology

A search of the GIS database in 2002 displayed initial weed locations which were supplemented by field surveys in 2003. Survey personnel used "Weed List of Grant County" list to determine target species. Forest personnel surveyed the fire area in 2003 using a GIS generated map that displayed fire lines (hand and mechanical), roads used during suppression activities; constructed safety zone clearings, and landing sites. Surveys focusing on these areas where fire suppression activities could have deposited weed seed or reproductive parts.

Existing Condition

Noxious Weeds

The Flagtail Fire and fire suppression activities have created conditions favorable for establishment of noxious weeds. The fire burned an estimated 7,120 acres, and fire suppression activities created 29 miles of fire lines (hand and mechanical); used 54 miles of road; constructed safety zone clearings and landing sites (Technical Specialist's Report Burned Area Emergency Rehabilitation, 2002); opened closed roads, and drove cross-country (personal communication on 4/22/2003 with Eric Wunz, Flagtail Fire Resource Advisor).

Twenty- two weed locations have been documented, mapped, treated and monitored within or adjacent to the Flagtail Fire project area (Appendix I - Bear Valley Weed Locations). Survey personnel used "Weed List of Grant County" list to determine target species. Seven species of noxious weeds occur within or within two miles of the Flagtail Fire project area: dalmatian toadflax, yellow toadflax, diffuse knapweed, spotted knapweed, scotch thistle, tansy ragwort, and white top. Species of greatest concern are spotted knapweed, diffuse knapweed, dalmatian toadflax, and white top, because these weeds can spread quickly, crowding out native plants, and are difficult to eradicate once established.

The six noxious weeds sites documented within the Flagtail Fire Project Area did burn. These are located within 300 feet of roads. Another fifteen sites are present within 3 miles of the project area and could be transported into the area. For locations see the following table and Figure 20 in the Map Packet.

Table 2 - Flagtail Fire Area – Noxious Weed Site Locations Before the Fire

Weeds Within the Project Area			
Road Number	**Weed Species**	**Site Number**	**Acres**
2400	YELLOW TOADFLAX	0100184	0.10
6300	DIFFUSE KNAPWEED	0100404	0.11
	SPOTTED KNAPWEED	0100405	1.71
	YELLOW TOADFLAX	0100185	0.10
		0100186	0.35
		0100187	0.10
		TOTAL Acres Within Project Area	**2.5**
Weeds Outside the Project Area			
2100	DALMATIAN TOADFLAX	0100509	0.11
3100	SCOTCH THISTLE	0100069	0.10
	TANSY RAGWORT	0100034	0.10
6300	DALMATIAN TOADFLAX	0100090	0.10
		0100433	0.11
		0100435	0.10
		0100510	0.11
	WHITETOP	0100131	0.10
		0100133	0.11
	YELLOW TOADFLAX	0100180	0.10
		0100181	0.10
		0100182	0.10
2195205	DALMATIAN TOADFLAX	0100434	0.11
6300679	DALMATIAN TOADFLAX	0100432	0.16
3100348	DIFFUSE KNAPWEED	0100009	0.10
		0100016	0.10
		TOTAL Acres Outside Project Area	**1.7**

Source: Malheur N.F. GIS, May 2003

Another 45 weed sites have been identified within the fire boundary while inspecting firelines, helicopter landings, and other areas where soil disturbance could have deposited weed seed during the 2003 field season. Acres are occular estimates and a single site and acreage may contain more than one weed species. Five weed locations do not appear on the field map (660, 661, 680, 685, 686), but the acreages are contained within the spreadsheet database provided by the survey crew (K:\bmeco\fwb\botany\invasive_species\weeds\ BAER_2003_weed_monitoring.xls). Approximately 35% of the total weed acres within the project area burned with moderate to high severity. The remaining 65% burned at a low severity.

For most invasive species this means the plants probably were not killed and will probably resprout and produce seed or additional underground parts from which they will produce new plants. The species that will probably survive include dalmation toadflax, diffuse knapweed, field bindweed, and houndstongue. Canada thistle is the only species that might be eliminated if sites can be treated for the next few years.

