

# Jocko Lakes Fire Salvage Project

## Invasive Weeds Report

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**for:**

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## Introduction

Invasive plants or “weeds” are non-indigenous plants that can invade and negatively alter native plant communities. A number of invasive plant species are recognized in Montana as noxious, meaning laws have been developed to restrict their spread and effect on the environment. The Lolo National Forest incorporated the state noxious list (Montana 2003) into its own weed list (Table 1). 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.

This analysis of weeds for the Jocko Lake Fire Salvage Project incorporates by reference the Lolo National Forest Integrated Weed Management Final Environmental Impact Statement (Weed FEIS 2007). The objective of this Forest-wide project is to implement an adaptive integrated pest management strategy to control and reduce the presence of noxious and invasive weeds on National Forest Service lands.

The Jocko Lakes Salvage project weed analysis focuses on currently known infestations and those found during project weed surveys and the risk of spread or new introduction in the project area due to project activities. This analysis is conducted for consideration in determining whether or not to prepare an Environmental Impact Statement.

- All invasive plant sites identified will be considered for control treatments under other decisions no matter which alternative is selected.

## ***Overview of Issues Addressed***

The following weed issue was identified by Forest specialists and from the input received during the scoping process for this project:

### **Salvage logging may enhance invasions by noxious weeds affecting sensitive plants and biodiversity.**

Any plant community has a certain amount of risk for weed spread and establishment because some weed species can invade undisturbed areas. However, for the purposes of this analysis only areas that are at a high-risk of spread and introduction of weeds were analyzed in detail.

The highest risk with respect to invasive plants is their presence or absence in and adjacent to harvest sites and roads. These areas serve as sources or pathways for weed spread. The more pathways through an area there are, the greater the risk of spreading weeds from primary colonization points into native plant communities (Banks et al. 2004 p2). The second concern is the creation of ideal conditions for weeds to colonize by disturbing soil. Also of concern is the presence of vectors that can carry seed such as equipment with seed attached in soil clinging to it. Consideration is given to the increase and duration of light availability caused by removing dead and dying trees. These measures will be qualitatively and quantitatively correlated to potential risk of weed spread and establishment.

### Issue Indicators to be measured

Relative risk of spread rating (qualitative measure) is based on an increase or decrease in risk factors. The risk of spread of known species within the project area is species dependent.

**Measure:** proximity of known infestations (quarter mile or 1,320 feet) to proposed activities

The risk of introduction of species within the cumulative effects area is also species dependant.

**Measure:** acres of soil disturbance

This equates to the amount or acres of habitat made susceptible to invasion by soil disturbing activities. Susceptible habitat is dependent on the characteristics of the specific species within the cumulative effects area that have the ability to readily invade the landscape where the project occurs.

**Table 1 Categories of Invasive Plants on the Lolo NF (Weeds FEIS 2007)**

Scientific Name	Common Name
<b>Potential invaders (currently absent)</b>	
<b>Goal is to prevent and eradicate promptly if found</b>	
<i>Bryonia alba</i>	White bryony
<i>Centaurea repens</i>	Russian knapweed
<i>Centaurea solstitialis</i>	Yellow starthistle
<i>Chondrilla juncea</i>	Rush skeletonweed
<i>Crupina vulgaris</i>	Common crupina
<i>Iris pseudacorus</i>	Yellowflag iris
<i>Isatis tinctoria</i>	Dyers woad
<i>Lythrum spp.</i>	Purple loosestrife
<i>Polygonum cuspidatum</i>	Japanese Knotweed
<i>Tamarix spp.</i>	Salt cedar
<b>New invaders</b>	
<b>Goal is to eradicate small new infestations and reduce larger infestations</b>	
<i>Cardaria draba</i>	White top
<i>Centaurea diffusa</i>	Diffuse knapweed
<i>Echium vulgare</i>	Blue weed
<i>Hieracium aurantiacum</i>	Orange hawkweed
<i>Hieracium piloselloides / pratense/ et al</i>	Meadow/Yellow hawkweed complex
<i>Lepidium latifolium</i>	Perennial pepperweed
<i>Linaria vulgaris</i>	Common toadflax
<i>Ranunculus acris</i>	Tall buttercup
<i>Senecio jacobaea</i>	Tansy ragwort
<b>Widespread Weeds</b>	
<b>Goal is to contain inside infested area and reduce plant populations</b>	
<i>Cardus nutans</i>	Musk thistle
<i>Centaurea maculosa (C. stoebe ssp madulosa)</i>	Spotted knapweed
<i>Chrysanthemum leucanthemum</i>	Oxeye daisy
<i>Cirsium arvense</i>	Canada thistle
<i>Cynoglossum officinale</i>	Hounds-tongue
<i>Euphorbia esula</i>	Leafy spurge
<i>Hypericum perforatum</i>	St. Johnswort
<i>Linaria dalmatica</i>	Dalmatian toadflax
<i>Potentilla recta</i>	Sulfur cinquefoil
<i>Sisymbrium altissimum</i>	Tumble mustard
<i>Tanacetum vulgare</i>	Common tansy
<i>Verbascum spp.</i>	Mullein

**Threshold**

A net increase in non-native plants is undesirable. The Weed FEIS embodies the strategy to achieve current Forest plan goals for weed control and containment. An effect would be acceptable if no long-

term increase in weed establishment and spread resulted from the chosen action. The threshold for no effect defined for this analysis is no net increase in weed infestations directly due to proposed actions.

## Affected Environment

### ***Existing Condition***

Establishment and spread of weeds has increased at an exponential rate over the past century. Timber harvest, road building, recreation, and housing construction, all vectors for the spread of weeds, have increased.

