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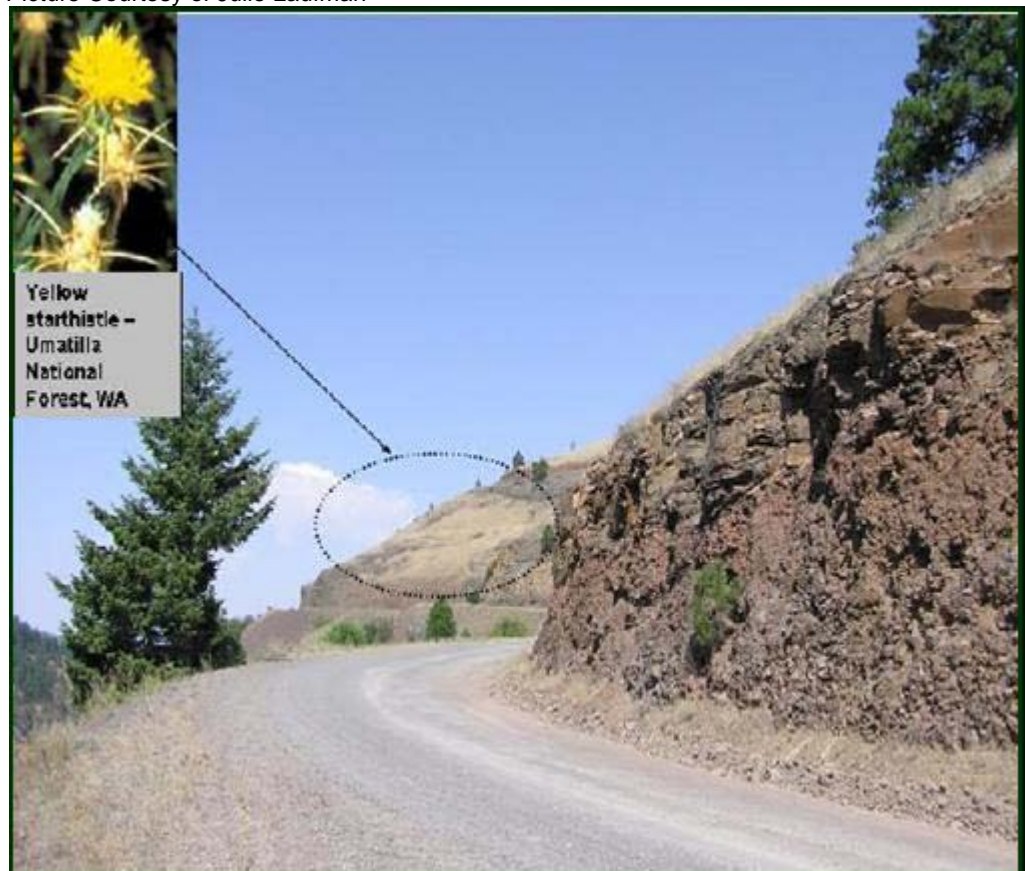


Record of Decision

Umatilla National Forest Invasive Plants Treatment Project

Asotin, Columbia, Garfield, and Walla Walla Counties in Washington; Grant, Morrow, Umatilla, Union, Wallowa, and Wheeler Counties in Oregon

Picture Courtesy of Julie Laufman



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Record of Decision

Invasive Plants Treatment Project

USDA Forest Service
Umatilla National Forest

Asotin, Columbia, Garfield, and Walla Walla Counties in Washington;
Grant, Morrow, Umatilla, Union, Wallowa, and Wheeler Counties in Oregon

Introduction

This Record of Decision documents my selection of Alternative B from the Umatilla National Forest Invasive Plants Treatment Project. My decision authorizes treatment of invasive plants and restoration of treated sites (seeding/mulching/planting). The project includes the following elements of the integrated weed management program: a) herbicide and non-herbicide treatment of existing infestations, b) early detection and rapid response to new infestations, and c) restoration of treated sites. My decision authorizes manual, mechanical, biological, herbicide, and cultural treatments, which complement additional elements of the program such as preventing the introduction, establishment and spread of invasive plants; public education; and interagency coordination.

Treatments will be completed following steps outlined in the Annual Implementation Planning process and Common Control Measures, according to Project Design Features and Herbicide Use Buffers that limit the extent and method of treatment appropriate to site conditions. Appendix B of the FEIS provides the full text of these elements of the selected alternative.

Background

Invasive species were identified as one of the four main threats to ecosystem health (USDA Forest Service 2003). Defined as “*non-native plants whose introduction do or are likely to cause economic or environmental harm or harm to human health*” (Executive Order 13112), invasive plants displace or alter native plant communities and cause long-lasting economic and ecological problems within and outside the National Forests. Invasive plants increase fire hazard, degrade fish and wildlife habitat, eliminate rare and endangered plants, impair water quality and watershed health, and adversely affect other resource values such as scenic beauty and recreational opportunities. Their strong reproductive and competitive abilities allow invasive plants to spread rapidly across the land, unimpeded by ownership or administrative boundaries.

In April 2005, the Pacific Northwest Region (R6) published the programmatic *Pacific Northwest Region Invasive Plant Program: Preventing and Managing Invasive Plants* FEIS (USDA Forest Service 2005a; R6 2005 FEIS). The *Record of Decision for Invasive Plant Program Management* (USDA Forest Service 2005b) was published in October 2005 (R6 2005 ROD). The R6 2005 ROD amended Forest Plans throughout R6 by adding a desired future condition statement; goals; objectives; standards for prevention, treatment and invasive plant site restoration, and a monitoring framework. The R6 2005 ROD authorized the use of 10 herbicide active ingredients to effectively respond to invasive plant threats. The new herbicides offer many advantages over the more limited set of herbicides previously allowed, including greater target plant selectivity, less harm to desired vegetation, reduced application rates, and lower toxicity to animals and people (R6 2005 ROD).

At present, 20 different invasive plant species are known to occur within the boundaries of the Umatilla National Forest. Species of greatest concern include spotted and diffuse knapweed, yellow starthistle, hound’s tongue, Dalmatian and yellow toadflax, scotch thistle, and rush skeletonweed, among others.

These invasive plants pose a threat to important forest resources as discussed in Chapter 3 of the FEIS (see Affected Environment sections for each resource). Thirteen botanical species of local interest are threatened by invasive plants on approximately 44 sites. Fish habitat quality is being degraded by invasive plants in about 5,500 acres of riparian areas. Rangeland quality is being degraded. Tribal resources and subsistence gathering sites can be ruined by invasive plants. Wildlife habitat quality can be adversely affected as invasive plants out compete native plant species. Roadless areas, wilderness areas, wild and scenic rivers, and research natural areas are all high priority areas for treatment due to the importance of the resources at risk. Many current infestations occupy areas less than one acre; for that reason there is a need to control or eradicate these sites quickly before they grow too large, costly or impractical to manage. These infestations will likely continue to spread unless effective treatments are applied.

Decision

I have selected Alternative B based on the Environmental Impact Statement and project record. This alternative was described in detail in Chapter 2 of the EIS, and authorizes treatment of approximately 25,000 acres of inventoried invasive plant sites, restoration of treated sites, and treatment of sites that may be detected in the future. Herbicide treatments will be part of the initial prescription for most sites, with the ongoing goal to reduce reliance on herbicides over time as control objectives are met and populations become small enough to effectively treat manually or mechanically. Alternative B incorporates all practicable measures to minimize environmental harm while effectively treating invasive plants. Aerial treatment will be confined to the 675 acres identified for treatment in the EIS; no aerial treatment is approved for newly detected sites.

Table 1. Summary of the key features of selected Alternative B

Activity	Approximate Value
Acres identified for treatment	24,649
Average maximum Percent of Total Forest landbase treated annually	0.03
Percentage of treatment sites where full range of effective treatments are available	100
Number of herbicides available for use	10
Acres of proposed herbicide treatments for known sites	20,691
Acres identified for aerial spraying of herbicides	675
Approximate total acres of ground based (hand or boom) broadcast treatments proposed for known sites*	17,478
Acres of hand or non-aerial broadcast treatments within riparian/wetland areas	3,022
Approximate total acres of non-broadcast (wicking, wiping, stem injection) herbicide application on known riparian/wetland areas	2,538
Acres of known invasive sites where treatment methods do not include herbicides	3,958
EDRR includes chemical methods other than aerial	Yes
Cost estimate per effectively treated acre of known sites	\$197

*Most ground-based treatments will use backpack sprayers.