Table 3 - Weeds within Treatment Units or Road Corridors

Common Weed Name	Road Corridor	Treatment Unit
Canada thistle (29.75 acres)		014
		130
	2195	011
	2400011	070
		075
	2400017	075
		077
		078
		110
	2400022	
	2400050	180
		182
	2400083	056
	2400086	
	2400131	120
		124
	2400134	
	2400136	114
		118
		120
	2400865	058
dalmation toadflax (0.9 acres)		014
	2195	011
	2400011	070
	2400017	075
		077
		078
		110
	2400083	056
	2400086	
	2400134	
	2400136	114
		120
	2400865	052
		058
	6300661	010
field bindweed (0.5 acres)	2195579	011
scotch thistle (0.3)	2400017	090
	2400067	
	2400865	052

Source: 2003 BAER Field Survey Weed Spreadsheet and Map

Table 4 - BAER Flagtail Weed Survey Acres

Weed	Acres
Canada thistle	29.75
dalmation toadflax	0.9
diffuse knapweed	0.1
field bindweed	0.5
houndstongue	21
scotch thistle	0.3
teasel	0.1
yellow toadflax	0.4
Total Acres	**53.05**

Source: 2003 BAER Field Survey Weed Spreadsheet

Other Introduced Species

Riparian grassland areas adjacent to the Silvies River and other smaller moist meadows are particularly affected by aggressive species such as Kentucky blue grass (*Poa pratensis*). This species has expanded into sites that once had native grass species, reducing native species distribution and patch sizes because blue grass is more resilient than natives to compaction and lowered water tables. In the drier upland areas, cheatgrass (*Bromus tectorum L.*) has increased

by being more successfully than native species at competing for moisture and by creating highly flammable conditions before native species can set seed, reducing the numbers and distribution of native bunchgrass species.

Concerns for Spread of Noxious Weeds

Activities that expose bare ground or areas where vehicle traffic occurs were used to assess the potential of spreading weeds. Acres affected by tractor yarding, grapple piling, and helicopter landings were chosen as indicators to evaluate effects, because off-road equipment use would disturb soil during harvest activities and could spread seed or reproductive plant parts stored in the soil. Roads are a significant source of seed and off-road equipment use has the potential to greatly increase weed spread to large areas. Planting conifers would ensure that ground cover is more quickly established and site conditions are not as favorable to noxious weeds.Flagtail Noxious weed Monitoring

Effects of Proposed Management Activities on the Spread of Noxious Weeds

Units of Measure

Activities that expose bare ground or areas where vehicle traffic occurs were used to assess the potential of spreading weeds. Acres affected by tractor yarding, grapple piling, and helicopter landings were chosen as indicators to evaluate effects, because off-road equipment use would disturb soil during harvest activities and could spread seed or reproductive plant parts stored in the soil. Roads are a significant source of seed and off-road equipment use has the potential to greatly increase weed spread to large areas. Planting conifers would ensure that ground cover is more quickly established and site conditions are not as favorable to noxious weedsMiles of open road in the subwatersheds and distribution

- Miles of open road within the fire boundary and distribution
- Acres of tractor yarding, grapple piling, landings constructed
- Miles of road construction
- Acres of reforestation

Acres affected by tractor yarding, grapple piling, and helicopter landings were chosen for indicators because off-road equipment would disturb soil during harvest activities, and could spread seed or reproductive plant parts stored in the soil. Roads are a significant source of seed and off-road equipment use has the potential to greatly increase weed spread to large areas. Planting conifers would ensure that ground cover is more quickly established and site conditions are not as favorable to noxious weeds.

The following table displays the impacts and percent change, if one exists, from Alternative 1 (No Action) or Alternative 2 (Proposed Action).

Table 5 - Comparison of Alternatives on Risk of Weed Spread

Activity	Unit of Measure	Alt. 1 (NA)	Alt. 2 (PA)	Alt. 3	Alt. 4	Alt. 5
Reforestation	Acres	0	4784	4784	4784	4784
Fuel Treatment - Grapple Pile	Acres	0	1250	1380 (+10.4%)	3000 (+240%)	1180 (- 6%)
Roads New Construction	Miles	0	0.3	0.3	0	0.3
New Temp. Roads	Miles	0	3.9	2.9 (-16%)	0	3.3 (- 15%)
Open Roads	Miles	46.5	29.2 (-37%)	29.2 (- 37%)	30.1 (- 35%)	29.2 (- 37%)
Decommissioned Roads	Miles	0	15.1	15.1(no change)	13.9 (- 8%)	15.1 (no change)
Salvage Harvest Tractor	Acres	0	4340	2870 (-34%)	0	3740 (-14%)
Landings (Outside Units)	Acres	0	7	3 (- 57%)		7 (no change)

Direct Effects

Alternative 1

There would be no risk that weed seeds would be spread by equipment, since harvest activities would not occur.