Current infestations were recorded during post-fire surveys. There were no systematic surveys for weeds prior to this available in the database although they were known to occur throughout this area. Currently there are approximately 200 acres of weeds within the project area. Botany technicians surveyed haul roads, storage/decommission roads, and log decking areas in the Jocko Lakes Fire burn area locating 120 acres of weeds. Most of the infestations within the project boundary were found on roads and other heavily disturbed sites because surveys concentrated on these high-risk sites. The high-use roads were more heavily infested than the low-use roads.

In general, the weeds in Table 1 tend to be shade-intolerant, and do not invade where the forest canopy is intact (Weed FEIS Appendix D). Drier habitat types are more vulnerable especially where recent ground disturbance occurs. Table 2 shows the invasive weed species observed within the project boundary from surveys in July 2008. Post-fire dominance of weeds is likely to vary with plant community, fire frequency, and fire severity. For example, spotted knapweed and Canada thistle may increase in abundance in ponderosa pine and closed-canopy forests after fire, while in native prairies, where the dominant native species are well adapted to frequent fire, their abundance may be reduced by fire (Zouhar et al 2008).

### **Post-burn Condition:**

Fire suppression actions for the Jocko Lakes fire created soil disturbance. Fire crews constructed 9 miles of hand line, 79 miles of dozer line, and several helispots and safety zones) within the Salvage project area. Four maps showing the location of these suppression activities are found in the project file (M2-8 through M2-11). Rehabilitation actions identified in the Jocko Lakes Fires Suppression Damage Repair Plan or "BAER Report" (M2-12) has reduced the risk of suppression activity-caused weed spread. Among other actions, the rehabilitation team seeded bare areas, pulled organic matter back onto hand and dozer lines, mulched where necessary with certified weed-free materials, and made sure motorized equipment used for these tasks was cleaned of material that could contain weed seeds.

Burned areas are at high risk or susceptibility to invasion of many weed species (Weed EIS 2007 Table 3-11 p 47). This is due to soil structure alteration, loss of organic duff layer, increased light availability, and loss of native seed bank (Zouhar et al 2008). In areas of high severity fire, the forest canopy is reduced to only dead tree boles to create shade (Fig 1) creating suitable habitat for most of the weeds in table 1. To what degree weeds will dominate and for how long depends on the weed species and the specific ecosystem it invades and the species of weeds present. Disturbance tends to increase weed abundance in communities that are already severely invaded and fire tends to exacerbate their establishment and spread whether the disturbance takes place before, during or after the fire (Zouhar et al. 2008 p26).

Within the Jocko Lakes Fire Salvage project area there is a concern that invasive plants may spread into burned areas where there are weeds in close proximity or where infested roads lead to uninfested areas. Weed populations have been observed in areas of past timber management projects, especially on much of the adjoining private, industrial forest land (personal observation).

Recent post-fire salvage within the fire perimeter was conducted by the Forest Service, state and private. Within the Jocko Salvage project area the Hidden Lake

Timber Sale was planned in 2007 to thin 388 ac. A portion of the area planned for thinning was burned by the Jocko Lakes fire and is included in this Salvage proposal (Unit 131). Since 1999 Plum Creek has harvested, with associated actions, approx. 7,600 ac. Other recent activities that contribute to the current conditions are summarized in the “Past, Present, and Future Activities” table in the (Appendix A).



**Figure 1. Jocko Fire: An area with reduced shade to forest floor; July 2008.**

### ***Desired Condition***

Forest Service policy (Executive Order 13112, 1999) identifies prevention of the introduction and establishment of non-native plant species as an agency objective. This policy directs the Forest Service to: 1) determine the factors that favor establishment and spread of NNIS, 2) analyze NNIS risks in resource management projects, and 3) design management practices that reduce these risks (USDA 2001).

According to the Lolo Integrated Weed Management project (Weed FEIS), all of the weed sites on National Forest land within the Jocko Lakes Fire Salvage project area would be treated. One to multiple treatment methods may be used including, mechanical, biological agents, and chemical herbicides (Weed FEIS 2007 Summary pg1). Follow-up monitoring will indicate the need for multiple treatments in subsequent years. Not all infestations may be treated in the first year; they will be prioritized according to risk as described in the Weed FEIS (pgs 4, 24).

This rapid response to these sites will move toward Forest goals of containing and reducing spread of known populations. Prevention methods described in the Weed FEIS such as washing off-road machinery and adhering to the Northern Region weed prevention “Best Management Practices” (FSM 2081.2) will be incorporated into the Jocko Lakes project.

## **Environmental Consequences**

Ground disturbing activity directly and indirectly can increase the risk for spread and introduction of non-native, invasive plants because if seeds are introduced they can germinate more readily than if the soil



surface was intact (Silveri et al. 2001). This weed seed could come from a nearby weed patch, be carried in soil clinging to equipment, or be introduced from some other sources (birds, animals, recreation).

## **Methodology**

Weed surveys for the species in Table 1 were conducted in 2008 on: 1) all haul roads; 2) all roads proposed for decommissioning, storage for future use, short-term specified, and temporary use, 3) those units that are proposed for salvage during non-winter using skyline yarding method (20-12; 29-2; 34-2) and one unit (20-2) that could be harvested by tractor yarding in summer. Invasive plant sites found during surveys will be mapped and entered into the Natural Resource Information Systems database for invasives (NRIS TESP-Invasives).<sup>1</sup>

Invasive plants considered by the Lolo NF for analysis include those listed as noxious by the State of Montana, Missoula County as well as other non-native species determined to be highly invasive yet not recognized by the County or State such as Japanese knotweed and musk thistle (Table 1).

**Assumption:** Individual harvest units proposed for winter harvest were not surveyed because though weeds may be present, the risk of spreading weeds with snow cover was not expected to be high enough to be significant.

