Appendix B – Botany

Herbicide Effects to Plants by Active Ingredient

Potential Herbicide Effects to SOLI

Determination Statements by Alternative for Each Individual SOLI Location

Draft Revegetation Guidelines Document

This document was printed for the DEIS and removed for the FEIS printing. Information from this document can be found at http://fsweb.r6.fs.fed.us/nr/native-plants/project-planning/

Weed Prevention Practices and Analysis Guidelines

FEIS Annual Implementation Planning Example

Herbicide Effects to Plants by Active Ingredient

This section summarizes the effects to plants by active ingredient. Effects are grouped by the mode of action (how the ingredient kills a plant).

Acetolactate Synthase (ALS) Inhibitors

Chlorsulfuron, metsulfuron methyl, sulfometuron methyl, imazapic, and imazapyr work by inhibiting the activity of an enzyme called acetolactate synthase, which is necessary for plant growth. These five active ingredients are very potent herbicides; very low concentrations kill and damage plants. In some circumstances, these ingredients could damage non-target species more readily than the other groups of herbicides proposed. On the other hand, lower concentrations mean smaller amounts of chemical substances are released into the environment.

The active ingredients and commercial formulations could be difficult to use in areas where native plants are a large component of a treatment area. These ingredients could be useful though, in situations where an invasive plant is the dominant cover species, or on some aggressive species that have not been effectively treated by other methods or herbicides.

Chlorsulfuron

Chlorsulfuron (used in Telar or Glean) is both a pre-emergent and post-emergent herbicide (i.e. it effectively inhibits seed germination and damages fully emerged plants). It could affect annual, biennial and perennial broadleaf species. Drift could cause damage to non-target plants at distances greater than 900 feet from the application site during a ground based broadcast application.

Chlorsulfuron is very potent relative to the application rate. The typical application rate proposed by the Forest Service for chlorsulfuron is greater than 6,000 times higher than the No Observed Effect Concentration (NOEC) in vegetative vigor studies on less tolerant species (sugarbeets and onions) (SERA, 2003-chlorsulfuron). This means that extremely small amounts will cause observable damage in these species. The risk assessment stated that a very broad range of sensitivities could occur, with grasses appearing far more tolerant than most other species.

The NOEC values for soil exposure used for seedling emergence testing were found to be substantially higher than the vegetative vigor studies (i.e. it would take a higher concentration of the ingredient to cause an observable effect on emerging seedlings than on vegetative vigor of older plants). Nonetheless, offsite movement of chlorsulfuron in runoff could damage non-target plants under conditions that favor runoff. In arid regions, wind erosion of treated soil could also result in damage to non-target plants (SERA, 2003-chlorsulfuron).

Chlorsulfuron has been shown to reduce non-target plant reproduction in a study done on cherry trees (Fletcher et al., 1993). The authors asserted that cherry tree reproduction displayed high sensitivity even when exposed to small quantities of chlorsulfuron, such as might be found in airborne particles traveling long distances, without altering vegetative growth. They postulated that drifting sulfonylureas might severely reduce both crop yields and fruit development on native plants. The same authors in another study compared three herbicides, atrazine, chlorsulfuron, glyphosate at low application rates (within the range of reported herbicide drift levels) to four other crop plants. Only chlorsulfuron was found to cause reduction in the yields of these crops if plants were exposed at critical stages of development (Fletcher et al., 1996).

Metsulfuron methyl

Metsulfuron methyl (used in Escort XP) is also a potent herbicide. It affects many broadleaf and woody species.

This ingredient could cause damage to non-target plants at distances of up to 500 feet using a ground based broadcast application. For metsulfuron methyl, the typical application rate is greater than 800 times higher than the NOEC for less tolerant plants (onions) (SERA, 2003).

The offsite movement of this ingredient in runoff could damage non-target plants under conditions favorable to runoff, although this is less likely with metsulfuron methyl than chlorsulfuron. In arid regions, wind erosion could also result in damage to non-target species (SERA 2003).

Sulfometuron methyl

Sulfometuron methyl (used in Oust) is a broad-spectrum pre- and post-emergent herbicide. It is less selective than chlorsulfuron or metsulfuron methyl and is effective against broadleaf and grass species. Sulfometuron methyl drift could cause damage to non-target plants at distances greater than 900 feet from the application site during a ground based broadcast application. Typical application rate is greater than 1875 times higher than the NOEC for less tolerant plants. The offsite movement of this ingredient in runoff could damage non-target plants under conditions favorable to runoff. This kind of offsite movement is more likely with sulfometuron methyl than with chlorsulfuron and metsulfuron methyl. In arid regions, wind erosion could also result in damage to non-target species (SERA, 2003).

Imazapic

Imazapic (used in Plateau) is a selective herbicide, but even tolerant plants that are directly sprayed at normal application rates are likely to be damaged (SERA 2003). Affected plants include annual, perennial broadleaf and grass species. Many native bunchgrasses are not affected. Less tolerant species can be affected by drift up to 50 feet from ground applications and up to 100 feet from aerial applications. In clay soils in areas of relatively high rainfall rates, conditions in which runoff is favored, there could be a slight risk to some susceptible terrestrial plants. Imazapic is more selective than imazapyr. It is less likely to harm native plants or plant communities.

Imazapyr

Imazapyr (used in Arsenal, Chopper and Stalker®) is a non-selective herbicide. Tolerant plants that are directly sprayed at normal application rates are likely to be damaged (SERA, 2003-Imazapyr). Less tolerant species can be affected by drift up to 500 feet by imazapyr. Imazapyr can also "leak" out of the roots of treated plants, and therefore can adversely affect the surrounding native vegetation (Tu et al., 2001). When applied in areas in which runoff is favored, damage from runoff appears to pose a greater hazard than drift. Residual soil contamination could be prolonged in some areas. In arid areas, residual toxicity to susceptible plant species could last for several months to several years. Residual contamination could be much shorter in areas of relatively high rainfall (SERA, 2003-Imazypyr).

Synthetic auxins

Picloram, clopyralid, and triclopyr mimic naturally occurring plant hormones called auxins. They kill plants by destroying tissue through uncontrolled cell division and abnormal growth.

Picloram

Picloram (used in Tordon®) is selective for broadleaf and woody plants. It could impact non-target species particularly sensitive to this chemical at distances of nearly 1000 feet from the application site (SERA, 2003-Picloram).

In their Pesticide Re-registration Fact Sheet (1995), the EPA noted that picloram poses very significant risks to non-target plants. Estimated concentrations of picloram in the environment are hundreds to thousands of times the "level of concern" at which 25 percent of seedlings fail to emerge. The EPA also noted that picloram is highly soluble in water, resistant to biotic and abiotic degradation processes, and

mobile under both laboratory and field conditions. They stated that there is a high potential to leach to groundwater in most soils.

Plant damage could occur from drift, runoff, and distant areas where ground water is used for irrigation or is discharged into surface water (EPA, 1995). Labeling restrictions from these findings were implemented to reduce effects. Because picloram persists in soil, non-target plant roots can take up picloram (Tu et al., 2001) and could impact revegetation efforts. Lym et al. (1998) recommended that livestock not be transferred from treated grass areas onto sensitive broadleaf crop areas for 12 months or until picloram has disappeared from the soil without first allowing seven days of grazing on an untreated green pasture. Otherwise, urine may contain enough picloram to injure susceptible plants. To a lesser degree, this can occur with other active ingredients such as glyphosate and imazapic.