Alternatives 2, 3, 4, 5

Thirty known populations of weeds have been identified within the burn area: twenty-four within treatment areas.There is a chance that off-road equipment could further spread existing weed seed or plant parts that survived the fire below ground and cause additional populations to be established. The risk would be low that equipment would bring seed onto the site, since equipment operating off of roads would be required to be cleaned before entering National Forest lands (Mitigation Measures, Chapter 2).

Indirect and Cumulative Effects

Alternative 1

This alternative would promote the spread of noxious weeds by not reducing open road miles and vehicle access and not hastening the vegetation recovery of the area. Since roadways support the heaviest known populations of noxious weeds and pose the biggest threat for invasion (Upper Silvies Ecosystem Analysis at the Watershed Scale), by not decreasing vehicle access this alternative would have the greatest risk of vehicles spreading noxious weeds into the project area. Weed populations are present along major travel routes: Grant County Highway 63, Forest Road 2400. There are few areas within the project area that do not have vehicle access. Alternative 1 would also not plant conifers on any upland areas. The risk is high that weeds could establish within the project area because weeds could establish before native vegetation could occupy the site.

Alternatives 2, 3, and 5
There is a low risk that these alternatives would increase the spread of weeds because of the combination of project design elements, specific mitigation measures, plans for quick reforestation, and a strategic decrease in area accessible by motorized vehicles.

These alternatives would build a short length of classified road and nearly 4 miles of temporary road and create the most ground disturbance of any of the alternatives. The risk that weeds might spread and find favorable growing sites would be reduced by contract provisions that require off-road equipment to be cleaned before entering National Forest lands or before leaving a unit where species have been documented or found, and requiring seeding disturbed areas with a non-persistent, cereal grass mix (Mitigation Measures, Chapter 2). The contract specification to report and treat weeds lowers the risk substantially, since monitoring on the Blue Mountain Ranger District has shown early treatment successfully eliminates weeds (Bear Valley Ranger District Weed Treatment Log, Appendix I). By treating existing populations found during harvest activities weeds should not be able to spread, and by establishing ground cover quickly, conditions would be unfavorable for weed establishment and native plants could establish first.

The access management plan would reduce open road vehicle access by 13%, decommissioning 14 road miles and permanently reducing access along many small draws and riparian areas. Alternatives 2 and 3 would also decommission more than a mile of the Snow Creek road, an important riparian area, while Alternative 4 would not. By closing many short roads, all the action alternatives greatly reduce the potential surface area that weeds could colonize. The access travel management plan will reduce access to riparian areas and the Bald Hills, which are particularly vulnerable to weed invasion (Upper Silvies Ecosystem Analysis at the Watershed Scale).

Alternative 4
This alternative is less impacting on soil than activities in Alternatives 2, 3, or 5 because it does not construct additional roads or helicopter landings, and uses low ground pressure machinery to pile treated areas, which does not disturb the soil to the extent of tractor yarding (Environmental Consequences - Soil). The risk is low that Alternative 4 would disturbance soil enough to create favorable conditions for weed establishment.

Conifers would still be planted in the upland areas, and, with the exception of leaving Snow Creek vehicle access unchanged, the access management plan described for Alternatives 2 and 3 would be implemented.

Cumulative Effects

All Alternatives

Effects of Fire and Fire Suppression Activities
There is a risk that the fire itself may have stimulated undocumented weed populations and that weeds were transported into the project area by off-road equipment during suppression activities. These weeds could germinate and spread, but this risk would be reduced because the Forest has decided to monitor for noxious weeds on disturbed areas created by fire suppression activities over the next three years. These areas include hand and machine fire lines, constructed safety zones and landing sites, and roads (Technical Specialist's Report Burned Area Emergency Rehabilitation, 2002).

Effects of Reasonably Foreseeable Actions

Other Flagtail Fire Recovery Analyses

Other Flagtail Fire Recovery Projects are planned for the near future (Actions Outside of this EIS to Address Recovery Needs, Chapter 1). There are plans to fence aspen; plant hardwoods in riparian areas; treat fuels within riparian areas; plant conifers within riparian habitat conservation areas (RHCA), place woody debris in stream channels and draws, fell hazard trees; and create windrows to control erosion on the Bald Hills area.