The level of risk for spread or introduction of weeds was determined according to:

- Availability or proximity of known weed infestation (within a quarter mile or 1,320 feet). The proximity distance was determined by the maximum skid distance that logging equipment could potentially disperse vegetative material and seeds of known infestations.
- Acres of soil disturbance based on the harvest activities proposed in treatment stands, amount of temporary constructed roads, road decommissioning, and repair of haul roads all of which could increase the amount vulnerable soil

Proposed harvest activities that could result in soil disturbance include skidding, decking logs, skyline support construction, and during skyline yarding on the corridor where the logs are pulled up hill. Planting trees and seeding bare areas may also be done as part of this project. Each of these activities has a certain degree of soil disturbance associated with them. The amount of soil disturbance and resultant opportunity for weed spread varies depending on the soil type, equipment used, operator experience level, and the season of operation for the activity.

**Assumption:** General assumptions in determining the area of potential soil disturbance within the proposed units and road projects. Tractor yarding in summer can on average disturb soil on up to 13 percent of the managed unit area (this includes haul and skid roads regardless of soil type). Tractor logging in winter conditions (defined as 4 inches of frozen soil or at least 6 inches of packed snow if soil is less frozen) can disturb about 5 percent of the unit area. Typical snow depth was estimated by the forest soil scientist at between 2 to 6 feet in the project area in the winter of 2007 (Vander Meer 2008). Skyline logging can disturb up to 2.8 percent of the soil in summer. Skyline logging is not proposed for winter. Tree planting by hand would disturb very small microsite areas within a unit. This information is described in the Soil Resource Report for Jocko Lakes Fire Salvage Project (Vander Meer 2008).

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<sup>1</sup> Prior to the data being entered into GIS, the miles of roads were estimated using field notes and hand-drawn maps of infestations for data in tables 2 & 3. The miles of road were multiplied by 4 acres per mile, a common average infestation rate on the Forest.

Additional soil would be disturbed by the reconstruction of existing roads, construction of temporary roads and decommissioning roads. To determine the amount of area of soil disturbance contributed by temporary road construction, and decommissioning, the following multipliers were used: temporary road construction = 3.4 acres/mile, and decommission = 1.7 acres/mile (the above multipliers are based on a 28-foot wide corridor for temporary construction and 14-foot for decommissioned). It was assumed that a 100 percent of this area would have some level of soil disturbance.

In addition to the quantitative measures above, consideration is given to the increase and duration of light availability as a contributing factor to persistence or establishment of the infestation and is factored into the risk rating.

Sites of high risk for weed spread or introduction:

- Severely burned sites with altered soil structure and/or reduce organic layer.
- Disturbed areas due to suppression activities (fire line, helispots, safety zones)
- Disturbed areas due to post-fire rehabilitation activities (water bars, culverts)
- Disturbed areas due to harvest activities: skid trails (non-winter), decking areas, skyline landing areas

### Incomplete and Unavailable Information

There were no systematic surveys for weeds prior to 2007 available in the database to use as a comparison of infestation level before the fire. This is acceptable because any increase in weed patch size or new introductions post fire would likely not be evident for one to two years while monitoring and treatment will commence immediately following the Forest Integrated Weed Management Project (Weed FEIS 2007) and the Jocko Lakes Fire Repair Plan (BAER 2007).

### ***Spatial and Temporal Context for Effects Analysis***

**Spatial Context:** The weeds analysis area for the Jocko Lakes Fire Salvage Project is limited to the 2007 Jocko Lakes Fire perimeter on the Seeley Lake Ranger District, Lolo National Forest, more specifically, the project boundary as mapped in the EA Chapter 2. The project area is located in Missoula County west of Hwy 83 about 35 air miles northeast of the city of Missoula. The proposed salvage units include 1648 acres of the 11,648 National Forest acres burned within the fire.

**Temporal Context:** The temporal bounds of the proposed actions and the foreseeable actions are confined to those projects listed in the Cumulative Effects Worksheet (Appendix A). Any direct, indirect, and cumulative effects of the project are expected to occur within this timeframe. Short term direct and indirect effects (weed spread and new introductions) would be expected with one to two growing seasons until native plants in the seed bank repopulate the area (Alaback & Lee 2006; Vander Meer 2008). Long term indirect and cumulative effects would be seen beyond two years if weeds get established (in the absence of control efforts) and the plant community depends on the maturing forest to shade out the weeds.

### Connected Actions, Past, Present, and Foreseeable Activities Relevant to Cumulative Effects Analysis

Any of the ground-disturbing actions described in the cumulative effects worksheet (Appendix A) are relevant to risk of weed spread and introduction. More activities in an area raise the potential that a vector will arrive bringing weed seed.

Survey results

**Table 2 Invasive Weeds located in Jocko Project Area**

Weed common name	Species code	Acres infested (approximate)
spotted knapweed	CEMA4	100
oxeye daisy	CHLE80	60
Canada thistle	CIAR4	15
mullein	VETH	3
hounds-tongue	CYOF	1
sulfur cinquefoil	PORE	1
St John'swort	HYPE	5
orange hawkweed	HIAU	0.1
tumble mustard	SIAL2	1
common tansy	TAVU	1

**Alternative 5 – No Action**

**Direct Effects**

Alternative 5 provides the least likelihood for creating weed habitat or spreading weeds as no action is proposed for this alternative. The no-action alternative would not directly increase or decrease the spread or introduction of weed plants in the project area because no ground-disturbing actions would take place.

**Indirect Effects**

Since no roads would be decommissioned or stored, it may indirectly increase weed spread and introduction along these 10.7 miles of roads that remain open but this would be a low risk since weed-control actions would occur as indicated in the Lolo Weed Management project.