Invasive plant treatments using herbicides will not exceed 4,000 acres annually and 40,000 acres for the life of the project. These limits include the sum of herbicide use on known as well as new sites.

This decision also includes pre- and post-project monitoring. Annual invasive plant control proposals will be shared with Endangered Species Act regulatory agencies each year. The proposals will include the treatment methods, herbicide application methods and rates, objectives of treatments, locations, maps of

treatment areas, acreages, proposed start and stop dates, and special mitigation measures that will be applied. Annual invasive plant control accomplishment reports would be shared with the same agencies. Post-treatment reviews will occur as per specific project design features to determine whether treatments were effective, if damage to non-target species occurred, or whether or not passive restoration occurred as expected. Post-treatment monitoring would also be used to detect whether project design features were appropriately applied and effective. Contract administration and other existing mechanisms would be used to correct deficiencies. Additional monitoring may be done consistent with the Umatilla National Forest Plan (see the R6 2005 ROD Monitoring Framework).

Reasons for My Decision

I decided to select Alternative B for a number of reasons: 1) because it will update the Forest's invasive plant treatment program by allowing the use of several new herbicides; 2) it allows for ground broadcast, spot and selective herbicide and other treatments of newly discovered infestations; 3) it is the most cost-effective alternative; the per-acre cost is about 25 percent (one quarter) of existing costs; 4) it minimizes the potential adverse impacts to human health and the environment via design features, buffers, a detailed implementation planning process, and monitoring; and 5) it allows the Umatilla National Forest to work more effectively and cooperatively with our neighbors and partners in addressing this issue.

I carefully considered the issues and concerns raised by those who participated and commented in this analysis to help make my decision. Some members of the public are concerned about the use of herbicides regarding the potential for unintentional exposure to people, non-target vegetation, soils, water, fish and wildlife. Other members of the public expressed concern that limitations on herbicide use result in higher cost per treated acre or lack of effectiveness. Alternative B addresses these issues and concerns by allowing for herbicide treatments done in a cautious manner. I find the interdisciplinary team developed appropriate project design features to minimize the potential adverse effects of herbicide use while maintaining project effectiveness.

Some members of the public specifically expressed concern about two aspects of the proposed action: ground broadcast application of herbicides in riparian areas (near water bodies), and aerial application. These project elements were identified as high risk/monitoring priorities in the R6 2005 ROD (Appendix 2).

I find that analysis in the FEIS shows that these elements of the project (broadcast treatments in riparian areas and aerial application) are necessary to fully accomplish the project purpose and need. Treatments in riparian areas are needed to maintain and restore native plant communities in these areas. The elimination of broadcast treatment as an option in riparian areas would reduce the effectiveness of the treatment, especially for species that are widespread and have the seedbank or underground vegetative parts capable of prevalent re-establishment in future years (such as yellow starthistle). Effectively controlling species that exhibit this type of growth morphology may require multiple repeated treatments over a period of years.

The FEIS demonstrates that aerial application is needed because some inventoried sites are remote and foot travel in these areas is unsafe due to steep topography. The steepness and remoteness of these proposed aerial sites, makes the use of mechanical equipment such as broadcast using all terrain vehicles and/or mowers impossible. If the terrain is too steep and poses a safety hazard, the area would not be treated using crews. The elimination of aerial treatment reduces treatment effectiveness in these areas now and in the future due to the potential inability to treat either from a safety or monetary standpoint. Sites that are presently proposed for aerial herbicide application consist of high priority aggressive invasive species (spotted and diffuse knapweeds and yellow starthistle), if left untreated, an increase of these infested acres is probable.

I find that Alternative B minimizes the potential for adverse effects from ground broadcast in riparian areas and from aerial spray. Certain herbicides and application methods will not be allowed near perennial and intermittent streams, lakes and ponds (see Chapter 2.2.3). The analysis in the FEIS concludes that concentrations of herbicides reaching streams are expected to be well below concentrations of concern to beneficial uses of water (Chapter 3.4.3), and implementation of the selected alternative will meet all applicable laws, regulations and policies relative to aquatic resources.

Alternative B also minimizes risks associated with aerial spray. My decision will authorize aerial spraying of clopyralid on 675 acres; aerial spray will not be authorized for new detections under EDRR. Clopyralid is a lower risk herbicide relative to aquatic resources (see R6 2005 FEIS and Biological Assessment) and site-specific model results demonstrate that adverse effects on fish are unlikely (Chapter 3.5.3 states that concentrations of herbicides reaching streams are expected to be well below concentrations of concern to beneficial uses [such as fish and other aquatic organisms]). Buffer widths were determined by monitoring results and modeling herbicide drift (AgDisp 2007) using worst case scenario application situations. Factors such as release height, wind speed/direction, droplet size, ground terrain, weather conditions, and nozzle type/orientation/droplet size were model input factors (see FEIS Chapter 3.2.3 and 3.4.3).

I reviewed the herbicide drift modeling (AgDisp) and field monitoring results from similar projects (FEIS Chapter 3.2.3 and 3.4.3) and find that herbicide drift and contamination to waterways will be further minimized by the following PDFs:

- E-2 requires that aircraft fueling occurs outside RHCAs
- F-5 requires that herbicide applications occur when winds are between 2 and 8 miles per hour
- F-6 requires coarse droplet size to minimize drift
- F-8i requires that aerial units be ground checked and water features marked and buffered before application
- F-8 and Tables 5, 6, 7 require buffers of 300 feet on perennial or wet intermittent streams and wetlands, and 100-foot buffers are required on dry channels.
- F-8 Additional buffers or drift reduction methods are required in winds over 5 mph with flight heights over 30 feet

I find that aerial applications of herbicides in the selected alternative will comply with EPA label restrictions and advisories and adhere to all Forest Plan standards as amended by the R6 2005 ROD. Aerial spray under this decision would be restricted to the 675 acres identified in FEIS figure 6.

Other Alternatives Considered

Nine other alternatives were considered in addition to the selected alternative. Three of those alternatives were analyzed in detail and are briefly described below. A more detailed comparison of these alternatives can be found in Chapter 2 of the FEIS. As discussed below, Alternatives A, C and D each would result in somewhat less herbicide exposure than the selected alternative. Table 2 compares the alternatives as they relate to the significant issues. Information in this table represents a summary of the analysis documented in detail in the FEIS and specialist reports.

Alternative A - No Action

The Umatilla National Forest has been treating invasive plants under direction found in the 1995 decision implementing the Umatilla National Forest Environmental Assessment for the Management of Noxious Weeds (USDA Forest Service 1995), and Forest Plan Amendment 4 (1998). This program would continue

where appropriate under the no action alternative. The 1995 EA approved treatment of approximately 2,771 acres (773 sites), including use of herbicides on 1,391 acres (587 sites). Biological agents were approved for redistribution on 1,339 acres. Manual treatments were approved on 41 acres. Amendments to this decision approved an additional 59 sites (383 acres) for herbicide treatments (USDA Forest Service 1998), for a total of 1,774 acres of herbicide approved. Herbicide applications included spot or ground based broadcast methods utilizing glyphosate, dicamba, and/or picloram (no aerial treatment was included). Under no action, herbicide treatment would continue to be limited to the sites identified in 1995 and 1998. Such treatments would focus on eradication of residual populations in these sites. However, the R6 2005 ROD does not allow the use of dicamba, so herbicide use would be limited to the other two chemicals listed. Aerial application of herbicides is not allowed under the current program. Manual and mechanical (e.g. lawn mowing) methods would continue within administrative sites and roadsides throughout the Forest where appropriate.

Why Alternative A Was Not Selected

Alternative A was not selected because it would have provided too few options to manage invasive plants. With few effective control methods and the small acreage of sites that would have been approved for treatment under Alternative A, invasive species would continue their spread across the Forest. Alternative A does not meet the purpose and need to contain, control or eradicate invasive plants.

Herbicide use would continue to be limited to two herbicides available for use. No process for treating new infestations discovered on the Forest would be adopted. The limited number of herbicides has comparatively less effectiveness and may have resulted in herbicide resistance (R6 2005 FEIS Chapter 4.2). Alternative A would have been the least likely alternative to abate risks to botanical species of local interest (SOLI). Of the 44 sites (13 species) where invasive plants threaten botanical SOLI, 13 sites (5 species) would have been approved for treatment under Alternative A.