These activities should not increase the spread of noxious weeds because activities are planned outside known weed locations, would not create ground disturbance by off-road equipment, or would create such limited and localized disturbance (scalping for planting spots) that existing seeds should not be able to colonize. These activities would also use the same precautions that apply to this analysis: to limit weeds spread, work would halt if weed species were seen until the population is identified, documented and mapped, and the need for treatment is determined or accomplished (contract provision CT 6.35 –Mitigation Measures, Chapter 2). Reforesting will reduce the risk that weeds could become established because planted conifers and hardwoods will provide future shade and compete with any germinating weed species.

Effects of Other Fire Recovery Decisions

Noxious Weed Monitoring and Treatment

The decision to monitor weeds within the fire area was made as part of the Flagtail Fire Burned Area Emergency Rehabilitation process. Monitoring will occur for three years, 2003 through 2005, to determine whether noxious weeds were introduced into the burned area by equipment or expanded from known locations. Monitoring activities will include walking fire lines, landings, and other areas where soil disturbance could have deposited weed seed. These actions should reduce the risk that weeds could spread or existing populations could enlarge.

Deferred Livestock Grazing

As another precaution, authorized livestock grazing will be deferred for at least 2 years in those allotments affected by the fire. This management strategy is important for both the short and long-term recovery of the area to assure that vegetation is re-established. This action should also reduce the risk of domestic livestock transporting seeds into the fire area and ensure that conditions in the future will not be as favorable for weed establishment.

Uncontrolled Grazing

Since the publication of the DEIS, there has been unauthorized use of the Swamp Grazing Unit within the fire boundary. While moving 359 pairs of cattle from the Flagtail Unit through the Swamp Unit (Flagtail Allottment) to private land, a portion of the herd went through damaged fences, moving into the burn area to the south. An estimated 25 cow/calf pairs trailed down Cold Creek (Forest Road 6300680), along Grant County Road 63, spent some time in the Bear Valley Work Center, and finally traveled to private land by moving uphill along Forest Road 2195. They were in the fire area for a week. I reviewed the Cold Creek area and Bear Valley Work Center areas on October 3, 2003 for conditions that might cause changes to my effects analysis.

Aside from the grass grazed in the Cold Creek riparian area, there were no noticeable changes in existing condition. I saw no browsing evidence on shrubs or aspen. The lack of cow manure in these areas suggests the cattle did not linger long in any spot.

The risk that cattle could have spread weed seed is low. The cattle may have traveled through one or two unburned weed populations along County Highway 63, however they may have affected a very limited portion of the burn area that had conditions favorable for weed development and didn't remain within the burn area for long. This potential effect could be lessened by monitoring for weeds within the Bear Valley Work Center and access roads, and along the traveled portion of County Road 63 and Forest Road 2195 over the next few years. Regular district weed monitoring efforts could include these areas in their program.

Blue Mountain District Noxious Weed Monitoring Program

The district treats identified weed sites and maintain a database to track treatment success. This cumulative effect of this program and the BAER weed monitoring will reduce the number of future weed sites and improve the recover of vegetation on a landscape scale.

Mitigation to Limit the Amount and Spread of Noxious Weeds

FP Standard – to implement a weed program to confine or prevent establishment of weeds in new areas (Std.188, IV – 45).

Given the existing documented and mapped noxious weed populations, the presence of nearby seed sources, the likelihood of seed that survived the burn, the use of "unclean" vehicles within the fire area, and the amount of disturbed soils during fire suppression, it is recommended that all disturbed sites be monitored for noxious weeds. Monitoring is proposed for 3 years to determine whether noxious weeds were introduced into the burned area and dozer lines or have expanded from known locations.

Mitigation: Design Criteria Common To All Action Proposals - Unwanted Vegetation Design Criteria

1. Off road equipment will be washed before entering Forest Service land, removing seed and plant parts to prevent invasive plants from moving onto the project area. Equipment will also be washed before moving from a treatment area with noxious weeds to another unit, unless the sale administrator waives this requirement.