Invasive species currently known within the analysis area (Table 2) would have potential for expansion into the burned area but would also be controlled under the post-fire Jocko Lakes Fire Suppression Damage Repair Plan (BAER 2007) and the Forest weed control program that prioritizes for treatment all the known invasive weed sites on the forest. The timing and funding of these weed treatments would be determined by priority as described in the Weed FEIS.

**Table 3 Alt 1 No-Action: Risk rating**

Acres of weeds on roads	Acres of other weed infestation	Acres of soil disturbed	Weeds treated*	Risk
180	20	0	Weed FEIS says up to 7000 ac on the district / yr	moderate

\*The timing and funding of these weed treatments will be determined by priority as described in the Weed FEIS.

**Cumulative Effects**

The invasive weed sites within the Jocko Lake Salvage Project area are entered into the forest database and will be treated starting in summer and fall of 2008 under the Jocko Lakes Fire Repair plan (BAER 2007) and the forest-wide Weed Management Project. The treatment schedule is determined by risk and priority according to the Lolo NF Integrated Weed Management strategy (Weed FEIS 2007). Taking no action would not contribute a significant risk to those that exist from past, present and reasonably foreseeable actions in the weeds effect area. This is because the risk of introduction and spread of weeds is reduced by the Forest Weed Management project.

## Summary of Effects

### *Indicator: acres of soil disturbance*

Alternative 5 provides the least likelihood for creating weed habitat, as taking no action would create zero acres of disturbed soil or carry in weed seeds. The No-Action alternative, while having no significant direct, indirect, or cumulative effects provides the least opportunity to address the purpose and need of control of invasive weeds because if the No-action alternative is selected no timber-related funding would be used to control weeds in the area.

### **Alternative 3 – Modified Proposed Action**

Of the 1,648 acres of harvest proposed in the Jocko Lakes Fire Salvage project, 94 percent would be accomplished during winter frozen ground and snow cover conditions. A total of 10.7 miles of roads would be stored or decommissioned and a total of four miles of temporary or short term roads would be constructed creating 16 acres of disturbed soil. The Forest proposes to reconstruct or improve haul roads where necessary for safety and soil resource protection (see Soil Resource Specialist Report M6-1). Log landing areas (about 128) would be created and then rehabilitated. Three culverts would be replaced and some tree planting is proposed.

## Design Features and Mitigation Measures

The following resource protection measures are proposed for this project specifically with regard to weeds:

- Prevention is the most cost-effective measure to control invasive species. This project would move toward this goal by closing (storage) or decommissioning 11 miles of road that would reduce the vector of vehicles that spread weeds.
- All off-road logging equipment will be clean of weed seed, mud, and plant parts prior to being brought into the project area (standard CT clause in timber sale contracts).
- Conduct ground-based noxious weed herbicide treatments along approximately 55 miles of NFS road and disturbed soil such as landings, and the 10.7 miles of stored or decommissioned roads in order to mitigate potential weed spread from harvest (Ch 2 EA).
- Mitigation measures 1-48 starting on page 28 of the Lolo National Forest Noxious Weed Management EIS (2007) would be followed. These include evaluating the weed site for sensitive plant habitat, implementing Region 1 weed prevention practices and Best Management Practices, revegetating sites with a seed mix that includes native species, following herbicide application law, and posting signs where herbicides area applied.

Other resource protection measures designed to protect soil integrity, water, and aquatic resources also help prevent the spread and new introduction of invasive plants (Chapter 2 of the EA). Some examples are:

- Restricting tractor logging operations to winter conditions
- Boundaries of wetlands and RHCAs would be flagged prior to activities to exclude ground-based equipment and other activities.
- Newly constructed short-term specified roads would be closed to public access during and following implementation. All temporary roads would be closed to public access during

implementation and obliterated, recontoured, seeded and covered within one season following purchaser use.

**Direct Effects**

Direct effects would include spreading weed seed from existing patches or introducing weed seed during project activities. The risks of spreading or introducing invasive plants due to proposed actions would be diminished due to weed control measures (Weed FEIS 2007) and the cautious approach taken in designing the project to minimize any adverse environmental effects (see design features and mitigation measures above).

**Indirect Effects**

Any action that disturbs soil indirectly creates a seed bed for new introductions of weeds. Closing and decommissioning roads indirectly reduces the risk by removing the vector of vehicles that could introduce weeds.

The general effects on risk of spread and introduction of weeds are best discussed as a relative risk of each activity compared with other proposed activities. For example, areas with more acres of soil disturbance or open roads are expected to have greater vulnerability to weed colonization than areas of little soil disturbance. Note that there is no such thing as “no risk” because all plant communities are at some risk for weed introduction. Table 4 below lists all of the proposed actions that could affect the risk of weed spread or introduction. Mitigation by treating weed sites would reduce the negative effects to where they are insignificant and would result in no net increase in weed infestations directly or indirectly due to proposed actions.

