IV. THREATENED, ENDANGERED, AND SENSITIVE PLANTS

Introduction

The Endangered Species Act (ESA), as amended (16 U.S.C. 1536(c), 50 CFR 402), requires that the Forest Service conserve endangered and threatened species of plants and animals. In accordance with Section 7(c) of the Act, the U.S. Fish and Wildlife Service (USFWS) has determined that the following threatened or endangered listed species (USDI Fish and Wildlife Service 2008) may be present on the Flathead National Forest:

- Water howellia (*Howellia aquatilis*)
- Spalding's catchfly (*Silene spaldingii*)

In addition to plants protected under the ESA, the Forest Service also identifies species for which population viability is a concern, these are termed sensitive species, and are designated by the Regional Forester (FSM 2670.44). Currently, 52 plant species are designated as sensitive on the Flathead National Forest (TES Plants section, Project File). Forest Service policy requires that activities conducted on NFS lands be reviewed for possible impacts to threatened, endangered, or sensitive (TES) species (FSM 2670.32). The Forest Service has no jurisdiction to protect habitat of sensitive plant species on private lands.

Analysis Area

The analysis area for the Firefighter Project is based on the area of the project's influence and impacts on known occurrences of, or potential habitat for, federally threatened and endangered plants, and Regional Forester's sensitive plants.

Spatial Bounds

The spatial bounds of the threatened and sensitive species analysis area are the extent of the Firefighter Project area where proposed vegetation treatments and all associated project activity would occur (Biological Assessment, TES Plants section of the Project File).

Temporal Bounds

The temporal bounds would be up to 50 years following project implementation. After project activities, it would take approximately 10-50 years to return to a closed overstory condition. Native overstory and understory cover conditions would probably then exist to shade out potentially occurring shade intolerant noxious weeds that may have established following project activities. During this recovery time, opening of the canopy and increased soil disturbance from treatments would increase the potential for weed establishment, possibly resulting in competition with known or potentially occurring sensitive plant species. Shade tolerant weeds may persist indefinitely even after the canopy closes. It is expected that after a 50-year period, the rate of new infestations due to the disturbance would be at a minimum. Effects of proposed timber

harvesting and haul route use to threatened, sensitive, and rate plant habitat is expected to be stable after 50 years.

Information Sources

Data sources used for this analysis include the Montana Natural Heritage Program's Element Occurrence Database (Montana Natural Heritage Program 2008), the Flathead National Forest's Threatened, Endangered, and Sensitive Species Survey Atlas, the Flathead National Forest's TES Plant Location Database, and the USFWS threatened, endangered, and candidate species list for the Flathead National Forest (USFWS 2008). These databases include data collected from field surveys conducted by the Forest Botanist, trained technicians, and other botanists contributing surveys and element occurrences to the Montana Natural Heritage Program (MNHP). All other sources of information are cited in the text.

Affected Environment/Existing Condition

Occurrences of Threatened and Sensitive Plants

Threatened Species

Water Howellia *(Howellia aquatilis)*

In Montana, water howellia is only known to occur in the Swan Valley, approximately 65 miles to the south of the project area. There are no known occurrences or potential habitat within the project area or on the Hungry Horse Ranger District. Aerial photo interpretation locating ponds, old oxbows, and other wet areas of potential habitat have been determined unsuitable habitat and/or past surveys did not locate occurrences. Water howellia is excluded from further discussion in this document due to the lack of occurrences and potential habitat within or near the project area.

Spalding's Catchfly *(Silene spaldingii)*

In 2000, aerial photos of the entire Flathead National Forest were reviewed by Maria Mantas (Flathead National Forest Botanist at the time) to locate large expanses of grassland with potential habitat for Spalding's catchfly. Grassland openings were delineated from aerial photos in areas along the North Fork Flathead River floodplain from the Canadian border to Polebridge and at Danaher, Horse Hill, and Bar Creek Meadows within the Bob Marshall Wilderness. Spalding's catchfly was not located during focused surveys for this species in the above areas. These grassland habitats were determined to be unsuitable (too high in elevation) for Spalding's catchfly.

Additional potential grassland areas were located on aerial photos within the Hog Heaven Range (Swan Island Unit of the Swan Lake Ranger District) and the south slopes near Ashley Lake on the Tally Lake Ranger District. Surveys specifically targeting Spalding's catchfly were conducted in 2006 within these potential grassland areas in the Swan and Tally Lake Ranger Districts; no new occurrences or suitable habitats were located during these surveys.

There are no known occurrences of Spalding's catchfly within the project area, Hungry Horse Ranger District, or within the Flathead National Forest, based on MNHP database and Flathead National Forest sensitive plants database. Spalding's catchfly is excluded from further discussion in this document due to the lack of occurrences and potential habitat within or near the project area.

Regional Forester's Sensitive Plants

A habitat suitability analysis was conducted to evaluate the potential for sensitive plant to occur within the project area. Sensitive plants species are grouped in thirteen habitat guilds (TES Plants section, Project File). For each proposed unit surveyed, known vegetation types, aerial photos, elevation ranges, and field surveys of the action area were considered in evaluating potential habitat for sensitive plants. Aerial photos (2005) were used to assist in targeting potential sensitive plant areas discernable from the photos (e.g., wetlands). Surveys are conducted by walking through units and searching based on knowledge of potential habitat for sensitive plants and aerial photo interpretation. Surveys attempt to visit the varying habitat types and aspects for each unit. Where the surveyor considered habitat potential high, more time was spent searching for sensitive plants in that area; less time was spent in areas with less potential for sensitive plants. A complete species list of plants encountered was assembled for each area surveyed. All surveyors (botanists and biological technicians) are trained and tested in the identification of Flathead National Forest sensitive plants, their habitats, and habitat associations. Alternative 2 treatment acres were evaluated for sensitive species habitats and surveyed for TES species in 2007 and 2008.

Approximately 633 of the 749 Alternative 2 treatment acres were evaluated for sensitive species habitat and surveyed for TES species in 2007 by Botanist and Biological Technicians. The remainder of the proposed treatment acres was surveyed in the summer 2008.

Special habitats were mapped (wetlands, seeps, etc) during surveys (TES Plants section, Project File). Design criteria would avoid wetlands with all ground disturbing activities, including lakes, ponds, marshes, fens, and streams with the use of Riparian Habitat Conservation Areas (RHCA) delineation buffers. Refer to the Fisheries section of this document for more information on RHCAs.

Historic & Existing Condition

Vegetation and Landform

Glaciation has been the primary land forming process that has shaped the Firefighter Project area. Alpine glaciers moved down the large drainages and coalesced in the valley bottoms. Glaciers overtopped the relatively low Firefighter Mountain and surrounding ridges, creating their rounded shape. Slopes are generally gentle (<45%), with some steeper, glaciated breaklands. Elevation in the project area ranges from about 3,600 feet at Hungry Horse Reservoir, to about 5,600 feet at the top of Firefighter Mountain. The glaciers retreated about 10,000 years ago. Volcanic eruptions about 6,600 years ago set down a layer of volcanic ash across the area, averaging 7-inches thick.

The majority of the Firefighter Project area is glacial moraine landtypes. Soils were formed in glacial till deposits, sandy to loamy with a volcanic ash influence; these are generally high-productivity soils. The cool, moist subalpine fir forest habitat types dominate, and slopes are usually between 20-50%. Most of the proposed treatment units fall within this landtype.

Steep glaciated breaklands comprise the majority of the rest of the project area. These areas are a mix of glacial-till and residual soils, typically of low to moderate productivity, and are dominated by the subalpine fir habitat types with some inclusions of Douglas-fir types. These lands have >45% slopes, a minor portion of the proposed treatment units fall within this landtype. The remaining acres of the project area are a mix of different landtypes, including steep glaciated alpine basins and ridges composed of residual soils, rock lands, mass failures, and glacial outwash/stream terraces.