   This requirement may be waived if there are no other weeds located within the unit or if the equipment does not operate when the plant has seed. In these cases there should be low risk that seeds would be spread by equipment.
2. Avoid parking, creating landings, and designating skid trails through, or within 10 feet of weed sites, to prevent spreading the plants to new areas.
3. When implementing vegetation treatments, ground disturbing activities will be avoided within documented weed and within 10 feet of locations, until the Forest Service can evaluate treatment and determine if preventive measures must be implemented before project activities begin.
4. Contractors will notify the sale inspector and Forest Service personnel will notify the project coordinator, at least two weeks before treatments are planned in treatment areas with weeds. This precaution will allow the Forest Service to remove the seed source to avoid spreading weeds to other locations. A list of units and weed species is located in the mitigation table in Chapter 2 of the FIES.

5. Contractors and Forest Service personnel will also notify the sale administrator or project inspector if unrecorded populations of "noxious weeds" are located to be sure the sites are recorded by the Forest Service. Forest Service personnel will notify the District Weed Coordinator when new locations are found. Equipment will avoid these areas until the Forest Service determines whether treatment is necessary.
6. Forest Service personnel, including project crews, project managers, and sale administrators, will coordinate with the District Noxious Weeds Coordinator to assure the planning, inventory, and implementation is documented.

Mitigation: Design Criteria Common To All Action Proposals - Unwanted Vegetation Design Criteria

If local[4], native seed is unavailable, use the following mix, unless a more appropriate of certified weed-free mix is available at the time of sowing:

Soft white winter wheat (*Triticum aestivum 'madsen' variety*) - at least 20 pounds per acre, and annual rye (Lolium perenne ssp. Multiflorum 'gulf' variety) at 4 to 4 ½ pounds per acre on disturbed soil areas to reduce erosion and to reduce the risk that weeds could colonize exposed soil. These species are cheap, have dependable germination, and frosts kill them after several years.

Sow seed in the fall when rain or snow will cause the seed to be retained on site and increase the chance for successful spring germination. Seed must be sown onto soil that has not formed a crust and, if necessary, will be scratched into the soil enough to keep the seed in place. If sub-soiling is done, seed after sub-soiling to keep the seed from being buried too low for good germination.

Monitoring

Noxious Weeds

General Information

Species Of Interest

As a minimum the following weeds known to occur on the Forest should be looked for, and others not on the list but considered noxious should be looked for as well:

Nineteen Oregon Department of Agriculture listed noxious weed species are known or suspected to occur on the Malheur National Forest:

Canada Thistle	Tarweed	Musk Thistle
Dalmatian Toadflax	Field Bindweed	Perennial Pepperweed
Diffuse Knapweed	Hound's-tongue	Poison Hemlock
Purple Loosestrife	Leafy Spurge	Tansy Ragwort
Scotch Broom	Spotted Knapweed	White Top
Scotch Thistle	St. Johnswort	Yellow Star Thistle
Yellow Toadflax	Sulfur Cinquefoil	

[4] Local means collected within the same subwatershed and elevation band as the project area.

Early treatment

If monitoring activities detect noxious weeds, the surveyors would fill out a Weed Location Form, and then remove the plants at that time by their roots, place them in a plastic bag, and dispose of them in an approved landfill. If large infestations are found that would take a more significant investment or resources and time to eradicate, the Forest Noxious Weed Coordinator will be consulted and the appropriate control actions will be planned. Pay particular attention to remove all roots on those species spreading through rhizomes and to avoid spreading seed from all species. Clothing of those performing treatment should be monitored to ensure they do not contain seed/vegetative material. NOTE: Extra care and handling must be done when treating poison hemlock to prevent ingestion, or exposure to poisonous plant material. Do not treat this plant until contact with Forest Noxious Weed Coordinator for direction on safe removal techniques and protection.

Recommended District Monitoring: Unwanted Vegetation Design Criteria

Crews and individuals should monitor for new weed populations within the Bear Valley Work Center and access roads, and along the traveled portion of County Road 63 and Forest Road 2195 to be sure no weeds were spread because of the unauthorized grazing in fall of 2003.

Erosion Control Seeding

Monitoring: Design Criteria Common To All Action Proposals – Persistence of non-native grass seed mix to control erosion and noxious weed establishment

> A sample of seeded areas, at different elevations and aspects, will be surveyed for 3 growing seasons after the seed has germinated to determine the duration of the plants and document whether these plants are suitable for continued use.

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