Although Alternative A would have been the least expensive alternative to implement (\$641,695 compared to Alternative B at \$3,887,460), it would have carried the highest costs per effectively treated acre (\$814/acre compared to Alternative B, \$197/acre). The relative lower costs overall to implement Alternative A is because far fewer acres would be treated. Implementing Alternative A would have resulted in fewer acres being treated at far higher costs per acre.

Alternative A would minimize potential herbicide exposure to non-target plants and animals because fewer acres would be approved for herbicide use. However, threats to these plants and animals from invasive plants would not be abated.

Finally, the Umatilla National Forest has been operating under this direction for the last 15 years and it has not worked. In a few areas we have slowed the spread of invasive plant species, however overall expansion of infested acres on the Forest has exceeded the acres successfully treated. The current direction is not consistent with the goals, objectives and standards in the Forest Plan and would not likely reduce the acreage of invasive plants over time. I find the current situation unacceptable.

Alternative C - No Broadcast Spraying in Riparian Areas

Alternative C would prohibit broadcast application of herbicides in riparian areas and wetlands; however, spot spraying or hand applications, such as wiping or wicking of herbicides, would be allowed. These areas could still have been treated using herbicides, but fewer acres would have likely been treated because of the higher average cost of spot spraying or selective application methods. Except for this limitation imposed on broadcast spraying, the features of this alternative are the same as Alternative B. Alternative C includes all the PDFs and buffers associated with Alternative B.

Alternative C was developed to respond to concerns that detrimental effects from broadcast spraying herbicide could occur in riparian areas. It also addressed human health issues associated with contamination of drinking water supplies and reduced potential herbicide impacts to non-target wildlife, plant species, soils, aquatic biota and riparian ecosystems compared to Alternative B. Alternative C would have increased treatment costs and decreased treatment effectiveness in riparian and wetland habitats compared to Alternative B.

Why Alternative C Was Not Selected

Alternative C was not selected because it would have been less effective than Alternative B in controlling invasive plants over time. Alternative C would have prohibited broadcast herbicide application (3,022 acres) in riparian areas. Instead, invasive plant species in riparian areas would have been treated by spot spraying individual plants, which may have resulted in less effective control, and which we anticipate would require more follow-up treatment.

If Alternative C were selected, the restrictions on broadcast spraying within riparian areas would have eliminated a cost-effective treatment option on about 12 percent of the known infestations (FEIS table 12). The elimination of broadcast treatment as an option would have reduced the effectiveness of the treatment for species that are widespread, and for species where the seedbank or underground vegetative parts are capable of prevalent re-establishment (such as yellow starthistle). Effectively controlling species that exhibit this type of growth morphology would have required repeated treatments over a period of years (FEIS 3.1.4).

I acknowledge that broadcast herbicide use within riparian areas is considered a high risk in the Umatilla Forest Plan Invasive Plant Monitoring Framework (R6 2005 ROD). By avoiding broadcast spraying herbicides in riparian areas, Alternative C would have had less potential to inadvertently kill non-target riparian plants, aquatic plants, or harm some other element of the aquatic ecosystem (Chapter 3.2, 3.4 and 3.5). Some members of the public favored Alternative C, as shown in the following comment we received: “[we support] *the prohibition of broadcast spraying of herbicides in riparian areas as described in Alternative C.*”

I seriously considered Alternative C. I understand the concerns expressed by some members of the public who do not want herbicides in forest streams, lakes and rivers that might kill non-target plants, aquatic vegetation and harm our fish and water quality. However, I did not select Alternative C because the analysis did not show compelling reasons that prohibiting all broadcast spraying in riparian areas is necessary to meet the requirements of the Clean Water Act and other applicable laws or regulations, and is needed to be consistent with Forest Plan standards. The selected alternative includes provisions to ensure the health and safety of people and the environment. Buffers will be in place to minimize the potential for adverse impact to riparian areas (PDFs and buffers are in Appendix 1 of this decision). The ways the PDFs and buffers work to minimize risks are discussed within each resource section. Alternative C would have decreased treatment effectiveness and increased treatment cost for a portion of the project. Average annual cost would have been increased by about \$10,000 per year. The impact of lost effectiveness could be important at individual riparian sites where invasive plants are competing with native plants and degrading habitat. This would have impacted about 14 percent of the acres of known sites, or about 3,000 acres.

In summary, although Alternative C would have reduced the potential adverse effects to water quality and aquatic ecosystems by prohibiting broadcast herbicide application in riparian areas compared to Alternative B, it would have been more costly and would have resulted in a lower degree of control to invasive plant populations.

As I considered Alternative C as a whole, I find that the PDFs and buffers established in Alternative B will minimize herbicide delivery to streams, lakes and rivers; and riparian areas will be in better shape ecologically by having the tool of broadcast spraying available to use where needed.

Alternative D - No Aerial Application

Alternative D would have eliminated the option to aerially spray herbicides. This alternative was designed to reduce the potential effects of herbicide drift from aerial spray. Concerns about aerial spray include potential effects to non-target plants, drinking water supplies, wildlife, soils, aquatic biota and riparian ecosystems. If Alternative D were selected, treatment of some sites would not have occurred due to inaccessibility or because access to the site is determined unacceptably hazardous.

The features of Alternative D are the same as Alternative B, except for the limitation imposed on aerial application. This alternative would have included all of the PDFs and buffers associated with ground based herbicide use developed under Alternative B, and would have eliminated herbicide impacts associated with aerial application. However, Alternative D would have increased treatment costs and decreased treatment effectiveness on 675 acres of yellow starthistle.

Why Alternative D Was Not Selected

Alternative D was not selected because it would have been less effective than Alternative B in controlling invasive plants over time. Alternative D is slightly more costly, on average, than Alternative B (\$200 versus \$197 per effectively treated acre). Treating these areas by hand methods is a safety concern because the aerial spraying is mostly confined to remote, steep areas. Without the ability to use aerial treatment these areas would likely not be treated or treated only sporadically.

I recognize that Alternative D would have eliminated aerial spraying, which is another of the high risks identified in the 2005 Monitoring Framework (Umatilla National Forest Plan Amendment – R6 2005 ROD). However, similarly to Alternative C, I find that analysis shows that the PDFs and buffers established in Alternative B will provide appropriate levels of protection, and overall the forest will be in better shape ecologically by having the tool of aerial spraying available to use where needed. If the remote, steep locations where invasive plants have already established are not treated, they will continue to spread and serve as a seed source for invasive plants to start elsewhere. In my opinion, leaving these infested areas untreated is not good stewardship of public lands.

Some commenters expressed disagreement with aerial spraying:

“Aerial broadcast spraying [is] the most indiscriminate method, subject to toxic drift and creation of bare ground encouraging more invasive plant infestation and should be prohibited. Prohibit aerial spraying in [various] wildlife habitats.”

Several commenters expressed the desire for more aerial spraying or for aerial spraying to be part of the Early Detection and Rapid Response approach.

“Only 675 acres of aerial treatment? Why are you being so restrictive?”

“PDF 8 with all of its requirements will make aerial treatment so onerous that it will not be an effective tool for the UNF. Some of the requirements are certainly important like SOLI buffers and municipal watersheds. However, buffers are generally too large, monitoring overdone, and communications necessary are exaggerated. PDF F8 takes the helicopter out of the EDRR prescription un-necessarily. An EDRR site of 20 acres or 100 acres in the rugged back country might be treated effectively and precisely with a helicopter for a reasonable price while hand treatments may be too expensive to actually implement.”

Aerial spraying has more potential to impact non-target species because drift increases in proportion with increased distance from the ground where herbicide is sprayed. I cannot make a decision regarding aerial spray in the future (EDRR treatments) without further site-specific information.