The Firefighter Project area is comprised of a few consistent vegetation communities, including the plant composition of coniferous forests, wetlands, and grasslands. In the coniferous forests, which make up much of the project action area, lodgepole pine (*Pinus contorta*) is abundant, with larch (*Larix occidentalis*) and Douglas-fir (*Pseudotsuga menziesii*) in the overstory. The understory is mainly dominated by huckleberry (*Vaccinium membranaceum*), twinflower (*Linnaea borealis*), beargrass (*Xerophyllum tenax*), pipsissewa (*Chimaphila umbellata*), pinegrass (*Calamagrostis rubescens*), and arnica (*Arnica cordifolia*). The wetlands in the project area are of four types: marshes, fens, riparian, and forested wetlands. The marshes and fens are dominated by sedges (*Carex spp.*) and bryophytes, and are ringed with alder (*Alnus spp.*), buckthorn (*Rhamnus alnifolia*), and dogwood (*Cornus sericea*). Riparian areas and forested wetlands commonly have an overstory of spruce (*Picea engelmannii*), subalpine fir (*Abies lasiocarpa*), and paper birch (*Betula papyrifera*). The understory and shrub layer is comprised of alder (*Alnus spp.*), green false hellebore (*Veratrum viride*), lady fern (*Athyrium filix-femina*), devil's club (*Oplopanax horridus*), and arrowleaf ragwort (*Senecio triangularis*). Thin-soiled grassy openings commonly have alumroot (*Heuchera cylindrica*), nineleaf biscuitroot (*Lomatium triternatum*), stonecrop (*Sedum spp.*), penstemon (*Penstemon spp.*), and mariposa lily (*Calochortus apiculatus*).

Regional Forester's Sensitive Plants

Little is known about the historical condition for TES plants in the Firefighter project area and on the Hungry Horse Ranger District. Botanical surveys that may have detected sensitive plants were not initiated in the area before the onset of the Forest's Botany Program in 1991. Based on the information sources and surveys listed above there are three sensitive plants known in the project area (within about 5 miles of project boundary) (Table 3-11). There are no sensitive plants located within any proposed treatment unit. One sensitive plant occurrence of pod grass (*Scheuchzeria palustris)* (Element Occurrence (EO) Number in the MNHP database to be decided (TBD)), occurs adjacent to Units 7 and 8 (TES Plants section, Project File); vegetation treatments or other activities would not occur within 300 ft of this population.

Table 3-11. Regional Forester's Sensitive Plants in the Project Area

Species	EO#[2]	Habitat Guilds[1]												
		AV	F	W	R	MCT	MC	MMC	GO	MS	CRS	S	A	D
Drosera anglica	1	--	X	--	--	--	--	--	--	--	--	--	--	--
Ophioglossum pustillum	13	--	X	X	--	--	--	--	--	--	--	--	--	--
Scheuchzeria palustris	TBD, 12, 13	--	X	X	--	--	--	--	--	--	--	--	--	--

[1] AV=Aquatic and vernal pools; F=Fens and fen margins; W=Marshes, seeps, springs, and wet meadows; R=Riparian; MCT= Vernally moist cliffs or mossy talus; MC= Mid-elevation moist coniferous forests; MMC=Margins of moist coniferous forests; GO=Dry grasslands & openings in ponderosa pine and dry Douglas-fir forests; MS=Mid-montane/subalpine grass/forb; CRS=Canyon walls, crevices, rock outcrops and slides S=Subalpine forests; A=Alpine; D= Disturbed areas
[2] EO# = Element Occurrence number in the Montana Natural Heritage Program database

Sensitive Species Occurring within the Project Area

Pod grass is a grass-like perennial herb in the Scheuchzeriaceae family, and has stems 2-4 dm high that arise singly from creeping rhizomes. Pod grass is globally ranked as G5 and state ranked as S2 by NatureServe (2008). It occurs throughout Canada and into the western and northern United States; in Montana, pod grass has been found in Flathead, Granite, Lake, Lincoln, and Missoula Counties (MNHP 2008). Pod grass is on the periphery of its range in Montana with 32 known occurrences in the state; 16 of which are on the Flathead National Forest. Refer to Botany Report in the Project File for more information.

Pod grass is found in the following habitat guilds: fens and fen margins; and marshes, seeps, springs, and wet meadows. Pod grass grows in wet, organic soil of fens in the valley and montane zones, usually associated with sphagnum moss, and from 2,660 to 6,890 feet elevation (MNHP 2008). The population located near Unit 7 is in a wetland with saturated soils and consists of approximately 100 individual plants. Potential threats to pod grass plants or populations include development and recreation, change in water quality of habitat, and nearby logging, siltation, nutrient loading, and eutrophication.

Potential Occurrences

Based on the information sources and surveys listed above, the project area contains habitat types for sensitive plants associated with 11 of the 13 of the habitat guilds listed in the TES Plants section of the Project File. The 11 habitat guilds contained in the project area include the following: aquatic and vernal pools; vernally moist cliffs or vernally moist talus slopes; margins of moist coniferous forest; marshes, seeps, springs and wet meadows; mid-montane/subalpine grass/forb; riparian associates; fens and fen margins; canyon walls, crevices, rock outcrops and slides; disturbed areas; mid-elevation moist coniferous forests; dry grasslands and openings in ponderosa pine and dry Douglas-fir forests. Habitat guilds are used to group sensitive plants into habitat areas where the species would likely be found.

Environmental Consequences

This section describes the direct, indirect, and cumulative effects of the proposed project activities on sensitive plants. To focus the analysis and describe relevant effects, the following effects indicators were used:

- Habitat types suitable for sensitive plants
- Known populations
- Acres treated

Alternative 1 (No-Action Alternative)

Direct and Indirect Effects

This alternative proposes no ground-disturbing activity; therefore, there would be no direct effects on any threatened or sensitive plant species or their habitats. The response of each of the sensitive plant species to management activity varies by species, and in some cases, is not fully known. Local native vegetation has evolved with and adapted to the climate, soils, and natural disturbances (e.g. fire, insect and disease infestations, and windthrow) in the project area. Any management or lack of management that causes these natural processes to be altered may have impacts on native vegetation, including threatened and sensitive plants. Indirect effects would depend on natural disturbances.

The No-Action Alternative would not increase the potential for establishment and spread of new noxious weed occurrences. There would be no harvest or associated ground disturbing activities that would disturb forest habitats and favor the spread or introduction of noxious weeds capable of impacting sensitive plant populations and habitat. Weed establishment and spread facilitated by ground disturbance and vehicle traffic in and out of the analysis area would not occur under the No-Action Alternative. In addition, the potential for weed invasion and competition for nutrients and light with sensitive plant populations and native vegetation would not occur with the No-Action Alternative.

Disturbance regime sensitive plants, such as Howell's gumweed and some moonworts, occasionally establish along roadsides. These species can be opportunistic along artificially created roadside habitats. The No-Action Alternative would not crease roadside habitat for this opportunistic establishment. However, these occurrences are not considered representative of the natural disturbance habitats such as grasslands or rocky outcrops that these sensitive plants more commonly occupy. Conservation of these low quality roadside sensitive plant occurrences/habitats are secondary to those occurring in natural habitats. Disturbance regimes sensitive plants are often rare due to the lack of habitats. An opportunistic roadside sensitive plant occurrence does not replace the habitat it represents.

Cumulative Effects

Past, present, and foreseeable actions within the Firefighter Project area include timber harvesting, wildfire and fire suppression, prescribed fire and underburning, noxious weed control, road construction and maintenance, recreation, and forest product gathering. These

actions may have historically affected threatened plants and Regional Forester's sensitive plants, and may continue to have effects (see Action Alternatives Cumulative Effects). It is unlikely that the No-Action Alternative would cumulatively contribute to a decrease in threatened or sensitive plant populations or habitat.

Alternatives 2 & 3 (Action Alternatives)

Direct and Indirect Effects (Sensitive Plants)

There are no known sensitive plants located within or immediately adjacent to the proposed vegetation treatment areas or affected roads, so no direct or indirect effects to known populations are expected. The population of pod grass (*Scheuchzeria palustris*) located near Unit 7 would be buffered for 300 feet, so no direct effects would occur. If sensitive plants were to be found during these any phase of project activities, a standard clause in the timber sale contract would ensure that they would be evaluated and protected as necessary (Design Criteria – Ch. 2).