Clopyralid

Clopyralid (used in Transline) is more selective than picloram. As with picloram, clopyralid has little effect on grasses, but also does little harm to members of the mustard family. It is effective on the sunflower, legume, nightshade, knotweed and violet families. It is less persistent than picloram. Off-site drift may cause damage to susceptible plant species at distances of about 300 feet from the application site. Wind erosion of treated soil in arid climates could also cause damages in the range of 200 to 900 feet. Use of clopyralid in a roadside revegetation project had mixed results (Tyser et al., 1988). Native grasses increased while native forbs decreased, which is typical for an ingredient that is selective against forbs. However, non-native annual grasses increased in this study.

Triclopyr

Triclopyr (used in Garlon®) is a selective systemic herbicide. It is used on broadleaf and woody species. It is commonly used against woody species in natural areas (Tu et al., 2001). Sensitive species could be impacted by drift from 100 feet (typical Forest Service application rate) to 1000 feet (maximum US Forest Service application rate) (SERA, 2003-Triclopyr). Two forms of triclopyr could be used with differing degrees of effects. Triclopyr BEE (butoxyethyl ester) is more toxic to plants than triclopyr TEA (triethylamine salt). Triclopyr BEE formulations are more apt to damage plants from runoff than other formulations. Both formulations have been found to decrease the relative long-term abundance and diversity of lichens and bryophytes. Newmaster et al. (1999) stated drift from triclopyr could affect the sustainability of populations of lichens and bryophytes, where these ingredients reduced abundance. They found that normal application rates (applied aerially) were found to reduce abundance by 75 percent, variable by species. Colonists and drought-tolerant species were more resistant than the mesophytic forest species, which means that herbicide treatments could essentially push back the successional stage on a non-vascular community. Triclopyr was found to inhibit growth of four types of ectomychorrhizal fungi associated with conifer roots at concentrations of 1,000 parts per million (Estok et al., 1989).

EPSP Synthase Inhibitors

Glyphosate - preventing plants from synthesizing three aromatic amino acids. The key enzyme inhibited by glyphosate is called EPSP.

Glyphosate

Glyphosate (used in 35 formulations including RoundUp® and Rodeo®) is a non-selective systemic herbicide that can damage all groups or families of non-target plants to varying degrees, most commonly from off-site drift. Plants susceptible to glyphosate can be damaged by drift up to 100 feet from the application site at the highest rate of application proposed. More tolerant species are likely to be damaged at distances up to 25 feet (SERA, 2003-glyphosate). Non-target species are not likely to be affected by runoff based on the NOEC for pre-emergent vegetation.

Glyphosate strongly adsorbs to soil, and has a low potential to leaching into groundwater systems (SERA, 2003-glyphosate). Because it adsorbs readily to soils, plant roots do not readily absorb it. Non-target species will not be impacted through their roots.

Some field studies have been conducted using glyphosate. Miller et al. (1999) found no effects to plant diversity in an 11-year study on site preparation using herbicides, though the structural composition and perennial species presence were changed. Such differences in overstory and understory vegetation may have ecological implication. For instance, reductions in several species (Vaccinium and Prunus species) in the understory could affect wildlife species dependent on them for food, and could also affect traditional gathering of these species. As discussed in the effects summary of triclopyr, Newmaster et al. (1999) raised concern that drift from glyphosate as well could affect long term sustainability of populations of lichens and bryophytes.

Acetyl CoA Caroxylase (ACCase) Inhibitors

Sethoxydim inhibits acetyl CoA carboxylase, the enzyme responsible for catalyzing an early step in fatty acid synthesis. Non-susceptible species have a different CoA carboxylase binding site, rendering them immune to the effects.

Sethoxydim

Sethoxydim (used in Poast®) kills post-emergent annual and perennial grasses by preventing the synthesis of lipids. Because sethoxydim is water-soluble and does not bind strongly with soils, it can be highly mobile in the environment. Rapid degradation generally limits extensive movement. In water, sethoxydim can be degraded by sunlight within several hours (Tu et al., 2001). For relatively tolerant species, there is no indication that damage from drift would result at distances more than 25 feet from application sites. For susceptible species, there is a possibility of damage no greater than 50 feet from application sites. Runoff could cause damage to susceptible plants in areas of high rainfall (SERA, 2001-sethoxydim).

Potential Herbicide Effects to SOLI

Herbicide effects are based on specific characteristics of the chemical, the target families, and restrictions of use based on EPA label and Regional FEIS guidelines. All methods of application are considered in effects analysis. N = Herbicide would not affect SOLI plant species (reasons explained) Y = Herbicide could potentially affect this species and herbicide related PDF's must be applied.

SOLI	**Chlorsulfuron PDFs to protect individual plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Clopyralid Targets Asteraceae, Fabaceae, Polygonaceae, Solanaceae**	**Glyphosate Non-selective; PDFs to protect from direct spray; runoff not a concern**	**Imazapic Somewhat selective PDFs to protect from direct spray, drift, runoff and timing after use of other herbicides**	**Imazapyr Non-selective; PDF's to protect plants from direct spray, drift runoff**	**Metsulfuron methyl Selective for some broadleaf and woody species and can damage conifers PDFs to protect individual plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Picloram Targets Asteraceae, Fabaceae, Polygonaceae, Apiaceae- also Brassicaceae, Liliaceae, Scrophulariaceae (less affected) PDFs to protect from direct spray drift, runoff, buffers, fall application by TES plants and other special situation**	**Sethoxydim Selective for annual and perennial grasses and target invasives**	**Sulfometuron methyl Non-selective; PDFs to protect plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Triclopyr Selective for broadleaf and woody plants. Selective application methods only spot, wiping, basal bank and cut stump application**
Achnatherum wallowaensis	Not sure, assume worst case scenario and apply PDF's and monitoring to determine potential impacts	N Poaceae is not a target and tolerant	Y	Y	Y	Not sure, assume worst case scenario and apply PDF's and monitoring to determine potential impacts	Not sure, assume worst case scenario and apply PDF's and monitoring to determine potential impacts	Y	Not sure, assume worst case scenario and apply PDF's and monitoring to determine potential impacts	N Poaceaw is not a target and is tolerant
Allium geyeri var. geyeri	Y	N Liliaceae is not a target	Y	Y	Y	Y	Y	N Broadleaved plants are tolerant of this herbicide N	Y	Y, if target invasive is nearby
Arabis hastatula	Y	N Crucifereaceae is not target	Y	Y	Y	Y	Y	N Broadleaved plants are tolerant of this herbicide	Y	Y, if target invasive is nearby