Alternatives Not Analyzed in Detail

Besides the alternatives described above, six alternatives were developed to address issues raised by the public (see FEIS Chapter 2.3). These alternatives were dismissed from detailed analysis because they would not reasonably meet the purpose and need for action. The themes of these alternatives included:

- Treat only high potential spread areas of priority 1 and 2 species with herbicides
- Manage invasive plants through natural processes
- No herbicide Use
- Use guidelines from 1995
- Add new EPA approved herbicides not available or not analyzed under the 2005 FEIS for Preventing and Managing Invasive Plants.
- Limiting herbicide use and no aerial applications

Table 2. Alternative Comparison Relative to Activities Proposed

Activity	Alt A	Alt B	Alt C	Alt D
Acres identified for treatment	3,154	26,469	26,469	26,469
Average Annual and Life-of-the-project Herbicide Use Caps	NA	4,000 acres per year, 40,000 acres total (including EDRR)	4,000 acres per year, 40,000 acres total (including EDRR)	4,000 acres per year, 40,000 acres total (including EDRR)
Acres of proposed herbicide treatments	1,774	20,691	20,691	20,691
Acres proposed for aerial treatment	0	675	675	0
Number of herbicides available for use	2	10	10	10
% of Forest land base potentially treated with Herbicides; life of project	0.002	0.03	0.03	0.03
% of forest landbase potentially treated with herbicides annually	0.002	0.005	0.005	0.005
Percentage of sites where all effective methods are available	0	100	88	97
Includes EDRR for new sites (all methods within the scope of the project, except aerial)	No	Yes	Yes	Yes
Average Cost Per Acre	\$814	\$197	\$200	\$201
Degree to which adverse effects to people and the environment are minimized	Minimal risks from project	Minimal risks from project: Aerial and broadcast include inherent risks	Minimal risks from project: Broadcast in riparian areas eliminated	Minimal risks from project: Aerial treatment eliminated
Projected time to contain or control currently inventoried infestations	Containment or control would not be achieved	19 Years	Same as B	Same as B

Table 3. Alternative Comparison Relative to Significant Issues

Issue Component	Unit of Measurement	(No Action) Alternative A	(Proposed Action) Alternative B	Alternative C	Alternative D
1 Human Health.	Character of PDFs reducing worker and public exposure to herbicides	<p>Forest Plan standards and project design features eliminate plausible harmful exposure scenarios in all alternatives. The R6 2005 FEIS displayed herbicide exposure scenarios that could result in human health impacts (such as nausea, skin rash, breathing trouble) based on risk assessments. Worst case exposure scenarios for workers and the public were studied. This project does not involve any exposure scenarios of concern for people.</p> <p>Rates of herbicide and surfactant application are limited in the PDFs, which eliminate the worst-case scenarios that could hurt people. The only scenario of concern remaining is drinking out of a pond contaminated by a direct spill of large proportions. This is not likely to occur given all of the safeguards associated with the project.</p> <p>In addition, there are many PDFs related to coordination with landowners, tribal members, forest products gatherers, and others to make sure inadvertent exposures do not occur. Public notification and sign posting would occur (see implementation plan).</p>			
2 Treatment Effectiveness	Number of herbicide options	2	10	10	10
	Character of limitation on integrated treatment options	Greatest degree of limitation. Does not allow herbicide treatment of most inventoried sites, or the full range of treatment options at any given site.	Allows for aerial and broadcast treatment where needed according to PDFs and buffers.	Does not allow broadcast within approximately 3,000 acres of sites where this may be most effective method.	Does not allow aerial treatment on 675 acres where this method would be most effective.
	Percentage of known sites where all effective treatments are available	0%, many effective treatment options were not available in 1995 EA)	100	88	97
3 – Social and Economic	Average Cost per Acre	\$814	\$197	\$201	\$200
	Total cost for one time treatment of all available acres	\$641,695	\$3,887,460	\$3,963,010	\$3,942,840
	Average cost per year	NA	\$539,030	\$549,790	\$546,950

Issue Component	Unit of Measurement	(No Action) Alternative A	(Proposed Action) Alternative B	Alternative C	Alternative D
4 - Effects on Botanical and Terrestrial Wildlife Species	Character of PDFs that apply to wildlife and plants	Herbicide exposure limited because herbicide treatment limited by only being used if non-herbicide treatments are ineffective; PDFs not specifically applied to this alternative	PDF Groups I and J minimize non-target plant and animal impacts. PDF Group I minimizes non-target botanical species impacts by reducing potential for damage from drift or run off in specific locations. Some individual sensitive botanical species may be impacted but risks from invasive plants would be abated at all 44 sites currently threatened. PDF Group J minimizes impacts to wildlife by limiting the ingredients, rate, or application method of herbicides in specific locations	In addition to alternative B, herbicide exposure further minimized by eliminating broadcast applications methods in riparian areas	In addition to alternative B, herbicide exposure further minimized by eliminating aerial application of herbicides and the potential for associated drift
	Acres of broadcast spraying	1,774	17,478	14,456	18,153
	Acres of Aerial Spraying	0	675	675	0
5 – Effects on Soils, Water, and Aquatic Organisms	Character of PDFs that apply to soils	Limited treatments	PDF group H includes restrictions on use of clopyralid, chlorsulfuron, and picloram and sulfometuron methyl due to their potential to impact soil biology and/or leaching.	Same as B	Same as B
	Acres of broadcast herbicide application within riparian areas	0	3,022	0	3,022
	Acres of aerial treatment	0	675	675	0

Public Involvement

Scoping began officially on April 6, 2006 when the Notice of Intent (NOI) to Prepare an Environmental Impact Statement was published in the Federal Register Volume 71, No. 66/April 6, 2006 on pages 17435-17437. The scoping proposal was also posted on the Forest website at the following address: <http://www.fs.fed.us/r6/uma/projects/readroom/invasive-plants/>. A scoping letter, dated April 3, 2006, was mailed to 128 individuals and organizations. The letter was signed by Forest Supervisor, Kevin D. Martin. In addition this project has been listed on the Umatilla National Forest Schedule of Proposed Actions (SOPA) since April 1, 2006. The SOPA has been mailed out to over 200 persons, groups, organizations and agencies four times a year since this project was listed.

The following significant issues were identified from the scoping input:

- **Human Health:** Some people have expressed concern that exposure to herbicides may have serious consequences for human health. People wonder if they could be sickened by brushing up against contaminated vegetation or by eating berries, mushrooms, fish or game that may have been exposed to herbicides. They worry that they might drink water contaminated by herbicides. People are concerned about the health and safety of forest workers who are more likely to be exposed to herbicides. Some believe that the potential cost to human health is too high and other methods should be used to treat invasive plants.
- **Treatment Effectiveness:** Some comments noted that limitations on the availability of treatment methods and herbicide options reduce the potential for effectively treating invasive plants. Fully integrated strategies are needed to effectively treat invasive weeds while minimizing effects to humans and the environment. Not using herbicides could result in the continued spread of invasive plants, resulting in the loss of ecosystem function and wildlife habitat loss.
- **Social and Economic:** Some expressed concern that the cost of each treatment acre influences the number of acres that can be treated with the same total budget. There are also concerns that the surrounding community should be informed of activities and economic costs of the project.
- **Non-target Botanical Species and Wildlife:** There is a concern that herbicide exposure, particularly when applied through aerial or broadcast spraying, may harm terrestrial wildlife species and non target plants. Specifically, herbicide drift, primarily from broadcast and aerial applications of herbicides could cause harm to non-target plants and animals.
- **Soil, Water Quality, Aquatic Biota:** There is a concern that there may be potential adverse effects of herbicide treatment on soils and the potential for leaching into ground water.

These and other issues are discussed in detail in Section 1.9 of the FEIS. To address these concerns, the Forest Service developed two action alternatives in addition to the proposed action that respond to the issues while meeting the purpose and need for action (described below in the “Other Alternatives Considered” section). The DEIS was prepared and described these alternatives, including the No Action alternative, and their impact to the environment.

The Notice of Availability for the DEIS was published in the Federal Register Vol. 72, No. 120 on Friday, June 22, 2007. The Forest documented and responded to public comments to the DEIS, and recorded these in Chapter 5 of the FEIS. About half of the comments expressly supported the proposed action. The other half suggested alternatives or raised concerns about herbicide use in the project, and/or the fact that prevention is not specifically addressed in this EIS.

I have considered all of the comments that were submitted. I acknowledge the objection that some people have to herbicide use and I take note of some that expressed stronger feelings against the use of herbicides. I am including in this ROD a few of those comments to give folks a feel for the types of comments that were received.