**Table 4. Alt 3 - Risk of weed spread or introduction**

Action or risk factor	acres or miles proposed	acres disturbed	Weeds present	risk level (comparative)*
harvest in winter (tractor)	1571 acres	126 (8% soil disturbance)	N.A.	low - due to protection of snow
harvest in summer (tractor)	21 acres	3 (13% soil disturbance)	none (small patch of spotted knapweed ¼ mile away)	high
harvest in summer (skyline)	77 acres 3 units	2 (2.8% soil disturbance)	none	moderate
temp road construction	4 miles	16 (3.4 ac/mile)	Yes (see Appendix B)	high
culvert replacement	3 each	<.1	0	moderate due to restricted area
log landings	64 Acres (.5 ac each x 128)	64		high
tree planting		<0.1	unknown - not surveyed	low -due to small disturbance areas
store or decommission roads	10.7 miles	18 (1.7 ac/mile)	Yes (see Appendix B)	high
weed treatment	to be determined	0	Yes	very low

\* See discussion by risk factor, below

### *Harvest actions*

The effects of salvage logging vary depending on the amount of soil disturbance: the more bare soil exposed, the more germination substrate is available for colonizing weed seeds. For this alternative about 94 percent of the units (1550 acres) are proposed for ground-based tractor logging system in winter over frozen ground or compacted snow (see Chapter 2 in the EA). This would reduce soil disturbance and thus the risk of weed introduction to a low level. Also, since harvest would take place in the winter, there would be very few weed plants above the snow to spread seed via logging or other machinery. Harvest unit 20-2 (21 ac) could potentially be harvested in the summer using tractor yarding. Risk of weed spread with summer tractor yarding is moderate on this 1 percent of the proposed area. The other five percent (77 acres) are proposed for skyline yarding during non-winter conditions. Soil disturbed using this method is approximately 2.8 percent of the unit area (Soils Report). Weed treatment proposed for existing infestations along roads and log landing areas and other resource protection measures were specifically designed into this project to substantially reduce the risk of weed introduction and spread. Follow-up monitoring would further reduce the risk to where there would not be an increase in weeds and would most likely reduce their occurrence.

### *Temporary road construction*

Temporary roads constructed for access (4 miles total) would be reclaimed when operations are complete. This type of activity would expose bare soil creating suitable substrates for weed germination if weed seeds arrive there. Proposed weed treatment actions, revegetation, and closing these roads to vehicular access would reduce this risk. Follow-up monitoring would further reduce the risk.

### *Road decommissioning or Storage*

Road decommissioning involves breaking up the compacted soil, creating a prime substrate for weed germination if they are present or arrive via some vector. (Weeds present would be treated prior to activity.) The area would then be seeded with a suitable seed mix that contains native plant species as well as short-lived annual grasses and logging slash may be scattered on the old road bed. Because weeds would be treated prior to decommissioning, the risk of spreading them is somewhat reduced. Monitoring and follow-up treatments according to the Weed FEIS would further reduce the risk.

Resource Protection Measures designed for Storage roads:

Retain on NFSR system in long term storage (self-maintaining); generally up to approx. 20 years. Water-bar or intermittent out-slope. Remove CMP's & restore all watercourses to natural channels & floodplains. Rip 6-12 inches, seed & fertilize. May scatter slash on road. Treat noxious weeds (Chapter 2.3 EA).

Resource Protection Measures designed for Decommissioning roads:

Remove from NFSR system, road not needed for 20 – 40+ years. Water-bar or intermittent out-slope. May recontour along the road. Remove CMPs & restore all watercourses to natural channels & floodplains. Rip 6-18 inches, seed & fertilize. May scatter slash on road. Treat noxious weeds (Chapter 2.3 EA).

### *Culvert replacement and tree planting*

Both replacing culverts and planting trees disturb soil. This project proposes to replace three culverts disturbing less than 0.1 acre of roadside area total. These areas would be seeded with appropriate seed mix. Tree planting proposed would have negligible ground-disturbing effect and is not expected to introduce weed seed.

Resource Protection Measures designed for culvert replacement:

Fish biologist or hydrologist would be present at all stream culvert removals during road decommissioning and at all stream crossing replacements to ensure appropriate alignment and reshaping of the stream channel, bankfull width, floodplain, step-pools and grade control structures, transplants, etc. (Chapter 2.3 EA).

### Cumulative Effects

The cumulative effects of past, present and reasonably foreseeable actions are summarized in Chapter 3 of the EA and these actions are described in detail in the cumulative effects worksheet for invasive weeds (Appendix A). Past ground-disturbing activities such as timber harvest on private, state, and Forest Service lands, road maintenance and fires suppression activities (fireline construction, dozerline, safety zone construction) have contributed to the establishment and spread of weeds in the area. Weeds are especially widespread on heavily managed industrial forest lands within the project area. Recreational and economic land uses (hunting, mushroom picking, firewood gathering, etc) have also promoted the spread of invasive plants because these users and their vehicles are vectors of weed seeds.

The threshold for no effect defined for this analysis is that there would be no net increase in weed infestations directly due to proposed actions. The treatment and monitoring of weeds within the Jocko Lakes Fire Salvage project area along with weed prevention resource protection measures outlined in the EA contributes to reducing the cumulative effects to a level where no net increase in weed colonization or spread is expected from proposed actions therefore there would be no cumulative effects. The Weed FEIS (pages 32-34) states that weed monitoring will take place before, during and after direct weed control treatments. Weed treatments and effectiveness are reported in the Forest Service national database (FACTS).

### Compliance with Forest Plan and Other Relevant Laws, Regulations, Policies and Plans

Both alternatives comply with all laws, regulations, and policies because control of invasive weeds within the project as directed by policy and law, will take place no matter which alternative is selected.

Forest Service direction for noxious and invasive weed control on the Lolo is set at the national and forest levels. Forest Service policies were developed in response to Federal laws guiding weed control actions set forth in the Forest Service Manual Chapter 2080-Noxious Weed Management.

**Forest Plan:** The new forest plan (in draft) will use an integrated pest management approach and prioritize control efforts, and will be based largely on the Integrated Weed Management strategy outlined in the Final Environmental Impact Statement (Weed FEIS - USDA Forest Service 2007). This project follows the current LNF management plan's 1991 Amendment 11 (Lolo National Forest Noxious Weed Management EIS) which addresses weed management based on effectiveness of efforts and priority.