The eleven habitat groups (TES Plants section, Project File) found in the Firefighter Project area were previously listed is this report under Regional Forester's Sensitive Plants – Potential Occurrences. Due to the lack of habitat, there are no direct or indirect effects for plants associated with alpine or subalpine habitats. For potentially occurring sensitive plants, (TES Plants section, Project File) the extent of direct and indirect effects for undetected occurrences is speculative due to lack of known locations. Undetected occurrences may experience direct and indirect effects from vegetation treatments and roadwork. Potential effects include mechanical compaction, noxious weed competition/displacement, roadside dusting, hydrologic alteration due to treatment activities, and degradation of habitat. Undetected annual plants disturbed before seed set may experience decreased viability in subsequent years, due to a reduction of the seed bank. Perennial plants may experience ground disturbance to rootstocks (rhizomes, taproots, and bulbs), potentially inhibiting the plants ability to re-sprout from rootstock.

Timber harvesting and road construction may alter the hydrologic processes for sensitive plants of wetland-associated habitat groups (TES Plants section, Project File) including mid-elevation moist coniferous forests. Changes to the hydrologic processes in wetlands may result in both a decrease and increase of wetland water levels. Timber harvesting and road construction often decreases canopy cover and in consequence may decrease evapo-transpiration rates. Potential occurrences of plants associated with aquatic and vernal pools; marshes, seeps, springs and wet meadows; riparian areas; and fens and fen margins habitats would be avoided with the use of Riparian Habitat Conservation Areas (RHCA) delineation buffers (see Fisheries section for more information on RHCAs).

For non-wetland associated sensitive plants, timber harvesting often increases the amount of light reaching the understory. This may be a beneficial effect for some rare or sensitive plants, but may have adverse effects for other rare plants requiring greater canopy cover (e.g. clustered lady's-slipper). In many cases, timber harvest creates stand changes similar to naturally occurring fires; however, the pattern and distribution of forest size classes has drastically shifted from patterns that were created under natural disturbance regimes. Today, forest stands are far more fragmented in the landscape in reference to forest structure and size class. Fragmentation

may limit recruitment of new populations into disturbed areas, and may alter patterns of seed dispersal, seed predation, germination rates, and survivorship of young plants (Jules 1998).

Timber harvest, excluding winter harvesting, may affect non-wetland sensitive plants and habitat by creating unfavorable conditions for establishment and persistence, at least in the short-term. Soil compaction may occur, which can alter current and future success of understory plants due to mortality, reduction in future recruitment, changes in soil moisture, and changes in mycorrhizal associations. Physical disturbance of the understory community may eliminate species from the stand that are disturbance intolerant, particularly plants which have shown little tolerance for logging disturbance. The temporal recovery of individual plants after disturbance is species-specific, and may depend on factors of the disturbance and effects to the microsite, tolerance of the species to disturbance, and presence of regenerative methods of survival (i.e. rhizomes, taproots, bulbs, and corms). Frequent and intense disturbance may favor ruderal species (a plant species that is first to colonize disturbed lands), and cause a decline of forest understory species that have low dispersal rates (Halpern and Spies 1995). Conversely, stands allowed to mature without additional disturbance may favor recovery of all but the most disturbance-intolerant species.

Timber harvesting opens up the canopy and creates new substrate for noxious weed colonization where propagules are present. Noxious weeds can have detrimental effects to the plant community altering its composition and function (Thorpe, et al. 2006, Yurkonis, et al. 2005). Weed invasion and expansion has been observed in areas of past timber management projects. Spread of noxious weeds would have the greatest potential for indirect effects on potentially occurring sensitive plant populations within the project boundary. Yellow and orange hawkweeds are commonly found within the Firefighter Project area. These aggressive noxious weed species have a high potential to invade habitat and persist (see Noxious Weeds section). Equipment associated with this project would be washed prior to entry on the national forest to reduce the introduction of weeds into the disturbed area. In addition, other project design criteria to minimize spread of noxious weeds may mitigate this potential impact (Design Criteria section of Chapter 2 in this document).

Although no known TES plants are located on roads proposed for decommissioning, there would be the possibility that undetected sites could be affected by ground disturbing actions during decommissioning.

Cumulative Effects (Sensitive Plants)

Because little is known about the condition of sensitive plants in the Hungry Horse Ranger District before the initiation of the FNF Botany Program in 1991, cumulative effects from past activities are described in general and are speculative for potentially occurring plants within the project area. The cumulative effects analysis below describes the potential impacts of past, present, and future activities for all potentially occurring plants, undetected in the past, present, and future.

Past, present, and reasonably foreseeable actions that may have affected sensitive plants and may continue to have effects include noxious weed control, wildfire and fire suppression,

underburning and prescribed fire, reservoir and dam building, stream restoration, recreation and forest product gathering, and road and timber management. Refer to Cumulative Effects Worksheet in the TES Section of the Project File, and Table 3-1 in this Environmental Assessment for an accounting of past, present, and reasonably foreseeable activities in the project area.

Road Construction and Management

Past, present, and future management of the roads would have both adverse and potentially positive (for a few disturbance-associated species) cumulative effects on documented and potentially occurring roadside sensitive plant populations. Roadside disturbance from maintenance activities may benefit sensitive species with a competitive edge in disturbed environments, although these populations may be temporarily adversely affected until new seedlings establish in the openings. Maintenance of roads may increase traffic along these roads and thus increase potential for disturbance of plant populations adjacent to roads.

Previous road construction may have affected sensitive plants and habitat. Potential effects of road construction include compaction, destruction of habitat or populations, and the degradation of habitat suitability due to changes in hydrology and the introduction of noxious weeds. Road construction and maintenance may affect wetland habitats. Increased siltation may result in shifts in the wetland vegetation composition, supporting emergent vegetation in place of submergent vegetation types (USDI 1996). Timber harvesting and development may also contribute to these same effects to wetland plants. Past and future road closures and road decommissioning would potentially have short-term effects to known and potentially occurring sensitive plants growing near and on these roads. However, closure and decommissioning of roads would reduce impacts overall.

Timber Management

The direct and indirect effects of timber management on sensitive plants and habitat were discussed in detail above. Potential effects include mechanical compaction, noxious weed competition/displacement, roadside dusting, hydrologic alteration due to treatment activities, and degradation of habitat. Approximately 5,154 acres, about one-third of the Firefighter Project area, have been harvested. This level of timber management may have potentially affected the habitat or occurrences of sensitive plants. The Firefighter Project in addition to the past and future timber management projects on federal and non-federal land contribute cumulatively to the effects on sensitive plants and their habitat.

Recreation and Forest Product Gathering

Trails and other areas frequented by recreationists and forest product gatherers may contribute minimally to the cumulative effects to sensitive plants. Trail construction/maintenance near wetlands may affect sensitive wetland plants by increased siltation into wetlands or the dispersal of noxious weed seeds from human vectors; however, most recreationists are reluctant to tread in the mucky waters of wetlands. Non-wetland plants may experience cumulative effects of

trampling, weed introduction, and collecting from dispersed recreation and forest product gathering.

Noxious Weed Control

Sensitive plants adjacent to areas of chemical weed control may be at risk of exposure to chemicals used in weed control. However, on the Flathead National Forest, sensitive plant surveys are conducted for each site (not previously treated) before any chemical control treatments, as required by the Flathead National Forest Noxious Weed and Invasive Weed Control Decision Notice and Finding of No Significant Impact (USDA Forest Service 2001a). Known populations would be protected from herbicide. With the exception of some sensitive plants that occur in disturbed environments, rare plants do not persist with noxious weeds due to differing habitat requirements. Noxious weed control may prevent degradation of sensitive plant habitat and therefore may have a positive cumulative effect.