One response stated: “*Effective cultural / mechanical and biological treatments must be considered in all situations and utilized in preference to chemical treatments*”; a second commenter wrote: “*We recognize that herbicides are one component of an integrated approach to control of invasive weeds at this point in time. However, we encourage the continuation of biological control and manual / cultural treatments in situations where they are likely to be effective*”; another commenter wrote: “*There is extreme over-reliance of toxic herbicide use planned despite much public concern regarding the effects of herbicides, Out of 24,649 acres of invasive plant infestations, somehow the Forest Service could only find 41 acres for which only manual or mechanical control would be used while 20,693 acres would be subjected to herbicide poisoning in addition to other methods. It must be understood that herbicides are not the solution to the invasive weed problem but merely a quick fix addressing symptoms*,” and lastly: “*Establish clear measurable standards to implement the goal of reduced herbicide use over time.*”

These types of comments seem to be trying to portray the Proposed Action as overly reliant on herbicides and not giving enough emphasis to other treatment methods. I do not concur with this interpretation of the information in the FEIS. No National Forest System lands will be poisoned. I am not a proponent of, nor does my decision to approve Alternative 2 authorize, the indiscriminant wide-spread use of herbicides. The acres where invasive species are present have been considered by species for what type of treatment, shown by monitoring and in the best available science, to be effective in reducing or eradicating the undesirable plants. The FEIS and project record clearly show that we have considered all reasonable treatment methods for each of the areas and each of the invasive species we need to treat. The scale of treatment I am approving (4,000 acres of herbicide use per year) is not excessive. Even at this proposed rate, all known invasive populations will not be controlled during the life of the project. However, without using the most effective treatment in our toolkit, we would have little hope that invasive plant species will ever begin to be controlled on the Umatilla NF (see treatment effectiveness FEIS Chapter 3.1.4 and the social and economic analysis FEIS Chapter 3.9).

Non-chemical methods and restoration are included, and these treatments will be used where effective. However, the potential for effectiveness increases when the broadest range of tools are available so that the optimum combination of methods can be applied. Many target species cannot be cost-effectively controlled without herbicides (see Common Control Measures in Chapter 2 of FEIS). Where non-chemical control methods are determined to be efficient and effective they will be used. On any given treatment site, re-treatments may be necessary over time using all methods to fully control the invasive population. Integration of herbicides are likely to reduce the number of entries needed (ibid.). Herbicide use is expected to decline at treatment sites after initial entry. However, annual herbicide use averaging about 4,000 acres per year may be needed for 20 years or more (ibid.). I have considered the direct, indirect and cumulative effects analysis in the FEIS and find that the level of herbicide use proposed is small in comparison to overall herbicide use in the John Day River basins, and site-specific risks have been appropriately and redundantly minimized in the Selected Alternatives.

It is clear that some people consider most or all herbicides toxic, in most or all situations. A commenter wrote: “*A precautionary approach with herbicide use is further warranted because of data gaps for impurities, metabolites, inert and adjuvant formula ingredients as well as for whole herbicide formulas and chronic toxicity of repeated exposures causing long-term health and ecological effects.*” I acknowledge this concern, however I believe the risk assessments done on the herbicides allowed under this FEIS make it clear that herbicides can be applied without harm to people or non-target resources. The FEIS analysis further confirms our ability to effectively apply herbicides in a cautious manner. The common control measures and the project design features (PDFs) have been developed specifically to ensure adequate protection for people and the natural environment.

The same commenter also expressed that: “*No herbicide should be used within 100 feet of any stream. People swim in streams and accidentally drink water.*” However, the risk assessments and site-specific analysis in the FEIS demonstrate that herbicide use in this project cannot conceivably harm people who

swim in streams adjacent to treated areas. The potential amount of herbicide exposure in those scenarios would be extremely low. I believe that through the design features and buffers in the selected alternative, people using water on the National Forest for any purpose will not be harmed.

Findings Required by Other Laws and Regulations

This decision is consistent with all other current laws, regulations and policies guiding invasive plant programs and other management activities on National Forest System lands including, but not limited to: the National Environmental Policy Act, the National Forest Management Act; the Umatilla National Forest Plan; the Clean Water Act and Safe Drinking Water Act; the Wilderness Act; the National Historic Preservation Act; and Executive Orders 11988, 11990 and 12898.

Specific findings and rationales required by law follow.

National Forest Management Act and Forest Plan

The project complies with the Umatilla National Forest Plan. The project was specifically developed to follow R6 2005 standards for herbicide use (see DEIS Appendix A).

Consistency with Forest Service Policies and Plans

The decision is consistent with all Forest Service policies and existing plans. No conflicts with existing plans have been noted. The conclusions and findings in this analysis are supported by the best scientific information available. The FEIS (and the broader scale R6 2005 FEIS to which it is tiered) identifies methods used, discusses responsible opposing views, and discloses incomplete or unavailable information, scientific uncertainty, and risk (See 40 CFR, 1502.9 (b), 1502.22, 1502.24).

Invasive plant treatments are no longer subject to the requirements of the 1989 Mediated Agreement that affected removal of unwanted vegetation in Region Six. The R6 2005 ROD vacated the mediated agreement, replacing it with management direction for invasive plant prevention, treatment, restoration and monitoring. In April 2007, Northwest Coalition for Alternatives to Pesticides, the lead signatory in the 1989 Mediated Agreement, agreed it was willing to dissolve the Mediated Agreement for purposes of controlling invasive plants in Region 6. The Portland Audubon Society (July 2, 2007) and the Oregon Environmental Council (October 15, 2007) have also documented agreement to dissolve the Mediated Agreement for invasive plant control. Clean Water Act and Safe Drinking Water Act

The selected alternative will meet and conform to the Clean Water Act as amended in 1982 and Safe Drinking Water Act as amended in 1996 (FEIS, Chapter 3, Sections 3.4.2 and 3.5.3).

The Wilderness Act

The selected alternative includes treatment of approximately 200 acres of invasive plants mapped within three congressionally designated wilderness areas or trailheads near wilderness boundaries. Treatments are primarily herbicide with some manual (hand pulling). Herbicide application methods vary from individual plant application to broadcast spraying. Use of helicopters or other mechanized methods to transport supplies and people to carry out invasive plant treatments is not proposed under any alternative or EDRR. Treatment methods that may be utilized include non-mechanical hand treatments such as hand-pulling or use of hand tools for cutting, digging and grubbing. Herbicide treatments may use application methods such as wicking, stem injection, spray bottle, hand pressurized pumps, and propellant based systems such as those that use pressurized carbon dioxide.

Battery or solar powered pumps are considered motorized equipment. These devices are used to apply herbicides from horseback mounted spray systems. Solar panels and/or batteries to operate pumps may be

evident on pack stock. These types of pumps are quiet and would not impact opportunities for solitude or a primitive and unconfined type of recreation in wilderness.

The project is consistent with the Wilderness Act. As noted in the FEIS (Chapter 3.6.3), the amount of area proposed to be treated in wilderness is very small; approximately 197 acres of 304,925 acres in wilderness on the forest. Effects would be localized to the treatment areas and effects to the wilderness ecosystem are limited to these treatment areas.

The National Historic Preservation Act

Section 106 of the National Historic Preservation Act (NHPA) requires Federal agencies to consider the potential effects their undertakings may have on historic properties. The definition of undertaking encompasses all agency decision-making actions including the *Umatilla National Forest Invasive Plants Treatment Project*. The NHPA also compels agencies to consult with Tribes in determining whether the undertaking has potential to pose an effect on historic properties. Government-to-government tribal consultation has been initiated for the Invasive Plant Treatment Plan and we will continue to inform tribal staff during project implementation (see Section 1.7 of the FEIS for further details on Tribal Consultation). Tribal concerns have been addressed in all alternatives through the use of Project Design Features (Chapter 2) that minimize the potential for herbicide exposure. PDFs require the Forest Service to notify the Tribes of areas proposed for treatment each year. The Public Notification Plan requires areas proposed for treatment to be mapped, information shared and posted, and warning signs posted at the locations treated with herbicides. Water quality and fisheries habitat, a tribal concern, is also protected through the use of PDFs that restrict herbicide use in riparian and near stream areas. Under the June 2004 Programmatic Agreement (between the USDA Forest Service Pacific Northwest Region, the Advisory Council on Historic Preservation, and the Oregon State Historical Preservation Officer Regarding Cultural Resources Management), a “no potential to cause effects” determination has been made per Appendix C.1 and Appendix C.2 of the agreement. Section 106 review of any proposed treatments other than application of herbicide or hand removal will take place to determine if any protection measures are necessary. Any mechanized ground disturbing procedures will also receive Section 106 review. Documentation to this affect will be forwarded to the Oregon SHPO, in compliance with the National Historic Preservation Act of 1966 (as amended), and the Oregon Programmatic Agreement.