**Weed Law and Policy:** Other numerous Federal, State, and USDA Forest Service laws and policy that provide direction and authority are listed starting on page 8 of the Weed FEIS.

### Summary of Effects

Proposed actions would disturb soil and create conditions suitable for invasive plants to colonize, especially in areas where they are in close proximity to the disturbance. If all mitigation measures proposed are followed, there would be no net increase in weed infestations directly due to proposed actions. The effects of harvest and road construction and decommissioning for the Jocko Lakes Fire Salvage project would be minimal due to the meticulous resource protection measures designed into the

project and the aggressive weed control that would be implemented. Alternative 3 meets the purpose and need to control invasive weeds in this portion of the Jocko Lakes fire.

## Monitoring Recommendations

Follow the Lolo National Forest Integrated Weed Management project (Weed FEIS pages 32-34), the “Effectiveness monitoring of noxious weed treatment” outlined in the BAER Report for Jocko Lakes Fire, and FSM BMPs regarding monitoring noxious weeds (FSM 2081.2).



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## Appendix A. Cumulative Effects Summary by Ownership

“X” actions contributing to effects of proposed action. Weed-related comments are in bold.

X = actions contributing to effects of proposed action. Note on weed effects in italics. To save space, other past, present and reasonably foreseeable actions from EA Appendix D were deleted if they had no impact on weed introduction or spread.

Actions on All Ownerships	Past	Present (Spring 2008 – Spring 2009)	Reasonably Foreseeable
X Wildland Fire	<b>X within past 2-3 years (allows time for either weeds to invade or natives to repopulate)</b> 3 recent fires occurred within boundary of Jocko Lakes Fire. 1981 (91 ac.); 1987 (10 ac.); and 2003 (85 ac.)	<b>X caused bare ground - effect lasts 2 yrs</b>	X wildland fire may occur in the future.
X Wildland Fire Suppression	<b>X may have spread weeds</b> Suppression efforts for the Jocko Fire included 79 miles of dozer line (with stream crossings); 9 miles of hand-line	<b>X - 2 yrs</b> Suppression of wildland fires, will continue. Wildland fire use may be used	X Suppression of wildland fires will continue.
Hunting, Trapping, Predator and Beaver Control	<b>X minor impact - indirectly from potential weed introduction</b>	<b>X minor impact</b> Hunting and trapping will continue.	<b>X minor impact</b> Hunting and trapping will continue.
X - vector Firewood and Other Miscellaneous Forest Product Gathering	<b>X minor impact - indirectly from potential weed introduction</b> Other products gathered in small quantities include post and poles, berries, and Christmas trees.	<b>X minor impact -</b> Gathering will continue.	<b>X minor impact</b> Will continue..
X - vector Mushroom Harvest	<b>X minor impact</b> Past personal use mushroom harvest likely occurred on all ownerships after past fires.	<b>X minor impact</b> Fee commercial harvest permits will be issued	<b>X minor impact</b>
X - vector Driving	<b>X - vehicles are vectors of weeds</b> Driving on open Forest and private roads have occurred.	<b>X - vector</b> Use will continue.	<b>X - vector</b> Use will continue.
X Road Maintenance and BMPs	<b>X may have spread weeds</b> Road work to improve surface drainage, stabilize slopes, and reduce erosion and stream sedimentation has occurred.	<b>X may spread weeds</b> Will continue.	<b>X may spread weeds</b> Will continue.
X - vector Hiking trails	<b>X - vector</b> Boles Creek trail was maintained in 1993.	<b>X - vector</b> Use will continue.	<b>X - vector</b> Use will continue.
X - pathway for weeds Power line & Substation	<b>X - pathway for weeds</b> Northwestern Energy line 100 feet wide	<b>X - pathway for weeds</b> Will continue.	<b>X - pathway for weeds</b> Will continue.
X - vector Grazing	<b>X - vector</b> grazing trespass on Forest Service land has occurred.	<b>X - vector</b> May continue.	<b>X - vector</b> May continue.

Actions on National Forest System Land Only	Past	Present (Spring 2008 – Spring 2009)	Reasonably Foreseeable
<p><b>X may have spread weeds</b> Implementation of Burned Area Emergency Stabilization &amp; Rehabilitation (BAER)</p>	<p><b>X may have spread weeds</b> 9 miles of handline restored; 60 miles of dozer line berms pulled back, logs, topsoil, and organic matter put on fireline to blend with adjacent ground to promote infiltration, erosion control implemented including waterbarring; 30 miles of rehabilitated roads seeded with approved seed mix spot seeding of safety zones, helispots, drop points and staging areas; replaced 3 culverts</p>	<p><b>X may spread weeds</b> repair culverts, re-contour portions of roads.</p>	
<p><b>X may have spread weeds</b> Removal of timber associated with fire suppression and hazard reduction</p>	<p><b>X may have spread weeds</b> Approx. 0.5 mbf was removed from fire</p>	<p><b>X may spread weeds</b> timber removed for fire suppression</p>	<p><b>X may spread weeds</b></p>
<p><b>X -vector</b> Fishing/Camping and Dispersed Sites.</p>	<p><b>X minor impact</b> Fishing and camping at Hidden Lake has a long history of use.</p>	<p><b>X minor impact</b> Use will continue</p>	<p><b>X minor impact</b> Fishing and camping is expected to continue to rise.</p>
<p><b>X minor impact</b> Special Use Permits</p>	<p><b>X minor impact</b> Outfitting and guest ranch for over 10 years.</p>	<p><b>X minor impact</b> Will continue</p>	<p><b>X minor impact</b> Will continue</p>
<p><b>X minor impact</b> Stream Rehabilitation</p>	<p><b>X minor impact-spread or introduction</b> Across the Forest approximately 0.21 miles of stream was rehabilitated in 2007</p>	<p><b>X minor impact</b> This type of work will continue.</p>	<p><b>X minor impact</b> This type of work will continue.</p>
<p><b>X minor impact</b> Road-Stream Crossing Replacements</p>	<p><b>X minor impact-spread or introduction</b> Across the Forest approximately 6 stream crossing replacements occurred in 2007; approx. 55 (majority pipe arch &amp; bridge replacements) On the Seeley Ranger District 6 crossings were removed in 2007 and a total of 66 have been removed since 1996.</p>	<p><b>X minor impact-spread or introduction</b> This type of work will continue.</p>	<p><b>X minor impact-spread or introduction</b> This type of work will continue.</p>
<p><b>X minor impact</b> Miles of Fish Habitat Made Available</p>	<p><b>X minor impact-spread or introduction</b> across the Forest in 2007: Culverts Removed: 6.65 miles and Culvert Replacements: 190 miles Across the Forest since 1996: Culverts Removed: 127.6 miles; Diversion Rehabilitation: 13 miles; Total: 330.6 miles</p>	<p><b>X minor impact-spread or introduction</b> This type of work will continue.</p>	<p><b>X minor impact-spread or introduction</b> This type of work will continue.</p>
<p><b>X -pathways</b> Road Construction</p>	<p><b>X -pathways &amp; introduction</b> The majority of roads built on federal lands were completed between 1950 to the mid- 1980s.</p>	<p>No new system roads are being constructed.</p>	<p>Unlikely any new system roads will be built in the reasonably foreseeable future on NFS land.</p>