SOLI	**Chlorsulfuron PDFs to protect individual plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Clopyralid Targets Asteraceae, Fabaceae, Polygonaceae, Solanaceae**	**Glyphosate Non-selective; PDFs to protect from direct spray; runoff not a concern**	**Imazapic Somewhat selective PDFs to protect from direct spray, drift, runoff and timing after use of other herbicides**	**Imazapyr Non-selective; PDF's to protect plants from direct spray, drift runoff**	**Metsulfuron methyl Selective for some broadleaf and woody species and can damage conifers PDFs to protect individual plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Picloram Targets Asteraceae, Fabaceae, Polygonaceae, Apiaceae- also Brassicaceae, Liliaceae, Scrophulariaceae (less affected) PDFs to protect from direct spray drift, runoff, buffers, fall application by TES plants and other special situation**	**Sethoxydim Selective for annual and perennial grasses and target invasives**	**Sulfometuron methyl Non-selective; PDFs to protect plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Triclopyr Selective for broadleaf and woody plants. Selective application methods only spot, wiping, basal bank and cut stump application**
Botrychium species: B crenulatum, B. minganese, B. montanum, B. pinnatum	Y	N Ophioglossaceae is not target	Y	Y	Y	Y	Not sure, assume worst case scenario and apply all PDF's	N Broad leaved plants tolerate this herbicide	Y	Y, if target invasive is nearby
Calochortus longebarbatus var. longebarbatus	Y	N Liliaceae not target family	Y	Y	Y	Y	Liliaceae less susceptible to this herbicide, monitoring indicates no effect	N Broadleaved plants tolerate this herbicide	Y	Y if target invasive species is nearby
Carex hystericina	Not likely due to species habitat preference for wetter habitat and herbicide use and buffer restrictions. If treatment allowed follow all PDF's.	N Cyperaceae not a target family	Y	Y	Y	Not sure, apply all PDF's	Not sure, assume worst case scenario apply all PDF's	N, Sedges tolerate this herbicide	Not sure, apply all PDF's	Y if target invasive species is nearby
Carex interior	Not likely due to species habitat preference for wetter habitat and herbicide use and buffer restrictions. If	N Cyperaceae not a target family	Y	Y	Y	Not sure, apply all PDF's	Not sure, assume worst case scenario apply all PDF's	N, Sedges tolerate this herbicide	Not sure, apply all PDF's	Y if target invasive species is nearby

SOLI	**Chlorsulfuron PDFs to protect individual plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Clopyralid Targets Asteraceae, Fabaceae, Polygonaceae, Solanaceae**	**Glyphosate Non-selective; PDFs to protect from direct spray; runoff not a concern**	**Imazapic Somewhat selective PDFs to protect from direct spray, drift, runoff and timing after use of other herbicides**	**Imazapyr Non-selective; PDF's to protect plants from direct spray, drift runoff**	**Metsulfuron methyl Selective for some broadleaf and woody species and can damage conifers PDFs to protect individual plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Picloram Targets Asteraceae, Fabaceae, Polygonaceae, Apiaceae- also Brassicaceae, Liliaceae, Scrophulariaceae (less affected) PDFs to protect from direct spray drift, runoff, buffers, fall application by TES plants and other special situation**	**Sethoxydim Selective for annual and perennial grasses and target invasives**	**Sulfometuron methyl Non-selective; PDFs to protect plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Triclopyr Selective for broadleaf and woody plants. Selective application methods only spot, wiping, basal bank and cut stump application**
	treatment allowed follow all PDF's.									
Carex cordillerana	Not likely due to species habitat preference for wetter habitat and herbicide use and buffer restrictions. If treatment allowed follow all PDF's.	N Cyperaceae not a target family	Y	Y	Y	Not sure, apply all PDF's	Not sure, assume worst case scenario apply all PDF's	N, Sedges tolerate this herbicide	Not sure, apply all PDF's	Y if target invasive species is nearby
Erigeron engelmannii var. davisii	Y	Y Asteraceaea family is target	Y	Y	Y	Y	Y	N Broadleaved plants are tolerant of this herbicide	Y	Y, if target invasive is nearby
Leptodactylon pungens ssp. hazeliae	Y	N Polemoniaceaea not a target family	Y	Y	Y	Y	Not sure, assume worst case scenario apply all PDF's	N Broadleaved plants are tolerant of this herbicide	Y	Y if target invasive is nearby
Mimulus clivicola	Y	N Scrophulariaceae is not a target family	Y	Y	Y	Y	Y	N Broadleaved plants are tolerant of	Y	Y, if target invasive is nearby

SOLI	**Chlorsulfuron PDFs to protect individual plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Clopyralid Targets Asteraceae, Fabaceae, Polygonaceae, Solanaceae**	**Glyphosate Non-selective; PDFs to protect from direct spray; runoff not a concern**	**Imazapic Somewhat selective PDFs to protect from direct spray, drift, runoff and timing after use of other herbicides**	**Imazapyr Non-selective; PDF's to protect plants from direct spray, drift runoff**	**Metsulfuron methyl Selective for some broadleaf and woody species and can damage conifers PDFs to protect individual plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Picloram Targets Asteraceae, Fabaceae, Polygonaceae, Apiaceae- also Brassicaceae, Liliaceae, Scrophulariaceae (less affected) PDFs to protect from direct spray drift, runoff, buffers, fall application by TES plants and other special situation**	**Sethoxydim Selective for annual and perennial grasses and target invasives**	**Sulfometuron methyl Non-selective; PDFs to protect plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Triclopyr Selective for broadleaf and woody plants. Selective application methods only spot, wiping, basal bank and cut stump application**
								this herbicide		
Mirabilis macfarlanei	Y	N Nyctaginaceae is not a target family	Y	Y	Y	Y	Not sure, assume worst case scenario apply all PDF's	N Broadleaved plants are tolerant of this herbicide	Y	Y, if target invasive is nearby
Phacelia minutissima	Y	N Hydrophyllaceae is not a target family	Y	Y	Y	Y	Not sure, assume worst case scenario apply all PDF's	N Broadleaved plants are tolerant of this herbicide	Y	Y, if target invasive is nearby
Phlox multiflora	Y	N Polemoniaceae is not target family	Y	Y	Y	Y	Not sure, assume worst case scenario apply all PDF's	N Broadleaved plants are tolerant of this herbicide	Y	Y, if target invasive is nearby
Platanthera obtusata	Y	N Orchidaceae is not a target family	Y	Y	Y	Y	Not sure, assume worst case scenario apply all PDF's	N Broadleaved plants are tolerant of this herbicide	Y	Y, if target invasive is nearby
Primula cusickiana	Y	N Primulaceae is not a target family	Y	Y	Y	Y	Not sure, assume worst case scenario apply all PDF's	N Broadleaved plants are tolerant of	Y	Y, if target invasive is nearby

SOLI	**Chlorsulfuron PDFs to protect individual plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Clopyralid Targets Asteraceae, Fabaceae, Polygonaceae, Solanaceae**	**Glyphosate Non-selective; PDFs to protect from direct spray; runoff not a concern**	**Imazapic Somewhat selective PDFs to protect from direct spray, drift, runoff and timing after use of other herbicides**	**Imazapyr Non-selective; PDF's to protect plants from direct spray, drift runoff**	**Metsulfuron methyl Selective for some broadleaf and woody species and can damage conifers PDFs to protect individual plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Picloram Targets Asteraceae, Fabaceae, Polygonaceae, Apiaceae- also Brassicaceae, Liliaceae, Scrophulariaceae (less affected) PDFs to protect from direct spray drift, runoff, buffers, fall application by TES plants and other special situation**	**Sethoxydim Selective for annual and perennial grasses and target invasives**	**Sulfometuron methyl Non-selective; PDFs to protect plants from direct spray, drift, runoff, wind erosion. No aerial application**	**Triclopyr Selective for broadleaf and woody plants. Selective application methods only spot, wiping, basal bank and cut stump application**
								this herbicide		
Rubus bartonianus	Y	N Rosaceae is not a target family	Y	Y	Y	Y	Not sure, assume worst case scenario apply all PDF's	N Broadleaved plants are tolerant of this herbicide	Not sure, assume worst case scenario and apply PDF's and monitoring to determine potential impacts	Y, if target invasive is nearby
Trifolium douglasii	Y	Y Fabaceae is target family	Y	Y	Y	Y	Not sure, assume worst case scenario apply all PDF's	N, broadleaves plants tolerate this herbicide	Y	Y, if target invasive is nearby
Trollius laxus	Y	N Ranunculaceae is not a target family	Y	Y	Y	Not sure, assume worst case scenario and apply PDF's and monitoring to determine potential impacts	Not sure, assume worst case scenario apply all PDF's	N Broadleaved plants are tolerant of this herbicide	Y	Y, if target invasive is nearby