Executive Orders 11988 and 11990: Flood Plains and Wetlands

Proposed invasive plant treatments within riparian areas are discussed in FEIS Chapter 3.4 and 3.5. The project is intended to restore native plant communities and habitats within riparian and upland areas. No serious adverse effects are anticipated to occur to wetlands and floodplains from treatment in the Selected Alternative B. PDFs H-1 through H-13, and buffers detailed in Tables 5-8 (see Section 2.2.3 of the FEIS) further protect water bodies, riparian areas and aquatic ecosystems.

Executive Order 12898: Environmental Justice

Executive Order #12898, Federal Actions to Address Environmental Justice in Minority Populations and Low Income Populations, directs Federal agencies to address effects accruing in a disproportionate way to minority and low income populations. FEIS, Section 3.9.4 discusses the potential impacts of this project on these groups. With the implementation of any action alternative, there is the potential for some impact to Hispanic, Asian and American Indian communities. Harvesters of non-timber forest products tend to come from Asian, Hispanic and American Indian communities. These groups may be at higher risk for exposure to herbicide treatments in areas for harvesting their products. The potential for harmful exposure of herbicide to these groups will be reduced by PDFs that require public notification including posting treatment areas, notifying gatherers when herbicide treatments would occur in their permitted area, newspaper or individual notification (see PDFs K-1 and L-2 in Section 2.2.3). Triclopyr would not be sprayed in food gathering areas (PDF L-1). Tribes would be specifically notified about treatment

schedules (PDF M-1). These groups may benefit as the project objectives to improve native plant communities and ecosystems are achieved.

Executive Order 13443: Facilitation of Hunting Heritage and Wildlife Conservation

This order was signed on August 16, 2007 and directs Federal agencies that have programs and activities that have a measurable effect on public land management, outdoor recreation, and wildlife management, including the Department of the Interior and the Department of Agriculture, to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat. The project is consistent with this order by improving wildlife habitat through the reduction of invasive plant infestations and the maintenance of native browse.

Secretary of Agriculture Memorandum of 1827: Prime Farmland, Rangeland, Forestland and Parkland

No prime farmlands, rangelands, forestlands or parklands are within the project area, thus there will be no direct, indirect or cumulative effects on these lands.

Endangered Species Act

Consultation with the Fish and Wildlife Service (FWS) and National Marine Fisheries Service (NMFS, also referred to as NOAA Fisheries) has been completed for this project. The Forest Service consulted with these agencies during the planning process. The Biological Assessment (BA) evaluating the Proposed Action was sent to the FWS and NMFS in September 2008. The BA identified actions that were determined both “not likely” and “likely” to adversely affect species listed or proposed for listing under the Endangered Species Act. In response to the BA, FWS and NMFS each prepared a joint Concurrence and Opinion letter for the portions of the project they considered “not likely” to adversely affect the species and portions of the project they considered “likely” to affect such species (Biological Opinion (BO) FWS March 2009 and NMFS March 2009). The FWS concurred: *the proposed action may affect, but (is) not likely to adversely affect Gray wolf*¹. The FWS BO covered the Umatilla and Wallowa-Whitman National Forests and concluded: *the project is likely to adversely affect Bull Trout and designated Bull Trout critical habitat, MacFarlane’s four-o’clock*² *and Spalding’s catchfly*, and added:

The project is not expected to appreciably reduce either the survival or recovery of bull trout. ... Long-term effects on instream critical habitat (enhancement of native riparian vegetation) from invasive plant treatment activities (reducing noxious weed populations) are anticipated to be beneficial. ...

*The possible loss of scattered individuals or small groups due to unintended herbicide exposure will not significantly affect MacFarlane’s four-o’clock*³ *at the population level. ...*

The possible loss of scattered individuals or small groups due to unintended herbicide exposure will not significantly affect Spalding’s catchfly at the population level.

On January 14, 2010 the Fish and Wildlife Service proposed revising the designation of critical habitat for bull trout in the coterminous United States (75 FR 2270-2433). The proposed rule includes habitat on the Umatilla National Forest within the project area for this FEIS. An addendum to the Fisheries Biological

¹ The Northern Rocky Mountains distinct population segment of the gray wolf was removed from threatened or endangered status effective May 4, 2009, 74 FR 15123-15188.)

² There are no know populations of MacFarlane’s four-o’clock on the Umatilla National Forest

³ Wallowa-Whitman National Forest only

Evaluation was prepared May 25, 2010, to assess whether this critical habitat proposal would result in any changes to the previous bull trout effects analysis and to meet the Umatilla National Forest's interagency cooperation responsibilities under Section 7 of the ESA. The report concluded that the Invasive Plants Treatment Project "will not destroy or adversely modify proposed critical habitat for bull trout." This conclusion is based on the following:

- The Action Area for the Proposed Action encompasses the entirety of the Umatilla National Forest and the proposed critical habitat for bull trout, so all areas proposed as critical habitat were analyzed in the original Biological Evaluation and Biological Assessment.
- Project Design Features were designed at a Forest Level (FWS BO, p. 10) and will minimize the impacts of invasive plant treatments, including Early Detection and Rapid Response treatments. These include protective buffers and restricted application methods.
- Project Design Features are mandatory and will be implemented across the Umatilla National Forest.
- Adverse effects to bull trout and their habitat have been analyzed, and are expected to be brief, limited geographically, non-lethal and non-quantifiable (BO, p. 82).
- Effects to habitat are limited to disturbance from walking or standing in streams during the in-water work window, minor and infrequent transport of herbicides to fish bearing streams, ground disturbance from hand-pulling invasive plants adjacent to streams and the potential for soil erosion or loss of shade, and resulting loss of natural cover from increases in substrate embeddedness. There are caps on the numbers of acres treated in riparian areas per 6th field watershed, thereby limiting the magnitude for adverse effects.

The NMFS BO concluded: *the proposed action is not likely to jeopardize the continued existence of Snake River Spring/ Summer (SR) Chinook salmon, Snake River Fall Chinook Salmon, SR sockeye salmon, Snake River Basin (SRB) steelhead, or Middle Columbia River (MCR) steelhead, or result in the destruction or adverse modification of designated critical habitat for critical habitats for these listed species* (USDC National Oceanic and Atmospheric Administration, March 31, 2009, page 1). The BO further states:

"the proposed action will slightly degrade the environmental baseline at the site scale in treated areas, the effects will not persist beyond a few years, and the removal of invasive plants and restoration of native species are likely to improve riparian functions at many of these sites over the long term." (ibid. page 53).

FWS and NMFS have authorized incidental take on the inventoried sites as well as the EDRR approach for future actions. Conservation recommendations, reasonable and prudent measures, including non-discretionary terms and conditions of the incidental take permit, necessary to minimize the taking of federally listed fish are documented in the BOs. The conservation recommendations, reasonable and prudent measures, and terms and conditions of the incidental take statement are reflected in the project design features and herbicide use buffers.

The National Marine Fisheries Service also completed an essential fish habitat (EFH) consultation, prepared in accordance with section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act (MSA) (16 U.S.C. 1801, et seq.) and implementing regulations at 50 CFR 600 (BIOP page 58). The NMFS found the conservation recommendations, plus terms and conditions 1-3 of the BO, are applicable to EFH conservation and recommended they be adopted as EFH conservation measures. As noted above, these measures, including the terms and conditions, have been incorporated in the project design.

Environmentally Preferred Alternative

Alternative B is the environmentally preferred alternative in accordance with Council on Environmental Quality (CEQ) regulations (40 CFR Part 1505.2 (b)). Alternative B is preferred because it would most effectively reduce the presence and influence of invasive plants on National Forest System lands. It would also do the most to protect and allow for re-establishment of native plant ecosystems that have been or are in danger of being displaced by invasive plant populations. The FEIS acknowledges that this alternative most aggressively utilizes herbicides and herbicide application methods to accomplish the project purpose and need. This FEIS also prescribes the project design features and common control measures necessary to insure protection of the natural and human environment during herbicide and other invasive plant control method applications.

Implementation

This decision may not be implemented before the end of the appeal filing period. If no appeals are filed within the 45-day appeal filing period, implementation of the decision may occur on, but not before, five business days from the close of the appeal filing period. When appeals are filed, implementation may occur on, but not before, the 15th business day following the date of the last appeal disposition.