Reservoir and Dam Construction

The construction of the Hungry Horse Dam and Reservoir may have affected sensitive plants by loss of habitat and destruction of populations.

Stream Restoration and Culvert Removal

Stream restoration and culvert removal may increase the potential for noxious weed colonization and persistence due to ground disturbance. This may have effects to riparian sensitive plant habitat, although the scope compared to large-scale disturbance is minimal.

Wildland Fire and Fire Suppression

Fire suppression has created a denser understory condition in many un-harvested stands where historically, low-intensity understory fires occurred regularly. The fires that have been eliminated from the understory played a role in reducing fuels and encroaching vegetation (USDA Forest Service 1998). Fire suppression resulting in closed-canopy stands may have effects of reduced light levels to sensitive plants in the understory.

Fire creates conditions favorable for noxious weed establishment where propagules exist for colonization. In addition, suppression activities disturbed soils (dozer lines and other staging areas) and created additional areas for weed establishment.

Underburning and Prescribed Fire

Prescribed fire and underburning may typically have short-term direct effects to potentially occurring sensitive plants from direct burn over. Undetected annual plants disturbed prior to seed set may experience decrease population viability in subsequent years, due to a reduction of the seed bank. Perennial plants may experience ground disturbance to rootstocks (rhizomes, taproots, and bulbs), potentially inhibiting the plants ability to re-sprout from rootstock. However, prescribed fires are typically low-intensity fires, and many sensitive species evolved

with and are tolerant to fire; therefore, minimal cumulative effects are expected with past, current, and future prescribed fire.

Conclusion

Neither Alternative 2 or 3 would be expected to have direct, indirect, or cumulative effects on any known occurrences of sensitive plants, due to the lack of known occurrences in or immediately adjacent to ground disturbing project activities. The direct and indirect effects of this project are expected to contribute minimally to the total effects from past, present, and foreseeable actions. The Forest Botanist has determined that the proposed Firefighter Project "may affect individuals and habitat, but will not likely contribute to a trend towards federal listing" (Biological Evaluation, TES Plants section of the Project File).

Additionally, the Forest Botanist has determined the Firefighter Project would have "no effect" on Water howellia or Spalding's catchfly, its habitat, or potential habitat for these species. This determination was based on the lack of known occurrence within the project area and the lack of suitable habitat within the action area. Refer to the Biological Assessment (TES Plants section) in the Project File for more information.

Regulatory Framework and Consistency

Threatened or endangered status affords a species and its habitat special protection from adverse effects resulting from federally authorized or funded projects. It is the responsibility of the Forest Service to design activities that contribute to the recovery of listed species in accordance with recovery plans developed as directed by the Endangered Species Act (ESA) (50 CFR part 402). The Flathead National Forest's Amendment 20 to the Land and Resource Management Plan (LRMP) provides for conservation measures to ensure the protection of water howellia. Amendment 21 to the LRMP has a goal to "provide sufficient habitat to promote the recovery of threatened and endangered species and conserve the ecosystems upon which they depend."

Federal laws and direction applicable to sensitive species include the National Forest Management Act of 1976 and Forest Service Manual 2670. Amendment 21 to the Forest Plan has standards to conduct analyses to review programs and activities, to determine their potential effect on sensitive species, and to prepare a Biological Evaluation. It also states, "*adverse impacts to sensitive species or their habitats should be avoided. If impacts cannot be avoided, the significance of potential adverse effects on the population or its habitat within the area of concern and on the species as a whole will be analyzed. Project decisions will not result in loss of species viability or create significant trends towards federal listing."* Future conservation strategies for each species would present direction on maintaining habitat diversity and managing for population viability, as required by the NFMA and Forest Plan Amendment 21. The Forest Service is bound by Federal statutes (ESA, NFMA Act), regulations (USDA 9500-4), and agency policy (FSM 2670) to conserve biological diversity on NFS lands. A goal in Forest Plan Amendment 21 is to "*ensure that Forest Service actions do not contribute to the loss of viability of native species*."

All Action Alternatives described in the Firefighter Project EA would meet the direction of Forest Service Manual 2670.3 (sensitive plant species) and would be consistent with the Forest Plan direction for sensitive plants. In addition, all activities are in compliance with ESA and Flathead National Forest LRMP Amendments 20 and 21, with respect to federally listed plants.

The activities associated with the Action Alternatives *may affect individuals, but is not likely to result in a trend toward Federal listing or loss of viability* for potentially occurring sensitive plant species and proposed plant species listed in the Botany section of the Project File. This is based on the 1) presence of suitable habitat for potentially occurring sensitive plants within the project area; 2) the potential for indirect effects of noxious weed competition; and 3) the delineation of new occurrences located prior to project implementation.

V. NOXIOUS WEEDS

Introduction

Invasive, non-native plants species can inhabit and negatively alter native plant communities. A number of invasive species are recognized as noxious, meaning laws have been developed to restrict their spread and effect on the environment. Dry vegetation types and areas affected by road development, grazing, logging, fire, or other disturbances are most susceptible to weed invasion. Typically, invasive species have the ability to spread rapidly and reproduce in high numbers, which enables them to effectively crowd out native plant populations. Some can pose serious threats to the composition, structure, and function of native plant communities. Field observations and road surveys indicate invasive plant populations are established, and have a high potential to spread, within the Firefighter Project area.

Analysis Area

Spatial Bounds

The spatial bounds of the Firefighter Project noxious weeds analysis area is based on the area of the project's influence on the potential introduction and spread of noxious weeds within the project area. Because ground disturbance increases the potential for weed establishment and spread, the analysis area includes all treatment units and road systems with activity related to this proposed project.

Temporal Bounds

The temporal bounds are up to 50 years after the decision is signed. Following project implementation, vegetation conditions would take approximately 10 to 50 years to return to closed overstory conditions. At that point, overstory and understory tree and shrub canopy cover conditions would exist to shade out and compete with potentially occurring shade intolerant noxious weeds that established after the proposed activities. During this recovery time, ground activities, opening of the canopy, and increased soil disturbance from treatments would increase the potential for weed establishment. Shade tolerant weeds (such as hawkweed) may persist indefinitely even after the canopy closes. It is unknown, but expected, that after a 50-year period, the rate of new infestations due to the disturbance would be at a minimum; therefore, the temporal bounds considering both shade tolerant and intolerant weed species is up to 50 years.

Information Sources

The Montana State noxious weed list was consulted and invasive species of concern were identified. In addition, a recent weed risk assessment project in the Northern Region of the USDA Forest Service (USDA Forest Service 2003) identified additional species that pose a threat to native vegetation. Noxious weed surveys have been conducted within the project area as part of this and other projects on the forest. A summary of the current noxious weed inventory for the project area is found in Table 3-12.

Weed inventories are documented in a USDA Forest Service national weeds database called the Natural Resource Inventory System (NRIS) Invasive Plants Database. Population of database began in 2005. Weed inventories from the 2007 and 2008 field season have been entered into the database. A summary is available in the existing conditions section and copies of the survey forms are found in the Noxious Weeds section of the Project File.

This assessment of non-native and noxious weeds incorporates by reference the Flathead National Forest's Noxious and Invasive Weed Control (NIWC) Decision Notice (USDA Forest Service 2001b) and Environmental Assessment (USDA Forest Service 2001a) of March 2001. The objective of the Forest-wide project is to implement an adaptive integrated pest management strategy to control and reduce the presence of noxious and invasive weeds on NFS lands.

Affected Environment/Existing Condition

Historic Condition

In the late 1800s, exotic plant species rapidly became established in North America due to the introduction of species for agricultural and experimental purposes. This introduction rate dropped in the mid-1900s because of the depression, wars, and decreased travel abroad. A dramatic increase in global travel and trade introduced many more species, and they are rapidly expanding via aerial distribution. Some of these species are growing at an exponential rate. Locally, establishment and rate of spread may have been influenced by timber harvest, road building, and to some degree grazing; all vectors for the spread of weeds. Most of these activities began in the 1960s on the Flathead National Forest. Most roadless areas remain relatively weed free because of healthy undisturbed native plant communities where few vectors exist for the spread of weeds.