Determination Statements by Alternative for each individual SOLI location

Site No	GENUS	SPECIES	Invasive Plant Code	Determination statements derived from impacts from invasive plant treatments in combination with treatment effectiveness				Proposed treatment for Alternative B, C and D 1st choice. Other methods also available
				Alt A	Alt B	Alt C	Alt D	
0616020241	*Achnatherum*	*wallowaensis*	CEMA4	MIIH	MIIH	MIIH	MIIH	Chemical
0616020502	*Achnatherum*	*wallowaensis*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616041176	*Allium*	*geyeri*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616041252	*Arabis*	*hastatula*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616041347	*Arabis*	*hastatula*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616012117	*Botrychium*	*crenulatum*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616012102	*Botrychium*	*minganense*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616012103	*Botrychium*	*minganense*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616012118	*Botrychium*	*minganense*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616060138	*Botrychium*	*minganense*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616062224	*Botrychium*	*minganense*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616012115	*Botrychium*	*montanum*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616012124	*Botrychium*	*montanum*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616012126	*Botrychium*	*montanum*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616060178	*Botrychium*	*montanum*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616062223	*Botrychium*	*montanum*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616062225	*Botrychium*	*montanum*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616012104	*Botrychium*	*pinnatum*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616012125	*Botrychium*	*pinnatum*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616012213	*Botrychium*	*pinnatum*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616060158	*Botrychium*	*pinnatum*	SEJA	MIIH	MIIH	MIIH	MIIH	Chemical
0616060016	*Calochortus*	*longebarbatus*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616060115	*Calochortus*	*longebarbatus*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616060131	*Calochortus*	*longebarbatus*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616060943	*Calochortus*	*longebarbatus*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616060952	*Calochortus*	*longebarbatus*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616040513	*Calochortus*	*macrocarpus*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616041078	*Carex*	*hystericina*	CEMA4	MIIH	MIIH	MIIH	MIIH	Manual
0616041364	*Carex*	*hystericina*	CEMA4	MIIH	MIIH	MIIH	MIIH	Chemical
0616012151	*Carex*	*interior*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616062226	*Carex*	*interior*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616020247	*Erigeron*	*engelmannii*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616020248	*Erigeron*	*engelmannii*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616020249	*Erigeron*	*engelmannii*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616020250	*Erigeron*	*engelmannii*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616020251	*Erigeron*	*engelmannii*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616021357	*Erigeron*	*engelmannii*	ONAC	MIIH	MIIH	MIIH	MIIH	Chemical
0616022087	*Erigeron*	*engelmannii*	ONAC	MIIH	MIIH	MIIH	MIIH	Chemical
0616022088	*Erigeron*	*engelmannii*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616022089	*Erigeron*	*engelmannii*	CESO3	MIIH	MIIH	MIIH	MIIH	Chemical
0616022090	*Erigeron*	*engelmannii*	CESO3	MIIH	MIIH	MIIH	MIIH	Chemical
0616040469	*Erigeron*	*engelmannii*	CESO3	MIIH	MIIH	MIIH	MIIH	Chemical
0616040480	*Erigeron*	*engelmannii*	ONAC	MIIH	MIIH	MIIH	MIIH	Chemical
0616040216	*Leptodactylon*	*pungens*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616041141	*Leptodactylon*	*pungens*	CESO3	MIIH	MIIH	MIIH	MIIH	Chemical
0616012134	*Mimulus*	*clivicola*	CYOF	MIIH	MIIH	MIIH	MIIH	Chemical

Site No	GENUS	SPECIES	Invasive Plant Code	Determination statements derived from impacts from invasive plant treatments in combination with treatment effectiveness				Proposed treatment for Alternative B, C and D 1st choice. Other methods also available
				Alt A	Alt B	Alt C	Alt D	
0616040294	*Mimulus*	*clivicola*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616040295	*Mimulus*	*clivicola*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616040296	*Mimulus*	*clivicola*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616040297	*Mimulus*	*clivicola*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616040382	*Mimulus*	*clivicola*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616040385	*Mimulus*	*clivicola*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616040539	*Mimulus*	*clivicola*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616041039	*Mimulus*	*clivicola*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616041045	*Mimulus*	*clivicola*	CIAR4	MIIH	MIIH	MIIH	MIIH	Bio-control
0616041109	*Mimulus*	*clivicola*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616041391	*Mimulus*	*clivicola*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616041392	*Mimulus*	*clivicola*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616040488	*Mirabilis*	*macfarlanei*	CESO3	LAA	LAA	LAA	LAA	Chemical
0616040494	*Mirabilis*	*macfarlanei*	ONAC	LAA	LAA	LAA	LAA	Chemical
0616040217	*Phacelia*	*minutissima*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616060123	*Phlox*	*multiflora*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616060149	*Phlox*	*multiflora*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616060150	*Phlox*	*multiflora*	CADR	MIIH	MIIH	MIIH	MIIH	Chemical
0616060151	*Phlox*	*multiflora*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616060152	*Phlox*	*multiflora*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616050462	*Platanthera*	*obtusata*	CEMA4	MIIH	MIIH	MIIH	MIIH	Chemical
0616020286	*Primula*	*cusickiana*	CEMA4	MIIH	MIIH	MIIH	MIIH	Chemical
0616020292	*Primula*	*cusickiana*	CYSC4	MIIH	MIIH	MIIH	MIIH	Chemical
0616020339	*Primula*	*cusickiana*	CYSC4	MIIH	MIIH	MIIH	MIIH	Bio-control
0616040300	*Primula*	*cusickiana*	HYPE	MIIH	MIIH	MIIH	MIIH	Chemical
0616041212	*Primula*	*cusickiana*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616040218	*Rubus*	*bartonianus*	CESO3	MIIH	MIIH	MIIH	MIIH	Chemical
0616040380	*Rubus*	*bartonianus*	LIDA	MIIH	MIIH	MIIH	MIIH	Chemical
0616060859	*Trifolium*	*douglasii*	PORE5	MIIH	MIIH	MIIH	MIIH	Chemical
0616060860	*Trifolium*	*douglasii*	PORE5	MIIH	MIIH	MIIH	MIIH	Chemical
0616060941	*Trifolium*	*douglasii*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616060942	*Trifolium*	*douglasii*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical
0616062299	*Trifolium*	*douglasii*	CIAR4	MIIH	MIIH	MIIH	MIIH	Chemical
0616040210	*Trollius*	*laxus*	CEDI3	MIIH	MIIH	MIIH	MIIH	Chemical

Draft Revegetation Guidelines Document

Guidelines for Revegetation of Invasive Weed Sites and Other Disturbed Areas on National Forests and Grasslands in the Pacific Northwest

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This document was printed in full for the DEIS and removed for the FEIS printing. Information from this document is available on http://fsweb.r6.fs.fed.us/nr/native-plants/project-planning/

Wallowa-Whitman National Forest

Weed Prevention Practices and Analysis Guidelines

A. Prevention Strategies and Tactics from the Forest Integrated Noxious Weed Management Plan (1992)

Project Planning

1. Noxious weed management is to be treated as a mandatory issue or concern within ALL NEPA planning activities where ground disturbance is likely. Prevention will be addressed as a part of the management constraints or requirements as well as being an evaluation criterion where appropriate.