Administrative Review or Appeal Opportunities

This decision is subject to appeal pursuant to Forest Service regulations at 36 CFR 215. Any individual or organization who submitted comments during the comment period for the Draft EIS may appeal (36 CFR.6). Written notice of appeal must be postmarked or received by the Appeal Deciding Officer, Regional Forester Mary Wagner, ATTN: Appeals, USDA Forest Service, PO Box 3623, Portland, OR 97208-3623 within 45 days of the date of publication of notice regarding this decision in The Eastern Oregonian newspaper (Pendleton, OR). The appeal must state that the document is an appeal pursuant to 36 CFR 215, and at a minimum must meet the content requirements of 36 CFR 215.14, and include the name and address of the appellant, and must identify the decision by title, subject, date of decision, and name of the Responsible Official. The appeal narrative must be sufficient to identify the specific change(s) to the decision sought by the appellant or portions of the decision to which the appellant objects, and must state how the Responsible Official's decision fails to consider comment previously provided. If applicable, the appeal should state how the appellant believes this decision violates law, regulation, or policy.

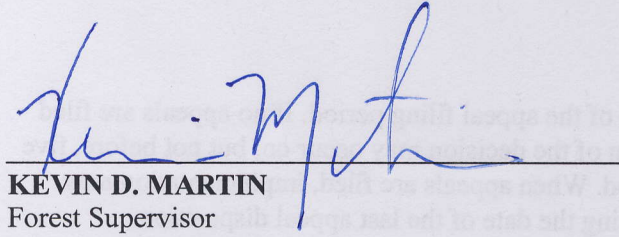
Appeals (including attachments) may be filed by regular mail, fax, e-mail, hand delivery, express delivery, or messenger service. The publication date of the notice regarding this decision in the newspaper of record is the sole means of calculating the appeal filing deadline, and those wishing to appeal should not rely on dates or timelines from any other source. E-mail appeals must be submitted to: appeals-pacificnorthwest-regional-office@fs.fed.us, and must be in one of the following three formats: Microsoft Word, rich text format (rtf) or Adobe Portable Document Format (.pdf). FAX appeals must be submitted to: 503-808-2255. Appeals may be hand-delivered to the Resource Planning and Monitoring Office, 333 SW First Ave., Portland, between 8:00 AM and 4:30 PM Monday-Friday.

It is the responsibility of all individuals and organizations to ensure their appeals are received in a timely manner. For electronically mailed appeals, the sender should normally receive an automated electronic acknowledgement from the agency as confirmation of receipt. If the sender does not receive an automated acknowledgement of the receipt of the appeal, it is the sender's responsibility to ensure timely receipt by other means.

Contact Person

For additional information concerning this decision, contact Joan Frazee at 541-278-3931.

For additional information about the appeal process, contact Bob Gianniny at 541-278-3869.



KEVIN D. MARTIN
Forest Supervisor
Umatilla National Forest

7/7/10

DATE

Appendix 1. Record of Decision Umatilla National Forest Invasive Plants Treatment Project

The information for this appendix has been taken from the FEIS for this project and repeated here for emphasis. Table numbers, figure numbers and other indication to areas of information have been retained for ease of cross referencing.

Common Control Measures

Table 3 that follows in this section summarizes species-specific integrated control measures that would be applied to known invasive species on the Umatilla National Forest. The table shows known acreages infested with each species, the range of effective treatment options, and site-specific considerations important to the final prescription. The priority and intensity of treatment needed varies widely based on site conditions, values at risk from invasion, and the range and aggressiveness of individual target species.

The Common Control Measures summary table in this document is a distillation of the common control measures prepared by Linda Mazzu (R6 2005 FEIS), and updated by Vicky Erickson (Invasive Weed Specialist), Julie Laufmann (TEAMS Botanist), Joan Frazee (Forest Botanist), with incorporated comments from M. Porter (Wallowa Resources, Enterprise, OR) D. Sharratt (Oregon Department of Agriculture), the Pacific Northwest's Least Wanted List: Invasive Weed Identification and Management, Oregon State University Extension Service, EC1563, 2003), and Nature Serve (www.natureserve.org). It displays the specific herbicides known to be effective for each species, along with the other integrated methods described above.

This analysis considers a wide range of treatment options applied to a wide range of site conditions so that practitioners are provided necessary flexibility to increase effectiveness of treatment, reduce cost of treatment, and minimize potential for adverse effects from treatment. As we learn from implementation through monitoring, specific control measures are expected to be adjusted. Adjustments would be subject to NEPA Section 18 reconsideration process.

Widespread species such as cheatgrass and ventenata are not shown in this table. Thousands of acres of common non-native plants are known on the Forest; these are not the focus of treatment in this document; however, some cheatgrass or ventenata sites may be treated if they are associated with other infestations treated within the scope of this document. Widespread invasive plants such as cheatgrass may be included in the treatment plan for some areas, such as wilderness or other natural areas. However, non-native species such as cheatgrass would not be considered non-target species for the purposes of protection (i.e. project design features intended to protect non-target plants).

Acres of treatment are estimated based on the existing inventory; density of the infestation within any given acre varies from a few plants to near total coverage. Analysis in Chapter 3 assumes herbicides would cover an entire acre, however, the treatments would target individual and groups of plants and would likely result in less herbicide actually used on many acres.

Table 3. Common Control Measures Summary – Range of effective treatment options and site-specific considerations by target species

Target Species - Common Name and Growth Habit	Acres and Number of Sites	Range of Effective Treatment Options	Site Specific Considerations
<p>Canada thistle (CIAR4) (<i>Cirsium arvense</i>)</p> <p>Perennial-rhizomatous</p>	<p>4,482 ac 339 sites</p>	<p>The only manual technique would be hand cutting of flower heads, which only suppresses seed production. Mowing may be effective in rare cases if done monthly.</p> <p>Herbicide treatment is most effective:</p> <ul style="list-style-type: none"> • Clopyralid • Picloram • Glyphosate • Chlorsulfuron <p>Timing: Apply in spring before to rosettes and prior to flowering. • Or apply in fall to rosettes; season is dependent upon herbicide used.</p>	<p>10 acres (7 sites) of Canada thistle are proposed for chemical treatment in riparian areas. Herbicide use buffers (see Tables 5, 6 and 7) would be applied. Picloram, glyphosate and chlorsulfuron would be spot applied to Canada thistle only if >50 feet from water and broadcast application would only occur if > 100 feet from water. Clopyralid would be spot applied to Canada thistle if > 15 feet from water (broadcast only if >100 feet from water). Buffers for dry intermittent streams may be smaller – see table 6. The aquatic formulation of glyphosate would be spot applied up to water’s edge.</p> <p>8 sites of Canada thistle occur on clay soils, 4 sites are on coarse soils and 2 sites include both coarse and clay soils. Chlorsulfuron would not used on sites with clay soils and picloram would not be used on coarse soils. See appendix D for listing of these sites.</p>
<p>Dalmatian Toadflax (LIGEDA) (<i>Linaria genistifolia</i> ssp <i>dalmatica</i>)</p> <p>Butter ‘n’ Eggs (LIVU) (<i>Linaria vulgaris</i>)</p> <p>Rhizomatous Perennials</p>	<p>93 ac 124 sites</p>	<p>Hand pull or dig small, easily accessible populations. Ensure all plant parts are completely removed. Plants can be left on site, but may reduce germination of desirable species due to mulching effect. If plants have flower heads with seeds, bag and remove from site.</p> <p>Mowing/cutting stems in spring or early summer will eliminate plant reproduction, but not the infestation.</p> <p>Biocontrols available (See appendix B)</p> <p>Herbicides with manual follow up treatment:</p> <ol style="list-style-type: none"> 1- Picloram 2- Chlorsulfuron 3- Imazapic (Use in native grass stands; fall application only) 4- Aquatic-labeled Glyphosate <p>Timing: Apply during active growth in spring before bloom or in late summer or fall during re-growth. Revegetate with desirable species at high priority sites when possible. Plant communities in good condition may recover without replanting.</p> <p>Notes: Revisits will be necessary; the number of</p>	<p>16 acres (12 sites) of Dalmatian toadflax and 19 acres (4 sites) of butter ‘n’ eggs are proposed for chemical treatment in riparian areas. Herbicide use buffers (see Tables 5, 6 and 7) would be applied. Picloram and chlorsulfuron would be spot applied to toadflax and/or butter ‘n’ eggs only if >50 feet from water and broadcast application would only occur if > 100 feet from water. Imazapic would be spot applied if > 15 feet from water and broadcast if >100 feet from water. Buffers for dry intermittent streams may be smaller – see table 6. The aquatic formulation of glyphosate would be spot applied up to water’s edge.</p> <p>3 sites of Dalmatian toadflax occur on sites with clay soils. Chlorsulfuron would not be used on these sites. See appendix D for listing of these sites.</p>