Actions on National Forest System Land Only	Past	Present (Spring 2008 – Spring 2009)	Reasonably Foreseeable
<b>X major impact-spread or introduction</b> Road Maintenance	<b>X major impact-spread or introduction</b> Roads open for motorized use by the public are maintained with safety as a high priority. This primarily involves repairing drainage features and clearing live and down vegetation	<b>X major impact-spread or introduction</b> Will continue.	<b>X major impact-spread or introduction</b> Will continue.
<b>X -initially neg, then positive</b> Road Storage and Decommissioning	Across the Forest approximately 788 miles of road under USFS jurisdiction have been closed or decommissioned since 1996. 51.6 miles in 2007. On the Seeley Ranger District approximately 15.2 miles of road were closed or decommissioned in 2007 and 125.2 miles since 1996.		<b>X -initially neg, then positive</b> storage or decommissioning of 9.6 miles of road
<b>X</b> Noxious Weed Control	<b>X</b>	<b>X</b> Noxious weed control (Weed FEIS 2007)	<b>X</b> Will continue.
<b>X major impact-spread or introduction</b> Timber Harvest (see Appendix D, Table D-2)	<b>X major impact-spread or introduction</b> Approximately 34,092 acres of timber have been harvested on National Forest System land in the project area since the 1950s Within the Jocko Lakes Fire Salvage Project area approximately 4,894 acres of timber have been harvested on NFS land.	<b>X major impact-spread or introduction</b> Hidden Lake Timber Sale planned in 2007	

Actions on State and Private Ownership Only	Past	Present (Spring 2008 – Spring 2009)	Reasonably Foreseeable
<b>X major impact-spread or introduction</b> <b>State – School Trust Land:</b> Timber Sales including Jocko Fire Salvage and activities	<b>X major impact-spread or introduction</b>	The DNRC is currently developing a proposed timber permit to salvage harvest approximately 34 acres of burned timber in Section 36 T16N R16W.	DNRC will plant, starting as early as the spring of 2009, new road construction,
<b>X -pathways &amp; introduction</b> <b>State – School Trust Land:</b> Road construction, reconstruction (State)	<b>X -pathways &amp; introduction</b> Jocko Salvage Roadwork – In 2007 the DNRC constructed new roads, reconstructed existing roads, and replaced road features		
<b>X minor impact-spread or introduction</b> <b>State – School Trust Land:</b> Mineral Extraction	<b>X minor impact-spread or introduction</b> flagstone/rock mineral lease		

Actions on State and Private Ownership Only	Past	Present (Spring 2008 – Spring 2009)	Reasonably Foreseeable
<p><b><i>X major impact-spread or introduction</i></b>  <b>Private</b> – Commercial Timber Lands</p>	<p><b><i>X major impact-spread or introduction</i></b>            Since 1999 through 2007 Plum Creek has harvested, with associated actions, approx. 7,600 ac.,</p>	<p><b><i>X major impact-spread or introduction</i></b>            Additional timber harvest can be anticipated on Plum Creek lands within the Jocko fire perimeter.</p>	<p><b><i>X major impact-spread or introduction</i></b>            Additional timber harvest can be anticipated on Plum Creek lands within the Jocko fire perimeter.</p>
<p><b><i>X -vector</i></b>            Private Land Development</p>	<p><b><i>X -vector</i></b>            Within the Jocko Fire perimeter, T16,R16,S12,S ½, has been subdivided and sold to individuals.</p>	<p><b><i>X -vector</i></b></p>	<p><b><i>X -vector</i></b></p>
<p><b><i>X -positive impact</i></b>            Noxious Weed Control</p>	<p>Montana applies herbicides on State lands near or adjacent to the Lolo NF.            Adjacent private landowners control weeds</p>	<p><b><i>X -positive impact</i></b>            Weed control is likely to continue.</p>	<p><b><i>X positive impact</i></b>            Weed control is likely to continue.</p>