2. NEPA analyses must consider the costs associated with preventing the occurrence or spread of noxious weeds

3. Project level personnel should be able to recognize noxious weeds occurring on or adjacent to their Districts and should be able to recognize potential invaders.

Vegetation Management

4. To the extent practical and feasible, with full consideration of other silvicultural and resource objectives, silvicultural prescriptions should strive to maintain as much shade as possible on site and to limit the amount of soil disturbance.

5. Logging systems should consider the objectives of maintaining ground cover, maintaining shade providing features, and minimizing ground disturbance when designing logging systems for a particular stand.

6. Stand exams, botanical inventories, range analyses, and other resource inventories will include a process for inventorying noxious weed occurrences by stand, species, size of infestation and location as a minimum.

7. Project or contract maps will show currently inventoried, high priority noxious weed infestations as a means of aiding in avoidance or monitoring.

8. Commensurate with anticipated risk of invasion or spread of noxious weeds, ground disturbing activities may need to include both a pre and one or more post project surveys to document pre-existing infestations and to evaluate the effects of the project on noxious weeds. The intensity and frequency of this survey should vary according to the risk/probability of the project affecting or being affected by noxious weed infestations. This risk should be evaluated during initial or periodic project planning and should be coordinated with the District noxious weed coordinator. Where monitoring is needed, it should be planned to continue for at least five years.

9. Where existing inventories or pre-project inventories indicate that an infestation occurs on or near a ground disturbing project, the project will be designed, in coordination with the District noxious weed coordinator, to plan for the long term management of the infestation and to prevent the spread of the infestation off site.

Depending on an assessment of the potential risk for introduction or spread of noxious weeds, this will often involve designing projects (including the implementing contracts, permits, etc.) so that the operator will not be working on high risk areas during the time when the weeds are capable of being spread by the operation. In the timber sale contract, C5.12 (Use of Roads by Purchaser), C5.4 (General and Special Maintenance Requirements, and C6.315 (Sale Operation Schedule) give the Districts the flexibility to keep contract vehicles out of high risk areas during the high risk times of the season These type of requirements can also be incorporated in Federal Acquisition Regulation contracts in Section H – Special Contract Requirements.

10. Contract clause language will be developed along the following general lines. These clauses will be submitted to the Regional Office for review and final approval. Implementation will not occur until such time as the clauses have received Regional Office approval.

If an assessment of risk conducted by the Forest Officer in charge of a project, and in full coordination with the District noxious weed coordinator, indicates a high risk of introduction or spread of noxious weeds through transport by logging, road construction, or other ground disturbing equipment, and unless otherwise agreed to in writing, all equipment to be operated on a project area will be cleaned in a manner sufficient to prevent noxious weeds from being carried on to the project area. This requirement does not apply to passenger vehicles or other equipment used exclusively on roads. Cleaning, if needed, will occur in a site to be established by the District Ranger, in coordination with the equipment owners or operators and the County Weed Board. Cleaning will be inspected and approved by the Forest Officer in charge of the specific project.

Where log trucks or other large equipment make delivery to or haul from purchaser's/contractor's yards infested by noxious weeds, the yard owner will be required to eradicate the noxious weeds from the yard/scaling site through an amendment to the yard scaling agreement or other contract provision as appropriate.

11. Where timber purchaser' log yards or other contractors equipment yards are known or suspected to be infested by noxious weeds, encourage their cleanup through working with the purchaser/contractor and the County Weed board.

Revegetation/Restoration

12. Ensure that all disturbed ground is revegetated as soon as possible after disturbance. Consider regeneration or other resource objective needs in planning for species to be seeded to be seeded, timing rates, etc. Rehabilitate bare ground unless it can be documented that natural or artificial regeneration can accomplish the same prevention objectives as seeding within a reasonable time frame.

13. Favor the use of native species (or domestic varieties of native species) in preference to introduced species for seeding for site protection when the native species can accomplish the site objectives in a reasonable timeframe and costs are not excessive.

14. Within the constraints of meeting other resource objectives, use the species and mixes that will most rapidly occupy a site. Consider seeding a fast germinating annual in the mix to provide a suitable ground cover as rapidly as possible.

15. Where there are no other multiple resource constraints, such as along road cuts and fills, consider use of sod-forming species as a major part of the mix.

16. All seed purchased or otherwise designated or accepted for use on National Forest System Lands will be required to be tested for "all states noxious weeds" according to AOSA (Association of Official Seed Analysts) standards and will be certified in writing a Registered Seed Technologist or Seed Analyst as meeting the requirements of the Federal Seed Act and the appropriate State Seed Law for the state in which application is planned to occur, regarding the testing, labeling, sale and transport of prohibited and restricted noxious weeds.

> Prior to acceptance of purchased seed, or use of seed by a purchaser, contractor, subcontractor, cooperator, or by the Forest Service, a sample meeting the AOSA standards for sample size and method of acquisition (see Appendix O) will be submitted to either the Oregon State University Seed Testing Laboratory or another seed testing facility for testing by a Registered Seed Technologist or Seed Analyst (as certified through either the AOSA for State and Federal analysts/technologists of the Society of Commercial Seed Technologists) for "all states noxious weeds." Only after a finding and documentation in writing of no weed seeds on the "all states noxious weeds" listing in excess of state limitations for prohibited and restricted weed seed will the seed be accepted and used.

17. When hay or straw is to be used for mulching, for erosion control, fire rehabilitation or other uses, it should be noxious weed free. Until a Regional or State process can be developed to ensure certification of hay or straw, the following process will be followed:

> Contact the local County Extension Agent to determine which farmers in the area are participating in the certified grass seed or grain programs. The County Agent may also be able to aid in determining which of the certified growers may also be baling the straw. To the extent possible, use only straw obtained from fields participating in the certification program.
>
> Monitor the applications site on a scheduled basis for a minimum of five years after use of the straw. This program will not ensure that the straw is totally weed free but is the best option available at this time.

Range Management

18. In the development of Allotment Management Plans and Annual Operating Plans, consider the potential for introduction of noxious weed seed through animal transport. 19. Where the livestock are entering the Forest from a known noxious weed infested area, consider requiring the feeding of the animals (at permittee expense) weed free hay (or other weed free forage or feeds) for 9 to 10 days prior to permitting ingress on to the general area of the National Forest allotment. The feeding area will, if at all possible, be on non-National Forest System lands. If this is not practical, confine the animals in as small a pasture as feasible for the 9-10 day period. This pasture will then require annual monitoring for the occurrence of noxious weeds (and management as appropriate). Under no circumstances will this strategy be applied in a manner inconsistent with Forest Plan standards nor in a manner which will result in resource degradation.

19. Consider the exclusion of livestock (and wildlife where feasible) from high priority noxious weed sites where the animals are likely to cause a spread of the weed off site.

20. In the AMP's to the extent possible, provide for the use of livestock as a tool in preventing palatable, non-poisonous noxious weeds from setting seed (e.g.: sheep grazing of leafy spurge).

21. In the Annual Operating Plans, provide information to the permittees regarding noxious weed infestations. To the extent possible after seed set, encourage livestock to avoid sites where the seeds are likely to be transmitted by the livestock (i.e., either through ingestion and excretion or through attachment to the animal and then dropping off).

22. In the Annual Operating Plans, provide information to the permittees regarding noxious weed identification, methods of spread and prevention measures.