The Flathead National Forest has been less affected than many other public lands because most invaders are best adapted to grasslands, shrub lands, and warmer/drier forest types than exist here. Regardless, exotics have significantly altered species composition locally. Areas of high risk, severely impacted by noxious invaders adapted to our climate, do occur, and have altered native plant communities.

Existing Condition

In the project area, there is a concern that invasive plants may spread into treatment areas and undisturbed native habitats, especially where susceptible conditions exist. Weed invasion and expansion has been observed in areas where there have been timber management projects. Noxious weeds may alter organic matter distribution and nutrient flux such as spotted knapweed's greater ability to uptake phosphorus over some native species in grasslands (Thorpe, et al. 2006). In addition, noxious weeds may influence species richness and displace of resident species by reducing native seedling establishment (Yurkonis, et al. 2005).

Invasive species considered for this analysis are those listed as noxious by the State of Montana, and other exotic species determined to be highly invasive; they are displayed below in Table 3-12. Of the 1,062 vascular plant species known on the Flathead National Forest, about 110 are

classified as exotic; of these, over 42 species are classified as invasive. Within the project and adjacent areas, 8 noxious weed species and 2 undesirable weed species of concern have been observed (Table 3-12).

Table 3-12. Noxious Weed Species of Concern – Firefighter Project Vicinity

Scientific Name[a]	Common Name	Currently in Project Area	Potential Invader
Category 1 – Widespread Established Noxious Weeds[b]			
Acroptilon repens (C. repens)	Russian knapweed		X
Cardaria draba	hoary cress		X
Centaurea biebersteinii (C. maculosa)	spotted knapweed	X	
Centaurea diffusa	diffuse knapweed		X
Cirsium arvense	Canadian thistle	X	
Convolvulus arvensis	field bindweed		X
Cynoglossum officinale	hound's-tongue		X
Euphorbia esula	leafy spurge		X
Hypericum perforatum	St. John's-wort	X	
Leucanthemum vulgare	ox-eye daisy	X	
Linaria dalmatica	Dalmatian toadflax		X
Linaria vulgaris	yellow toadflax		X
Potentilla recta	sulphur cinquefoil	X	
Tanacetum vulgare	common tansy	X	
Category 2 – Recently Established, Rapidly Spreading[b]			
Hieracium aurantiacum	orange hawkweed	X	
Hieracium caespitosum, H. floribundum, H. piloselloides, H. pretense	yellow hawkweed complex	X	
Lepidium latifolium	perennial pepperweed		X
Lythrum salicaria	purple loosestrife		X
Lythrum virgatum	wandlike loosestrife		X
Ranunculus acris	tall buttercup		X
Senecio jacobaea	tansy ragwort		X
Tamarix spp.	salt cedar or tamarisk		X
Category 3 – Not yet detected or small occurrence[b]			
Centaurea solstitialis	yellow starthistle		X
Chondrilla juncea	rush skeletonweed		X
Crupina vulgaris	common crupina		X
Iris pseudacorus	yellowflag iris		X
Isatis tinctoria	dyer's woad		X
Myriophyllum spicatum	Eurasian water milfoil		X
Additional Invasive Plants of Concern			
Achillea nobilis	noble yarrow		X
Artemisia absinthium	absinthium	X	
Bromus tectorum	cheatgrass		X

Scientific Name[a]	Common Name	Currently in Project Area	Potential Invader
Campanula rapunculoides (undesirable)	creeping bellflower		X
Carduus nutans	musk thistle		X
Chorispora tenella	purple mustard		X
Cirsium vulgare	bull thistle	X	
Elymus repens	quackgrass		X
Euphorbia species (cautionary)	spurge (all)		X
Onopordum acanthium	Scotch thistle		X
Phalaris arundinacea	reed canarygrass		X
Potentilla argentea	silvery cinquefoil		X
Sonchus spp.	perennial sowthistle		X
Tragopogon dubius	goat's bear/salsify		X
Tripleurospermum perforata (Matricaria inodora, M. perforata) (undesirable)	scentless chamomile		X
Veronica officinalis	common speedwell		X

[a] Nomenclature follows the USDA Plants Database (USDA NRCS 2008).
[b] Montana Department of Agriculture noxious weed categories.
Category 1 = Noxious weeds currently established in Montana and widespread in many counties. Management criteria include awareness, education, containment, and suppression of existing infestations, and prevention of new infestations. They are capable of rapid spread and can render land unfit or greatly limit beneficial uses.
Category 2 = Noxious weeds that have recently been introduced into the state, or that are rapidly spreading from their current infestation sites. They are capable of rapid spread, invasion of lands, and rendering lands unfit for beneficial uses. Management criteria include awareness, education, monitoring, and containment of known infestations, and eradication where possible.
Category 3 = Noxious weeds not yet detected in Montana, or found only in small, scattered, localized infestations. Management criteria include awareness, education, early detection, and immediate action to eradicate infestations. They are known pests in nearby states and are capable of rapid spread that may render land unfit for beneficial uses.

Surveys

Project specific weed surveys were completed in 2007 and 2008. Weed inventories were conducted in most of the proposed units and for haul routes. There are 105 known infestations over 402 infested acres within the project area. Infestation data in the project area were compiled for surveyed units, haul routes, and other roads in the project area. Eight weed species were mapped during the 2007 and 2008 surveys (Table 3-13).

Table 3-13. Weed Species of Concern Found in the 2007/2008 Firefighter Surveys

Unit or Road	Species Present	
	Latin Name	**Common Name**
Road 896A	*Hypericum perforatum*	common St. John' s wort
	Centaurea biebersteinii	spotted knapweed
	Leucanthemum vulgare	ox-eye daisy
Unit 2/ Rd 896C/ Rd 11045	*Hypericum perforatum*	common St. John' s wort
	Centaurea biebersteinii	spotted knapweed
	Leucanthemum vulgare	ox-eye daisy
	Hieracium spp.	yellow hawkweed complex
	Cirsium vulgare	bull thistle
	Cirsium arvense	Canada thistle
Road 896	*Hypericum perforatum*	common St. John' s wort
	Centaurea biebersteinii	spotted knapweed
	Leucanthemum vulgare	ox-eye daisy
	Hieracium spp.	yellow hawkweed complex
	Hieracium aurantiacum	orange hawkweed
Road 896F	*Hieracium aurantiacum*	orange hawkweed
	Hieracium spp.	yellow hawkweed complex
Road 896G and Proposed Temporary Road to Unit 61	*Hieracium aurantiacum*	orange hawkweed
	Hieracium spp.	yellow hawkweed complex
	Leucanthemum vulgare	ox-eye daisy
	Hypericum perforatum	common St. John' s wort
	Centaurea biebersteinii	spotted knapweed
	Hypericum perforatum	common St. John' s wort
Unit 13/ Road 1623/ Spur	*Hypericum perforatum*	common St. John' s wort
	Centaurea biebersteinii	spotted knapweed
	Leucanthemum vulgare	ox-eye daisy
Unit 9b/9c	*Centaurea biebersteinii*	spotted knapweed
	Cirsium arvense	Canada thistle
Clearcut Adjacent to Unit 26/ Proposed Temporary Road	*Hieracium aurantiacum*	orange hawkweed
	Hypericum perforatum	common St. John' s wort
	Hieracium spp.	yellow hawkweed complex
Road 11042	*Centaurea biebersteinii*	spotted knapweed
	Hypericum perforatum	common St. John' s wort
	Hieracium aurantiacum	orange hawkweed
	Hieracium spp.	yellow hawkweed complex
	Leucanthemum vulgare	ox-eye daisy
	Cirsium vulgare	bull thistle