## Appendix B. Invasive Plant Road survey results July 2007

Road Number	Type of Road	Weeds found during survey	Miles
16001	Haul	1.5 mi CEMA4; CHLE80; spots: CYOF, CANU4	1.53
	<b>storage</b>	.83 mi infested: CEMA4, CHLE80 spots: CIAR4,CYOF, CANU4	<b>0.83</b>
16003	Haul	.85 mi CEMA4, CHLE80 spots: CIAR4, VETH, CANU4	0.85
16655	Haul	.5 mi CEMA4, CHLE80 Vernal ponds present	0.71
16687	Haul	.5 mi CEMA4, CHLE80 spot CIAR4	0.53
16887	Haul		0.60
	<b>storage</b>	.3 mi CEMA4, CHLE80 spots CIAR4	<b>0.81</b>
16892	Haul	district to survey (Two Moose Rd)	1.44
16898	<b>decom</b>	.5 mi CEMA4, CHLE80 spot CIAR4	<b>0.92</b>
	Haul	1 mi CEMA4, CHLE80 4 spots CIAR4, one spot: <b>HIAU</b> , VETH	0.92
16899	Haul	1 spot CEMA4	1.30
17455	Haul	1.23 mi CEMA4, CHLE80 4 spots CIAR4	1.23
	<b>storage</b>	.89 mi CEMA4, CHLE80	<b>0.89</b>
17457	<b>decom</b>	.49 mi CHLE80, .4 mi CEMA4	<b>0.49</b>
	Haul	1.25 mi CEMA4 & CHLE80	1.98
17458	Haul	.96 mi CEMA4; 1 spot HYPE	0.96
17546	<b>decom</b>	<b>no NNIS; Camas population east of road</b>	<b>0.24</b>
	Haul		0.03
17620	Haul	.2 mi CEMA4 & CHLE80; spot of VETH, 1 of CANU4	0.22
17642	Haul	.74 mi CEMA4 & CHLE80; 5 spots PORE5, 1 of SIAL2, 1 of CIAR4	0.74
17668	Haul	.25 mi CHLE80 + 6 spots CHLE80, 2 of CEMA, 4 of CIAR4	0.35
17682	Haul	.25 mi CHLE80 spots CEMA, CIAR4, HYPE	0.37
		<b>vernal pond nearby</b>	
2190	Haul	district to survey	4.57
2191	Haul	2.35 mi CEMA4 2 spots HYPE	2.35
		<b>Camas patches - 2</b>	

Road Number	Type of Road	Weeds found during survey	Miles
2192	Haul	5 .34 mi CEMA4 5 spots CIAR4, 2 of HYPE	5.34
349	Haul	district to survey	10.03
36000	<b>decom</b>	unsure where this is - GIS layer does not have	<b>0.15</b>
	Haul		0.15
36265	<b>decom</b>	<b>.1 mi CHLE80</b>	<b>0.28</b>
36279	<b>decom</b>	CEMA4 at start <b>Camas</b> both sides of this spur	<b>0.20</b>
	Haul		0.20
36285	Haul	.2 mi CEMA4 & CHLE80; 1 spot CIAR4	0.72
	<b>storage</b>		<b>0.83</b>
36286	<b>storage</b>	2 spots CEMA4, 1 spot CIAR4	<b>0.10</b>
36290	<b>decom</b>	<b>.4 mi CEMA4 .2 mi CHLE80 2 spots CIAR4, 1 of CYOF, 1 of HYPE</b>	<b>0.70</b>
	Haul		0.40
36295	<b>decom</b>	<b>.4 mi CEMA4</b>	<b>0.64</b>
	Haul		0.64
36427	Haul	.25 mi CEMA4,CHLE80; spots PORE, CIAR, SIAL	0.25
	<b>storage</b>	<b>.25 mi. CEMA4, CHLE80</b>	<b>0.25</b>
4339	Haul	1.28 mi CEMA4 & SHLE80; spots CIAR; 3 ac patch CHLE80	1.28
	<b>storage</b>	<b>culvert (1244)</b>	<b>1.28</b>
4342	Haul	.95 mi CEMA4 & CHLE80 3 spots CIAR4	0.95
		<b>vernal pond on Plum Crk land</b>	
4345	Haul	.25 mi CEMA4, 2 spots CHLE80	0.33
4347	Haul	1 spot CIAR4 Camas patch on Plum Crk land sec 9	0.75
	<b>storage</b>	<b>temp spur CEMA4 &amp; CIAR4</b>	<b>1.27</b>
4349	Haul	district will survey	0.65
4367	Haul	district to survey	1.98
		<b>culvert (1222)</b>	
46372	Haul	.49 mi CEMA4, .2 mi CHLE80, 1 spot PORE	0.49
46527	<b>decom</b>	<b>NOT SURVEYED - not highlighted on original map given to surveyors</b>	<b>0.22</b>
	Haul		0.22
46560	Haul	.5 mi CEMA4 & CHLE80; 3 spots CIAR4	0.80

Road Number	Type of Road	Weeds found during survey	Miles
46617	Haul	.21 mi CEMA4	0.21
46622	<b>decom</b>	<b>no NNIS (?)</b>	<b>0.10</b>
	Haul		0.10
60344	Haul	.04 mi CEMA4 & CHLE80	0.04
	<b>storage</b>		<b>0.09</b>
60348	Haul	.25 mi CEMA4 & CHLE80	0.25
9974-2	Haul	district will survey	7.37
9975	Haul	district will survey	0.91
		<b>culvert (1469)</b>	
60348	<b>decom</b>	<b>.39 mi CEMA4 &amp; CHLE80</b>	<b>0.39</b>
	Haul		0.39

Weed common name	Species code
spotted knapweed	CEMA4
oxeye daisy	CHLE80
Canada thistle	CIAR4
mullein	VETH
hounds-tongue	CYOF
sulfur cinquefoil	PORE
St John'swort	HYPE
orange hawkweed	HIAU
tumble mustard	SIAL2
common tansy	TAVU