Mining

23. Review Mineral Operating Plans to ensure that proper actions are taken to prevent the establishment of new infestations or the spread of existing ones. Ensure that disturbed sites are rehabilitated and revegetated as soon after disturbance as possible. Consider the use of annual cover crops where an area will be left in a disturbed condition for period of time prior to being re-worked.

Recreation

24. For recreational livestock use authorized under permit (such as outfitter-guide permits), permit only the use of feeds with a high probability of being free of noxious weeds (such as heat treated and pressurized pelletized feed).

25. For recreational and other livestock use not required to be under a permit, develop a process to prohibit the use of feeds on National Forest System lands unless they are accompanied a certification insuring their weed free status or are such that they have a high probability of being free of noxious weeds (such as heat treated and pressurized pelletized feed).

26. Where feasible, cooperate with the County Weed Boards and other cooperators to provide a hay exchange program during hunting seasons (e.g., Wallowa County).

27. Where recreational vehicle activity such as off road vehicle (ORV) use is occurring in an area where noxious weeds are present or are resulting in a ground disturbing activity such that potential invasion sites are available for noxious weeds, consider closing the area to motorized vehicle use and/or conducting revegetation efforts to minimize sites available for weed spread or invasion.

> Where ORV use is restricted to a specified area, that area, because of the extensive disturbance to the soil and vegetative cover, will need to be closely monitored for noxious weeds. Planning for the ORV area must consider prevention as a high priority.

28. By District or Zone, conduct a Forest-wide inventory for noxious weeds. Concentrate on high priority species (e.g., potential and new invaders) and on areas where ground disturbing activities are common.

Travel and Access Management

29. Road management objectives should consider the benefits and costs associated with allowing or encouraging desirable herbaceous vegetation growth on shoulders, cuts and fills versus the potential for invasion by noxious weeds and the long term costs associated with treatments and off site effects.

30. Road maintenance planning will address practices to prevent the spread of noxious weeds.

31. Where shoulders or drainage ditches are covered by desirable herbaceous cover, consider leaving it in place rather than blading it off if such a practice can be done without causing excessive damage to the road surface or significant public safety hazards.

32. When blading, brushing, rock raking, or otherwise maintaining a road surface where a noxious weed infestation is located the COR/ER (or road maintenance foreman) will work with the District noxious weed coordinator to ensure that appropriate inventory and treatment measures are applied. The following are suggested practices:

Ensure that the contractor notifies the COR/ER in timely enough manner so that the road can be checked for the current status of noxious weeds prior to any work occurring. Weed sites should be managed as follows:

- if the weed is not in flower, or will not reproduce through damaged plant parts (e.g., vegetatively) proceed with maintenance,
- if the weed has flowered, either hand pull or cut all topes, bag in a plastic bag, then proceed with maintenance; or flag the site for avoidance by the contractor until the District can properly treat the infestation (dispose of weed seed heads by burning),
- if the weed is known or suspected to sprout vegetatively from cut parts, flag the site to ensure avoidance by the contractor until the weed can be treated by proper means.

To the extent possible, in full consideration of road maintenance and public safety objectives as well as silvicultural needs, do not remove trees or brush from adjacent to the road. The objective is to provide as much shade as possible on the unvegetated or sparsely vegetated road surface, cuts and fills.

33. Pit/Quarry plans will consider noxious weeds in the development of long-term plans and will develop plans to prevent introduction or to prevent the spread of existing infestations. Minerals materials procured from non-Forest Service pits will also be checked to be sure the material is not infested with noxious weed seed.

34. In planning for Access and Travel management ensure that management of noxious weeds will be a consideration. If a road is to be closed, coordination with the District noxious weed coordinator should occur to ensure that if noxious weeds exist within the closed portion of the road, the sites are inventoried, IWM decisions are made regarding their management, and provisions are made for access as needed to implement the IWM treatments and monitoring. Roads to be closed should be seeded (with tested and certified weed free seed) to minimize potential invasion sites.

Intergovernmental Cooperation

35. Each District/Zone will coordinate closely with the associated County Weed Board to ensure sharing of information regarding infestations, treatments, etc.

36. Coordinate with adjacent Districts, Forests and BLM Areas to ensure that animals or equipment moving from the adjacent lands onto the District are either moving from weed free areas or are treated/Quarantined as appropriate. Encourage coordinated policies between adjacent lands.

Wildfire Suppression

37. To the extent possible, do not sue noxious weed infested sites for fire crew bases. Where emergency situations dictate that the base must be located on a site infested by noxious weeds, ensure that noxious weeds on the site are prevented from going to seed and that appropriate short and long term inventory, mitigation and management measure are applied to rehabilitate the site and to manage the infestation. Do not use noxious weed infested sites as a helibase unless appropriate long-term actions are taken to prevent seed production and to ensure eradication of the weeds and rehabilitation of the site.

See Appendix A – Hells Canyon National Recreation Area, for further direction regarding weed prevention practices within HCNRA.

Site Implementation Guide Example

The purpose of this exercise is to demonstrate how the implementation planning process would work to ensure individual treatments are within the scope of the EIS analysis. The example location was not a known site in the 2006 inventory used for the Invasive Plant Treatment EIS, thus the prescription followed the Early Detection Rapid Response (EDRR) Herbicide Use Decision Tree associated with the action alternatives.

The Wallowa Whitman FEIS describes a process for characterizing the infestation, developing site prescriptions, and monitoring. Using the process, the following prescription was developed:

This site is proposed for herbicide treatment. The distance from a road and size of the infestation, along with the deep rooted, aggressive nature of the invasives, render manual and mechanical treatments ineffective (see common control measures in the FEIS). No biological control agents are available for these species. Based on the phenology of the plants, applications are most effective in the spring and fall. Due to Project Design Features that apply to this treatment, treatment would occur during times of the year when wetter areas are driest.

Passive restoration is prescribed at this time. The site will continue to be part of a sheep grazing allotment and the timing that sheep are turned out there will be affected by herbicide use and label requirements and the presence of invasive plants. The FS will coordinate invasive plant treatment and prevention strategies with the permittees.

No wildlife or botanical SOLI would be affected and consultation with biologists revealed no additional survey needs. The 4 acres is mostly more than 100 feet from the Grande Ronde River. Soil type on the site is silt/clay mix with organic matter so glyphosate used within 50 feet zone adjacent to water is very unlikely to reach the river. Picloram will not move through this vegetated buffer with these soil types. The amount of glyphosate that could possibly enter the river from herbicide use at this site would be very small and instantly diluted in the large river. The predicted herbicide exposure would be within the scope of analysis in the R6 2005 FEIS and the 2009 W-W FEIS/Biological Opinions.

A map of the area follows.