Unit or Road	Species Present	
	Latin Name	**Common Name**
Road 11042A	*Hieracium spp.*	yellow hawkweed complex
	Hieracium aurantiacum	orange hawkweed
	Leucanthemum vulgare	ox-eye daisy
	Centaurea biebersteinii	spotted knapweed
	Hypericum perforatum	common St. John' s wort
Road 38B	*Centaurea biebersteinii*	spotted knapweed
	Hypericum perforatum	common St. John' s wort
	Hieracium aurantiacum	orange hawkweed
	Hieracium spp.	yellow hawkweed complex
Unit 56	*Cirsium arvense*	Canada thistle
	Hypericum perforatum	common St. John' s wort
Road 1621	*Hieracium aurantiacum*	orange hawkweed
	Hieracium spp.	yellow hawkweed complex
	Centaurea biebersteinii	spotted knapweed
	Cirsium arvense	Canada thistle
	Cirsium vulgare	bull thistle
	Hypericum perforatum	common St. John' s wort
Road 1621A	*Hypericum perforatum*	common St. John' s wort
	Cirsium arvense	Canada thistle
	Leucanthemum vulgare	ox-eye daisy
	Hieracium spp.	yellow hawkweed complex
Proposed Temporary Roads to Units 3 and 26	*Hypericum perforatum*	common St. John' s wort
	Leucanthemum vulgare	ox-eye daisy
	Hieracium spp.	yellow hawkweed complex
	Cirsium arvense	Canada thistle
	Hieracium aurantiacum	orange hawkweed
Road 5317	*Hypericum perforatum*	common St. John' s wort
	Cirsium arvense	Canada thistle
	Cirsium vulgare	bull thistle
	Hieracium spp.	yellow hawkweed complex
	Leucanthemum vulgare	ox-eye daisy
	Centaurea biebersteinii	spotted knapweed
	Hieracium aurantiacum	orange hawkweed
	Potentilla recta	sulfur cinquefoil
Unit 16	*Centaurea biebersteinii*	spotted knapweed
	Hieracium spp.	yellow hawkweed complex

Spotted knapweed and ox-eye daisy are roadside species that generally have not invaded into understory-forested habitats. However, these species do have the potential for expansion into open canopies and natural occurring forest openings, including grasslands, open rock outcrops,

and other open areas created by fire. Canada thistle is a generalist and can invade almost any habitat from dry to wet disturbed areas with canopy openings; it is in some of the wetlands in the Firefighter Project area. Portions of the edges of the Hungry Horse Reservoir and open slopes and grasslands in the Firefighter Project area are heavily infested with St. John's wort. St. John's wort has the ability to invade undisturbed grasslands.

State listed Category 2 noxious weed species yellow and orange hawkweed are of greatest concern in the area. These species have been recently established (the last five to ten years), and are rapidly expanding in established areas. They can invade undisturbed areas where native plant communities are intact. These species can persist in shaded conditions and often grow underneath shrubs, making eradication very difficult. Their stoloniferous habit can create dense mats, which can persist for 30 years and spread to densities of 3,500 plants/m^2 (Thomas and Dale 1975). Along some roads in the Firefighter Project area, hawkweed is present in high densities over two-thirds of the length of the road. It is also present in some past harvest areas.

The amount and distribution of the invasive plants listed above is variable within the project area, ranging from scattered, isolated individuals to small, dense groups. These species occur along portions of many of the roads, in old harvest units, on old skid trails and spur roads, in grasslands adjacent to roads, and on other disturbed sites. Invader weed species tend to be shade-intolerant, with the exception of orange and yellow hawkweed (personal observation). Invasive plants usually establish in disturbed areas, where other plants are slow to establish and recover. Disturbed areas are mostly associated with road right-of-ways, landing sites for timber harvesting, gravel pits, mechanically piled slash burn piles, skid roads, mechanical site-preparation treatment areas (on well-drained or shallow soils), power lines, railroad corridors, and mines. Most of the area outside of these more heavily disturbed sites has experienced limited invasive plant establishment; except for grasslands that are susceptible to noxious weed invasion without disturbance.

Weed Management

The Flathead National Forest completed an Environmental Assessment (EA) evaluating the effects of treating noxious and invasive plants (USDA Forest Service 2001b). Currently, treatment and inventory is prioritized at quarterly meetings of the Flathead National Forest Weed Advisory Group. Factors for prioritization include:

- Weed invasive category as outlined in the Flathead National Forest Noxious and Invasive Weed Control EA and shown in Table 3-14 below.
- Level of invasive risk to a potential vegetation group.
    - The Western Montana Planning Zone Weed Risk Assessment (Noxious Weeds section, Project File) is used as a tool to ascertain the level of invasiveness for weed species within potential vegetation groups.
- Special areas that are threatened by weed invasion.
    - Particular areas of greater conservation concern need additional protection from weed invasion (e.g. designated wilderness, sensitive plant habitat, and pristine native plant communities).
- Potential for increased off-site movement of weeds that could increase the spread to new areas.

- Weed infestations that are located along roads, at trailheads, or at high-use recreation sites are a higher priority for treatment because of the increased vectors of spread in these areas.

Table 3-14. Weed Treatment Prioritization on the Flathead National Forest

Forest Priority	State Category	Objectives	Prioritization Factors
1	3 (Potential Invaders)	Currently absent – goal is prevention, then eradication, if possible	* Detection * Available funds
2	2 (New Invaders)	Localized containment and strong emphasis on overall population reduction	* Available funds * Relative invasive nature of the species and its potential to displace native vegetation * Potential for off-site movement of seeds * Relative ecological importance of rarity of the site that could be damaged by the presence of the invader species
3	1 (Widespread Invaders)	Containment and localized reduction of populations	* Available funds * Relative invasive nature of the species and its potential to displace native vegetation * Potential for off-site movement of seeds * Relative ecological importance of site rarity that could be damaged by the presence of the invader

Control and Containment

Efforts to control the spread of noxious weeds include prevention, containment, and eradication methods. Eradication is generally limited to localized areas and to Category 2 and 3 species. Methods used for eradication include hand pulling and herbicide applications.

Containment methods are used to prevent weeds from spreading into new areas and to reduce the coverage (if possible) in existing infestations. Containment methods include closing infested areas to travel, washing vehicles and equipment upon entering or leaving an infested area, using weed-free seed and straw mulch for revegetation, hand pulling, and herbicide application around the perimeter of the infestation. Prevention uses similar techniques as containment with the objective of preventing a new weed infestation, rather than limiting spread of an existing one.

Aside from Forest Road 38, the Firefighter Project area has not been targeted for weed control. Although Category 2 species such as hawkweed have higher priority than Category 1 weed species, the focus in the Hungry Horse Reservoir area has been more on attempting to prevent the spread of hawkweed into new areas on the Hungry Horse and Spotted Bear Ranger Districts. The Firefighter Project area consists of mostly closed roads with limited access; therefore, hawkweed has little potential movement beyond current infestation rates and has not been treated in recent years. Past treatments may have occurred in the Paint Emery Project.

Environmental Consequences

Effects (measurement) indicators considered in this analysis are as follows:

- Acres of existing noxious weed infestations
- Miles of proposed temporary roads and haul routes
- Acres of proposed ground disturbance

Other more qualitative measurement indicators are invasiveness of the noxious weed species, invasibility of the habitat, and trends of infestation of noxious weed species.

Alternative 1 (No-Action Alternative)

Direct and Indirect Effects

Alternative 1 provides the least opportunity for creating weed habitat because there would be no new areas of ground disturbance. However, invasive species currently known to the analysis area would have potential for expansion. Roads currently open may continue to serve as corridors for weed spread. Invasive species considered in the analysis area could potentially expand by utilizing roads as vector corridors. Once seeds are dispersed to a new site, habitat type and disturbance patterns influence the establishment potential of invasive plant species. Because Alternative 1 proposes no ground disturbance, the potential for noxious weeds species to establish in undisturbed areas would be low. With the exception of orange and yellow hawkweeds, noxious weed species commonly require disturbance, bare ground openings, and reduced competition (early successional habitat conditions) for initial establishment. However, if established, the ability for weed species to out-compete existing native vegetation, to sustain its occurrence, and potentially alter native habitat functions is largely dependent on the habitat conditions and the life history, morphology, phenology, ecology, and reproductive biology of the individual weed species.