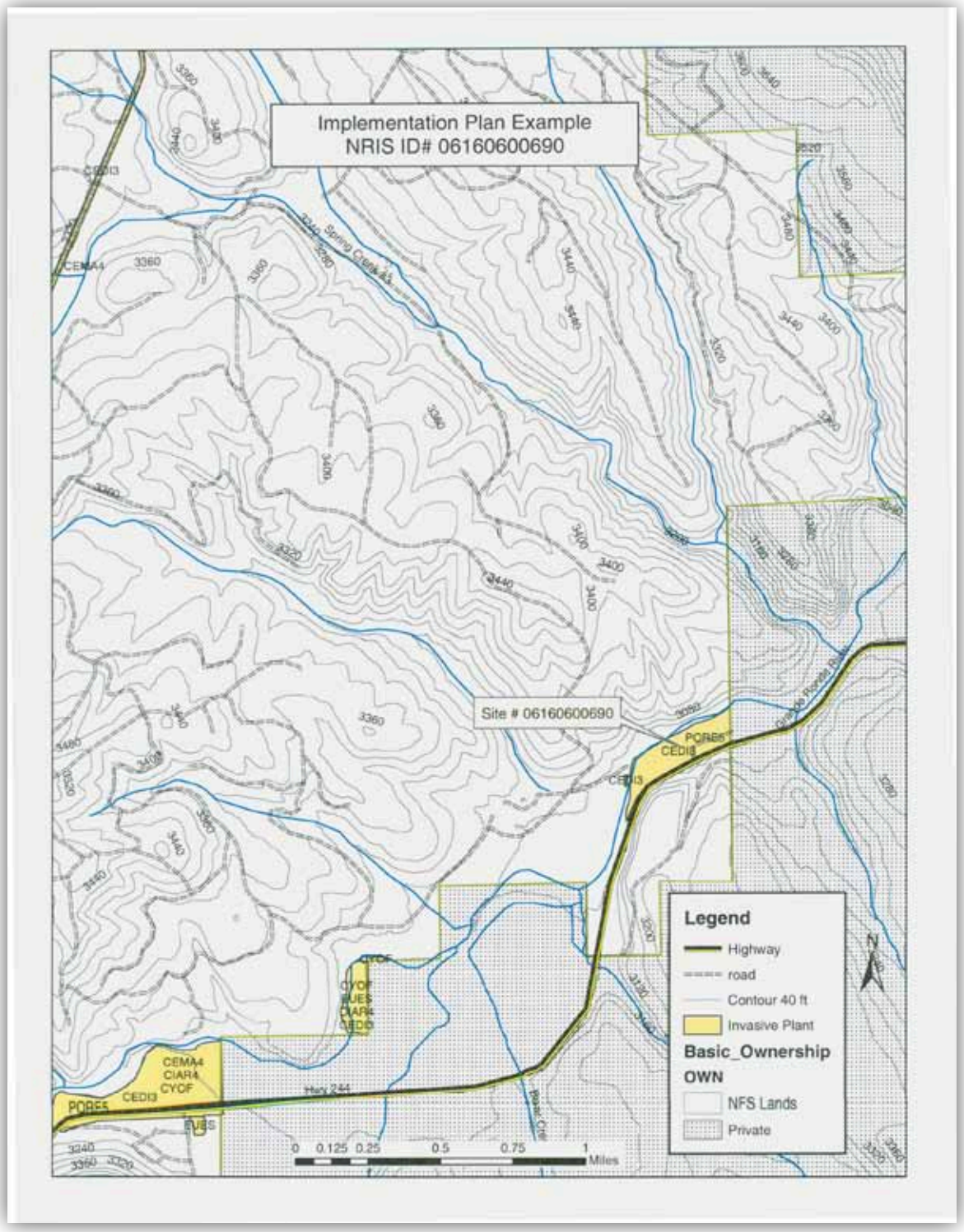

Figure B-1. Implementation Plan Example

1. Characterize the Infestation

A: Map and describe the target species, density, extent, treatment strategy, and site conditions:

- Sulfur Cinquefoil (*Potentilla recta*) - PORE5; NRIS ID 06160600690;
    - Extent: E2.5 acres in patches across a 27.7 acre area.
    - Density: in patches, Daubenmire cover class 4 (50-75% crown cover).
    - Diffuse knapweed -.
- Diffuse Knapweed (*Centaurea diffusa*); NRIS ID 06160600389
    - Extent: 1.5 acres; spotty throughout the 27.7 acre area
    - Density: Daubenmire cover class 1 (0-5%)
- Treatment Strategy: Control and reduce cover. Control means to prevent the species from reproducing or spreading off site.
- Site Conditions: Open meadow with scattered pines; rangeland, active sheep allotment; Invasive plants are not nearer than 50 feet to the Grande Ronde River. Some sulfur cinquefoil may be within 50 feet of a small wetland area. Site is adjacent major road (OR 244) but invasive plants are not near the roadside. Site consists of riparian vegetation, scattered pines, annual grasses, bunch grass, and forbs. Site is adjacent private property. Invasive plants are not known to occur on the adjacent private parcel.
- Soils: vary from loam to finer than loam with a silt/clay mix (North Dakota Department of Water quality, non-point source pollution program). http://www.ndhealth.gov/wq/sw/z1_nps/pdf_files/soil_texture_feel_test.pdf)
- See attached Early Detection Rapid Response (EDRR) Herbicide Use Decision Process Example

B: Resource Concerns:

- The Grande Ronde River is habitat for migratory bull trout, summer steelhead and spring/summer Chinook salmon. No T&E plants or wildlife species nearby, and no plant or wildlife species of local concern (SOLI) habitat; additional SOLI surveys are not needed. Invasive plant dispersal vectors include the river, road, permitted sheep, wind, and wildlife). Sulfur cinquefoil and diffuse knapweed are degrading rangeland/grassland condition.

2. Develop Site Prescriptions

A. Treatment Methods Options

- Manual – not effective because site is too large; deep rooted
- Bio/Cultural –biological agents are available for diffuse knapweed, but not sulfur cinquefoil.
- Chemical – effective chemicals exist and applicable to site conditions (picloram (both species), clopyralid (diffuse knapweed), aquatic labeled glyphosate (both species).

B. Apply Appropriate Project Design Features

A - Pre-Project Planning

A-1: Documented in #1 above.

B - Coordination with Other Landowners and Agencies

B-1: Coordination: Site on Forest lands; contact range permittee at annual meeting.

C - Prevent the Spread of Invasive Plants during Treatment Activities

C-1: Prevention: Educate crews and permittees; sign roads.

D - Wilderness Areas

D-1: Wilderness: Not applicable (NA) – site is not in a wilderness area.

E - Non-Herbicide Treatment Methods

E-1: Will limit crew size working on site within 150 feet of streams.

E-2: Fueling will not occur within the RHCA.

F - Herbicide Application

F-1: Labels: All label restrictions will be followed. Selected herbicides, picloram and glyphosate comply with this PDF.

F-2: Forest Plan standards will be followed.

F-3: Surfactants: POEA surfactants, urea ammonium nitrate or ammonium sulfate will not be used.

F-4: Lowest Effective Label Rates: Infestation will be treated prior to bloom stage with picloram at 1% solution, and with Aquatic Glyphosate at a 3% rate, the lowest effective label rates.

F-5: Wind: Guideline will be followed.

F-6: Nozzle: Guideline will be followed.

F-7: NA - sulfonylurea herbicides are not proposed for this site.

F-8 Aerial: NA, treatment ground based.

G - Develop Herbicide Transportation and Handling Safety/Spill Prevention and Containment Plan ¬– The transportation and handling/safety will be developed as outlined.

H - Soils, Water and Aquatic Ecosystems

H-1: Buffers- will broadcast spray picloram beyond 100 ft. from the water's edge; spot spray picloram from 100 ft. to 50 ft. from river; and spot spray aquatic labeled glyphosate within 50' of wetland.

H-2: Broadcast on roads – NA, highway roadside not proposed for treatment.

H-3: Riparian vehicle use– will spot spray with backpack in riparian areas.

H-4: Clopyralid on porous soils – NA, not using clopyralid.

H-5: Chlorsulfuron on clay soils- NA, not using chlorsulfuron.

H-6: Picloram on shallow or coarse soils - NA, soils finer than loam

H-7: Sulfometuron methyl on shallow or coarse soils - NA, not using chlorsulfuron.

H-8: Lakes and Ponds – NA, no lakes or ponds present.

H-9: Wetlands – will implement treatment when soils are driest.

H-10: Foam – NA

H-11: Wells – NA, no such developments

H-12: Boat transport – NA – not needed

H-13: Aquatic influence zone- not treating between water's edge and bank full line; will treat much less than 1 acre within the aquatic influence zone along any 1.6 mile length including this site.

I - Vascular and Non-Vascular Plant and Fungi Species of Local Interest

I-1: Consultation with district botanist revealed no need for additional surveys in the area of the infestation. Species of Local Interest (SOLI) or their habitats are not present.

I-2: Habitat – NA, no documented sites

I-3: SOLI – No SOLI identified in treatment area

I-4: T&E - no habitat or sites for Mirabilis macfarlanei and Silene spaldingii

I-5: T&E - no habitat or sites for Mirabilis macfarlanei and Silene spaldingii

I-6: Nonvascular SOLI - no documented sites or habitat

I-7: Aerial Application – NA

I-8: Monitoring to refine SOLI Buffers - NA

I-9: SOLI monitoring - NA, no known SOLI sites or habitat

I-10: Compliance Monitoring – this implementation plan documents compliance with PDFs, etc.

I-11: Implementation Monitoring - The treatment form will be used to document compliance during implementation

I-12: Effectiveness Monitoring: Results of effectiveness monitoring will be reported in FACTS the Forest Service corporate database of record.

J - Wildlife Species of Local Interest

J-1: Wildlife: consultation with the district Wildlife Biologist revealed no areas of special concern or additional surveys needed.

K - Public Notification

K-1: The treatment site will be posted and the public will be notified via the press through an annual notification.

L - Special Forest Products

L-1: Special Forest Products – NA and triclopyr is not the preferred herbicide

M - American Indian Tribal and Treaty Rights

M-1: Indian Tribes will be notified annually

N - Rangeland Resources

N-1: Not applicable

N-2: Permittee will be notified during annual operating meeting

N-3: EPA labels will be followed for grazing – GF

O - Human Health

O-1: Not applicable; sulfometuron methyl will not be applied

O-2: Picloram rate will not exceed 0.35lb/acre

O-3: Not applicable; triclopyr will not be applied

P - Restoration

P-1: will monitor to determine potential restoration opportunities

P-2: Not applicable, not highly disturbed

P-3: Will monitor site following treatment to determine need for further restorative actions.

3: ESA Consultation (Biological Opinion consistency)

The prescribed treatment to spot spray aquatic glyphosate within 50 feet of the wetland and spot spray picloram from 50 feet – 100 feet of the river and wetland, and broadcast spray with picloram beyond the 100-foot stream buffer is consistent with the PDFs and ESA consultation.

4: Forest Plan Compliance Review

Because the project is consistent with all applicable PDFs, it is consistent with the Forest Plan, label guidelines, public notification requirements, and coordination with American Indian Tribes.

5: Pesticide Use Proposal

Site is to be included in annual pesticide use proposal form FSM 2150.

6: Restoration

No immediate restoration is anticipated; however, as invasive plant cover decreases, the site will be evaluated for restoration opportunities.

7: Coordination

Will coordinate treatment with the grazing permittee via the annual operating plan and per PDF N-2.

8: FS Caps

Project will be included among acreages tallied for annual treatment caps.

Treatment strategy

Because of the proximity of this site to vectors like the highway and the river, and because it is adjacent to private land, immediate action to control this site is warranted. The site will be treated with herbicides. Biological controls will not be used on diffuse knapweed because of the time lag required for control. Although clopyralid is effective in controlling diffuse knapweed, picloram is the sole herbicide to be used. Using one herbicide increases efficiency (cost-effectiveness) and eliminates the need to mix additional herbicides. This reduces the opportunity for accidental spills and worker exposure. In the areas beyond the 100-foot buffer from the edge of the river and the wetland, the site will be treated using ATV broadcast techniques with Picloram (at 1% sol.). Between 50 and 100 feet from the river and wetland, invasive plants will be spot sprayed via backpack with picloram (1% sol.). Plants nearer than 50 feet to the wetland will be treated by spot spraying aquatic labeled glyphosate at 3 percent solution. The recommended timing for application is early fall during low flow of the river. The site will be monitored for treatment efficacy and need for revegetation following treatment.

Early Detection Rapid Response (EDRR) Herbicide Use Decision Tree Example

1. Is the target population of the size, phenology, density or distribution that warrants herbicide use?

YES, Target Population: The site is infested with two species: diffuse knapweed (*Centaurea diffusa)* and sulfur cinquefoil (*Potentilla recta*). Diffuse knapweed grows in numerous small spots totaling 1.5 infested acres spotted throughout the 28-acre area. Sulfur cinquefoil grows in fewer, larger, dense patches totaling 2.5 infested acres throughout the 28-acre area.

The site consists of an open meadow with scattered pines. The desired native plant community consists of riparian vegetation, annual grasses, bunch grasses, and forbs. The area is used as rangeland and is within an active sheep allotment. A small wetland lies within the mapped area but is 100 feet away from invasive plants. The site is 1000 feet from a major road (OR 244) and is adjacent to private property. No infestations noted on the private property at this time. Soils vary from loam to finer than loam with a silt/clay mix.

The long term desired condition for this area is control of the invasive species to the point that desirable forbs and grasses can reestablished and. Control would mean that this area would no longer provide a source for spread of invasive plants off site.

Treatment Options: Biological controls exist for diffuse knapweed but not for sulfur cinquefoil. Manual treatment is not effective in controlling sulfur cinquefoil, nor for diffuse knapweed at this site because it is large and would be too costly to treat. Volunteers are not available. Herbicides that are effective for both invasive plants are available.

YES use herbicides due to the high potential for spread via travel vectors and to adjacent private land. (Go to step 2)

Herbicide Choices:

- Diffuse knapweed: Common Control Measures lists picloram and clopyralid as most effective herbicides and glyphosate as a secondary option.
- Sulfur Cinquefoil: Picloram is considered the most effective herbicide. Metsulfuron methyl is a secondary choice.

2. Do the size, density and distribution of invasive plants warrant broadcast application?

YES, sulfur cinquefoil is in large dense patches that warrant broadcast application. Portions of the infestation are within the aquatic influence zone, but not along the nearby road. (Go to step 3a)

NO, diffuse knapweed infestation is too scattered with light density to warrant broadcast application. (Go to step 3b)

3a. Apply surface water buffers.

In the areas beyond the 100-foot buffer from the edge of the river and the wetland, the site will be treated using ATV broadcast techniques with Picloram (at 1% sol.). Between 50 and 100 feet from the river and wetland, invasive plants will be spot sprayed via backpack with picloram (1% sol.). Plants growing nearer than 50 feet to the wetland will be treated by spot spraying aquatic labeled glyphosate at 3 percent solution.

Is the site within an area where broadcasting is prohibited?

YES, portions of the infestation are nearer than the 100-foot broadcast buffer. (Go to step 4)

3b. Are there botanical species of interest (SOLI) or suitable habitat within 100 feet of the proposed broadcast site?

NO, botanical SOLI or suitable habitat are not present. (Go to step 4)

4.Will spot or selective methods be reasonably effective in this situation?

YES, backpack treatment of sulfur cinquefoil and diffuse knapweed is possible at this location. Between 50 and 100 feet from the river and wetland, invasive plants will be spot sprayed via backpack with picloram (1% sol.). Plants growing nearer than 50 feet to the wetland will be treated by spot spraying aquatic labeled glyphosate at 3 percent solution.