Orange and yellow hawkweeds are Category 2 species (recent invaders to Montana). Life history and reproductive biology of these two invasive hawkweeds allow for rapid spread, once established, in open areas and forested conditions. Unlike other known weeds in the project area that remain primarily within open disturbed areas and grasslands, orange and yellow hawkweeds can spread into forested habitats despite reduced understory light levels.

Cumulative Effects

Past ground disturbing activities such as timber harvest, road construction, and road maintenance have contributed to the establishment and spread of noxious and invasive plants in the area. Recreational and economic land uses (e.g. hunting, hiking, fishing, logging, firewood gathering) have promoted the spread of weed seeds, because users and their vehicles are vectors for weed seed spread. Wildlife has likely contributed to weed spread in the past by transporting weed seeds across the landscape. All these activities would likely continue into the future.

Alternative 1 would be less likely to address existing weed populations than would the Action Alternatives (Alternatives 2 & 3), which would treat haul routes and units in the project area. Alternative 1 would create the least amount of new disturbed areas for potential new weed establishment and spread. Nevertheless, the total existing condition of infested weed acres is

expected to continue to increase with existing uses and conditions in the No-Action Alternative, although not to as great of an extent as under the Action Alternatives.

Alternatives 2 & 3 (Action Alternatives)

Direct and Indirect Effects

Vegetation treatments and temporary road construction are proposed for this project. General effects on the risk to weed establishment and spread are discussed below by activity. Areas with more acres of ground disturbance or open roads would be expected to have greater vulnerability to weed colonization and spread, especially where disturbance occurs next to existing weed populations.

Timber Harvest and Other Vegetation Treatments

The effects of logging vary depending on the amount of ground disturbed; the more bare soil exposed – the more germination substrate that would become available for colonizing weed seeds. Mechanical systems (tractor and tractor/swing) with wheeled machinery usually disturb more ground than skyline and cable systems. Skyline usually has less ground disturbance than cable systems, which may use a combination of tractor and cable systems. Helicopter extraction of logs is even less disturbing to the ground within the actual units; however, areas used for landings can be impacted. Areas used for log landings with any system can be highly impacted. Hand treatments often have little associated ground disturbance.

Alternative 2 proposes the greatest number of harvested acres. The number of acres that would be harvested using systems with the most ground disturbance (mechanical) would be greatest for Alternative 2; although proportionally, logging system acreage prescriptions are similar. Alternative 2 would have more risk to native communities in the project area from weed establishment and spread than Alternative 3, due to the greatest acreage of ground disturbance. Alternative 3 would pose the least risk of noxious weed spread. The differences in these logging systems and prescriptions by alternative are displayed in Table 2-11 (Comparison of Features of the Alternatives) in Chapter 2 of this EA.

The amount of an area disturbed may vary by the prescription planned for that area. Stands with more volume removed, more canopy cover (shade) removed, and more soil disturbed, would have more potential for weed invasion and persistence. Regeneration harvests would pose a greater risk for weed invasion and persistence than the thinning harvests would. Seedtree harvests would remove more volume than shelterwood cuts, although both would have considerable canopy removed and associated ground disturbance. Alternative 2 proposes 716 acres of regeneration harvest and 33 acres of thinning; Alternative 3 proposes 180 acres of regeneration harvest and 175 acres of thinning. Alternative 3 has the least number of harvest acres and the least acreage of the most impactive prescriptions, and would pose the least risk of noxious weed spread.

The effect of weeds on native plant communities following proposed slash treatments would depend on the amount of ground disturbed during the activity; the more bare soil exposed the

more germination substrate that would be available for colonizing weed seeds. Using excavators and other mechanical methods to treat slash could cause ground disturbance and expose bare soil. Burning slash using a low-intensity underburn may limit additional soil scarification and encourage native plant regeneration. Alternative 2 has more acreage of burning treatment (543 acres) and less of mechanical treatment (198 acres) than Alternative 3 (7 acres of burning treatments and 340 acres of mechanical treatments) (refer to Table 2-11 in Chapter 2 of this EA). However, considering the vegetation treatment acreage and prescription, Alternative 2 would still have more ground disturbance, even using the less impactive slash treatment method.

Machinery can also spread weed seeds if not washed prior to use. Design criteria included in Chapter 2 of this EA includes cleaning all off-road equipment prior to entering the area. Use of dedicated skid trails would minimize spread across units, as would any design criteria designed to minimize soil impacts (Soil Productivity Design Criteria – Chapter 2).

Tree planting in the harvested areas may contribute to weed expansion; vehicles and personnel may act as vectors for weed spread. However, planting activities would be of short duration with minimal soil impact. In addition, planting conifers would assist in the regeneration of natural vegetation and would reduce the potential for establishment of shade-intolerant weed species after the conifers establish a canopy cover.

Temporary Road Construction and BMPs on Haul Routes

Portions of the existing road network would be used to implement this project. Use of existing roads facilitates weed establishment because cars, trucks, mountain bikes, and horses are among the main vectors of weed spread. Alternative 3 would have about 26 miles of haul routes (the least amount) and Alternative 2 would have about 30 miles of haul routes (the highest amount). This activity could create new ground disturbance, and the possibility of potential new weed establishment. Refer to Table 2-11 in Chapter 2 of this EA for more information.

Temporary road construction to access some units is proposed under the Action Alternatives. Alternative 2 would use 4.3 miles of temporary roads and Alternative 3 would use 0.5 miles. Both historic road templates and new roadbeds would be used. Temporary road construction activities would expose bare soil and parent material, creating suitable substrates for weed germination. The use of temporary roads may also contribute to the dispersal and spread of weed seeds. Historic template roads may have current weed infestations, whereas new roads would be constructed in areas with more native vegetation. Weeds seeds on historic road templates may be carried into harvest units. Proposed weed control prevention methods and revegetation would lessen the establishment and spread of weeds (Noxious Weed Design Criteria – Chapter 2). Alternative 3 poses the least amount of temporary road construction and would have the least risk of weed establishment and spread.

Vegetation habitat type can influence susceptibility to weed invasion. Riparian areas are often more susceptible to infestations from weeds adapted to mesic habitats. In Alternative 2, temporary roads would access Units 7 and 8, crossing an intermittent stream. Ground disturbance in these moist soils could increase the potential of noxious weed establishment in riparian corridors; weeds that thrive in moist environments (e.g. Canada thistle, hawkweed, ox-

eye daisy) would be of most concern. Soil and banks in riparian areas often have frequent natural disturbance, which can exacerbate the spread of weeds once colonized. Alternative 3 would not construct temporary roads in riparian areas, and would have the least risk of weed spread in riparian corridors. Revegetation of the temporary roads with forbs, shrubs, and graminoids, may help prevent noxious weed establishment and spread (Design Criteria – Ch. 2).

Seeding or planting forbs and shrubs would create competition with non-native invaders on the newly disturbed soils of the temporary roads. This may be effective short-term mitigation for weeds because the seeding and planting would deter weed establishment. Over the long-term, the imprint and impact of temporary roads would remain on the landscape, as these roads would not be returned completely to their natural state, and may be somewhat susceptible to weed establishment. The reclaimed temporary roads would most likely have a mix of the planted revegetation species, new colonizers from the surrounding vegetation, and potentially some weed species.

Seeding temporary roads to reduce weed invasion has been occurring on the Flathead National Forest (FNF) for past 30-40 years, primarily using non-native mixes of grasses and forbs. Native grasses and forbs have only been applied on the FNF for the last few years. Observations of some of the temporary roads constructed in the last 30-40 years indicate some success with prevention of weed invasion on these temporary roads. Shade-intolerant weed species (e.g. knapweed) are not as abundant as the native and non-native grass and forb seed mixes on these old roads. However, shade-tolerant species (e.g. hawkweed, Canada thistle, ox-eye daisy) are often abundant along old temporary roads (personal observations). There is no information pertaining to how these old roads were built or rehabilitated, so it cannot be determined how or why these weeds established.

How long the effects of the temporary road construction would act as corridors for weed establishment and invasion is unknown. Observations of old forest roads on the FNF (50+ years old) indicate that some roads may recover, with the surrounding forest vegetation species inhabiting the old road template. Weed prevention measures were most likely not implemented during these older harvest operations. However, conditions during those times are unlike current existing conditions, because now there are weed populations near the proposed units.

Road Maintenance, Closure, and Decommissioning

Road maintenance can cause ground disturbance that would contribute to the potential spread of noxious weeds. Road closures limit the use of roads and the amount of new weed propagules spread in the area, but they may create conditions (overgrown with brush or closed with berms) that prevented established weed populations from being treated by spraying of noxious weeds from a vehicle.

Road decommissioning also limits road use and amount of new propagules spread into the adjacent area. Road decommissioning involves ground disturbance, which can increase the spread of weeds. The areas are usually revegetated using seed where ground disturbance from water bars and culvert removals occurs. Revegetation using native species can compete with noxious weed establishment. Usually the remaining road surface that has not been disturbed by

machinery would not be seeded or revegetated. Thus, an existing substrate remains that may be colonized by existing noxious weed populations on the roadside that were not eradicated prior to decommissioning. There are approximately 14 miles of roads proposed for decommissioning within the project area. Treatment of noxious weeds would occur before decommissioning, but decommissioning; however, decommissioning of roads may prevent further treatment of weeds due to the closure of the road to vehicle access. In the short-term, decommissioning can increase the spread of weeds by disturbing soil. In the long term, road decommissioning may decrease weed spread of shade-intolerant species, but shade-tolerant species, such as hawkweed, may persist and spread into adjacent areas if left untreated.

Cumulative Effects

In addition to the cumulative effects described for Alternative 1, Alternatives 2 and 3 would have additional cumulative effects to the degree described above for each proposed activity. Past, present, and foreseeable actions within the Firefighter Project area (federal, state, and private) that have affected or may affect noxious weeds include timber harvesting, prescribed burning, wildfire, fire suppression, road construction, road maintenance, road reclamation, recreational activities, forest product gathering, stream restoration, reservoir creation and dam building, and noxious weed control. These actions may have historically affected noxious weed populations and may continue to have effects.

People, vehicles, domestic animals, wildlife, and wind are all vectors contributing to the transport of weeds within the project area. Once seeds are dispersed to a new site, habitat type and disturbance patterns influence the establishment of invasive plant species. The potential for each species to establish is dependent on the life history, morphology, phenology, ecology, and reproductive biology of the individual weed species. Activities that create ground disturbance provide a substrate for colonization of noxious weeds when propagules are present. In general, past, present, and future activities with the greatest amount of ground disturbance accompanied by a vector source of noxious weed seeds have the greatest potential for noxious weed establishment and spread.

<u>Timber Harvesting and Prescribed Fire</u>

Timber harvesting would open up the canopy and create new ground disturbance, possibly allowing for noxious weed colonization where propagules are present. Logging equipment may carry noxious weed seeds into the harvest area. Currently there are no data on the quantitative increase in weed infestations from past timber harvests in the Firefighter Project area, although weed invasion and expansion has been observed in areas of past timber management projects. Past, present, and future timber harvests cumulatively contribute to increases in noxious weed distribution and populations.

Prescribed burning activities within the analysis area cumulatively contribute to increases in noxious weed distribution and populations. However, prescribed fire is generally of low- to moderate-intensity, and relatively cool. Although there is potential for weed establishment, the potential for the establishment and spread into the burned areas would be low, due to the low-intensity burns. Low-intensity burning, which mimics natural fire, may invigorate the

germination of native species because they are adapted to natural fire disturbances. Should weeds become established, the potential for spread would be lower than that in ground disturbed by timber harvesting activities. The prescribed burns would have a short-term low-intensity disturbance, which would promote the native understory vegetation to compete with potential weeds.

Recreation and Forest Product Gathering

Hiking, horseback riding, camping, motorcycle and ATV riding, snowmobiling, boating, fishing, guiding and outfitting, driving, sightseeing, and forest product gathering are past, present, and foreseeable activities in the project area. People and their associated activities can be vectors contributing to the transport of weeds within the project area. Trail construction and maintenance can create ground disturbance and increase the potential spread of weeds. Recreation has likely increased, and would continue to increase, noxious weeds in the project area, although compared to a large-scale disturbance this would be minimal and likely limited to established roads, trails, campgrounds, and a few dispersed locations.

Stream Restoration

Stream restoration and associated ground disturbance on the bridge site at Forest Road 896 may increase noxious weeds and contribute minimally to cumulative effects. However, this project would be monitored after completion and noxious weed populations treated accordingly.

Hungry Horse Dam Construction

The Hungry Horse Dam construction and Reservoir building may have increased noxious weed populations due to ground disturbance and people and equipment acting as vectors. Some areas on edge of the reservoir are currently infested with noxious weeds. The unnatural fluctuations of the water creates frequent disturbance that may promote noxious weeds and hinder the development of native vegetation. The Dam and Reservoir contribute cumulatively to increased noxious weed populations.

Noxious Weed Control

Future spraying of haul routes and other roads in the Firefighter project area may temporarily decrease noxious weeds establishment and spread in the short-term. Populations of orange and yellow hawkweed (Category 2 species) have recently increased in the Hungry Horse Reservoir area; this has shifted weed treatment priorities and the treatment of more roads and areas are expected in the future. While hawkweed would be the primary target, all noxious weeds in a given area would be sprayed when an area is treated to control hawkweed. However, to maintain the gains accomplished by these treatments, more intensive, long-term integrated management is needed. Ongoing and reasonably foreseeable noxious weed control within the analysis area would cumulatively contribute to maintaining present weed infested acres should these areas continue to be a priority for control and containment for the FNF. However, infested weed acres may also increase without continued management.

Summary of Direct, Indirect, and Cumulative Effects for Alternatives 2 & 3

Cumulatively, the Firefighter Project, in combination with past, present, and foreseeable actions, would contribute to increases in weed distribution and populations. Additional acres, outside and adjacent to the treatment units, would become more susceptible to weed invasion because of the project activities. Areas with more miles of open roads, road use, and bare-ground exposure would facilitate weed spread, especially where adjacent noxious weed populations exist. This contribution to cumulative effects would be moderated by design criteria that would reduce the potential for new weed introduction and spread into existing un-infested areas. These design criteria include weed treatments, washing of equipment, soil stabilization measures, and revegetation of disturbed sites, restoration of constructed temporary roads, and post implementation of haul roads. The objectives of the weed treatments associated with Alternatives 2 and 3 are to reduce the short-term potential for new establishment into the newly disturbed areas created by this project, not to reduce the total infested acres of the project area.

In summary, Alternatives 2 and 3 would increase the infested noxious weed acres from existing conditions, more so than Alternative 1 and the lack of weed treatments for that alternative. This would be due to the ground disturbance caused by Alternatives 2 and 3, which would create new areas for potential new establishment of weeds. Alternative 3, compared to Alternative 2, has the lower risk of noxious weed spread and persistence due to least amount of treatment acreage, least haul route mileage, and least amount of temporary road construction.

Regulatory Framework and Consistency

Management direction for noxious and invasive weed control on the FNF is set at the national and forest levels. Forest Service policies were developed in response to Federal laws guiding implementation of noxious weed control actions. These policies are set forth in Amendment 2000-95-5 of the FSM, Chapter 2080, Noxious Weed Management, and have been incorporated into the Forest Plan. Treatment and monitoring of known weed populations in the project area would be implemented under the authority and guidance of the Flathead National Forest Noxious and Invasive Weed Control Decision Notice (May 2001) and EA (March 2001). These were designed to meet legal requirements and Forest Service policies for noxious weed control. The proposed project incorporates and is consistent with the Flathead National Forest Weed Control Decision. Design criteria and management requirements for actions proposed under this project follow requirements documented in the FSM Amendment for Noxious Weed Management, and road and timber management projects.

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