Target Species - Common Name and Growth Habit	Acres and Number of Sites	Range of Effective Treatment Options	Site Specific Considerations
		<p>which is dependent on the chemical used and the seedbank. This control could vary by site. Even after three years of consecutive treatments, control may range widely. These treatments may take up to ten years due to long term seed viability.</p> <p>Biocontrol agents have been shown to be very successful on lands in and around the Umatilla National Forest</p>	
<p>Hounds tongue (CYOF) (<i>Cynoglossum officinale</i>)</p> <p>Biennial</p>	<p>2,606 ac 300 sites</p>	<p>Hand pull or dig small populations. Entire root system must be removed. Plants could be left on site if no seed pods are present.</p> <ol style="list-style-type: none"> 1- Metsulfuron methyl 2- Chlorsulfuron 3- Picloram 4- Imazapic 5- Glyphosate <p>Timing: Apply during active growth, preferably basal rosette stage.</p>	<p>126 acres (31 sites) of hounds tongue are proposed for chemical treatment in riparian areas. Herbicide use buffers (see Tables 5, 6 and 7) would be applied. Metsulfuron methyl and imazapic would be spot applied if > 15 feet from water and broadcast if >100 feet from water. Chlorsulfuron, picloram, and glyphosate would be spot applied to hounds tongue only if >50 feet from water and broadcast application would only occur if > 100 feet from water. Buffers for dry intermittent streams may be smaller – see table 6. The aquatic formulation of glyphosate would be spot applied up to water’s edge.</p> <p>3 sites of hounds tongue occur on clay soils and 21 sites are on coarse soils. Chlorsulfuron would not used on sites with clay soils and picloram would not be used on coarse soils. See appendix D for listing of these sites.</p>
<p>Leafy Spurge (EUES) <i>Euphorbia esula</i></p> <p><i>Rhizomatous perennial</i></p>	<p>35 ac 55 sites</p>	<p>Requires combination of techniques for successful control. Multiple entries per year are required.</p> <p>Repeated mowing or hand cutting can control seed production but must be used with herbicides for adequate control of the site.</p> <p>Biocontrols available (See appendix B)</p> <p>Herbicides in combination with manual, mechanical and biological controls.</p> <ol style="list-style-type: none"> 1- Picloram 2- Glyphosate or Imazapic 3- Aquatic-labeled Glyphosate 	<p>25 acres (56 sites) of leafy spurge are proposed for chemical treatment in riparian areas. Herbicide use buffers (see Tables 5, 6 and 7) would be applied. Picloram and glyphosate would be spot applied only if >50 feet from water and broadcast application would only occur if > 100 feet from water. Imazapic would be spot applied if > 15 feet from water and broadcast if >100 feet from water. The aquatic formulation of glyphosate would be spot applied up to water’s edge and broadcast if spurge is >100 feet from water. Buffers for dry intermittent streams may be smaller– see table 6.</p> <p>There are no sites with coarse or clay soils (see appendix D).</p>
<p>Lesser burdock (ARMI2) (<i>Arctium</i>)</p>	<p>184 acres 17 sites</p>	<p>Hand pulling and mechanical control may prove to be successful since common burdock cannot tolerate cultivation. When cut down or uprooted, any root fragment that is left behind can grow</p>	<p>148 acres (18 sites) of lesser burdock are proposed for chemical treatment in riparian areas. Herbicide use buffers (see Tables 5, 6 and 7) would</p>

Target Species - Common Name and Growth Habit	Acres and Number of Sites	Range of Effective Treatment Options	Site Specific Considerations
minus) Biennial		into an entirely new plant and can contribute to spread. An effective control is to cut off emerging flower buds. The plants will have to be monitored throughout the summer as buds can reform after cutting. Herbicides: 1- Metsulfuron methyl 2- Clopyralid+Triclopyr 3- Glyphosate Timing: Apply during active growth, before flowering Notes: Seeds remain viable for 2 and reported up to 10-20 years.	be applied. Metsulfuron methyl would be spot applied if > 15 feet from water and broadcast if >100 feet from water. Triclopyr would be spot applied 150 feet from water's edge with no broadcast application allowed. Glyphosate would be spot applied to lesser burdock only if >50 feet from water and broadcast application would only occur if > 100 feet from water. Buffers for dry intermittent streams may be smaller – see table 6. The aquatic formulation of glyphosate would be spot applied up to water's edge. There are no sites with coarse or clay soils (see appendix D).
Meadow Hawkweed (HICA10) (<i>Hieracium caespitosum</i>) Perennial	1 ac 4 sites	Manual treatments are difficult since hawkweeds have stolons and will re-sprout from any fragments. Therefore, pulling must be done during moist soil conditions to get as much of the root as possible. Remove seed heads if control is attempted later in the season to reduce seed spread. Mowing of plants can cause plants to respond by sending up shorter stems and quickly flowering again. Herbicides are the most effective treatment: <ul style="list-style-type: none"> • Picloram • Clopyralid • Aquatic-labeled glyphosate Notes: Seed bank is not long-lived but yearly visits may be warranted to ensure no re-sprouting. Herbicides have been shown to be more effective when combined with fertilizer for grass species.	No riparian sites of yellow hawkweed are proposed for chemical treatment. There are no sites with coarse or clay soils (see appendix D).
Medusahead (TACA8) (<i>Taeniatherum caputmedusae</i>) Annual grass	56 ac 19 sites	Repeated cutting/mowing with herbicide treatment is effective. Manual removal can be effective with small populations. A combination of prescribed fire (in June), herbicide application, and reseeding with native grasses is considered highly effective. Repeated treatments may be needed Active restoration (seeding of a competitive desirable species) is important. Herbicide: <ol style="list-style-type: none"> 1- Imazapic 2- Sulfometuron methyl + Chlorsulfuron 3- Sulfometuron methyl 	1 site (<1 acre) is proposed for chemical treatment in a riparian area. Herbicide use buffers (see Tables 5, 6 and 7) would be applied. Imazapic would be spot applied if > 15 feet from water and broadcast if >100 feet from water. Chlorsulfuron, sulfometuron methyl, sethoxydim and glyphosate would be spot applied to medusahead only if >50 feet from water and broadcast application would only occur if >100 feet from water. Buffers for dry intermittent streams may be smaller – see table 6. The aquatic formulation of glyphosate would be spot applied up to water's edge.

Target Species - Common Name and Growth Habit	Acres and Number of Sites	Range of Effective Treatment Options	Site Specific Considerations
		<p>4- Sethoxydim 5- Glyphosate</p> <p>Timing: Treatment should be done before seed formation or during the fall through early winter.</p>	<p>There are no sites with coarse or clay soils (see appendix D).</p>
<p>Musk thistle (CANU4) (<i>Carduus nutans</i>)</p> <p>Biennial</p>	<p>42 ac 5 sites</p>	<p>Any manual method that severs the root below the soil surface will kill these plants. Effective control requires cutting at the onset of blooming. Treatment before plants are fully bolted results in re-growth. Mowing should be specifically conducted close to full flower stage (within 2 days).</p> <p>Biological controls may be helpful to suppress populations in combination with other methods (see appendix B).</p> <p>Herbicide treatments are effective in combination with mechanical/manual/biological controls:</p> <ol style="list-style-type: none"> 1- Picloram or Clopyralid 2- Metsulfuron methyl 3- Glyphosate 4- Chlorsulfuron <p>Timing: Apply in spring before to rosettes and prior to flowering. • Or apply in fall to rosettes; season is dependent upon herbicide used. •</p>	<p>No riparian sites of musk thistle are proposed for chemical treatment.</p> <p>One site of musk thistle occurs on a site with both coarse and clay soils. Neither picloram nor chlorsulfuron would be applied at this site. See appendix D for a listing of this site.</p>
<p>Rush skeletonweed (CHJU) (<i>Chondrilla juncea</i>)</p>	<p>1 ac 3 sites</p>	<p>No manual techniques recommended. A 1-cm section of the extensive and deep tap and lateral root system can re-sprout aerial parts if damaged</p> <p>Frequent mowing of plants infested with gall mites may decrease the rate of spread.</p> <p>Biocontrols available (See appendix B)</p> <p>Herbicides can be effective (Application may be difficult due to lack of leaf surface):</p> <ol style="list-style-type: none"> 1- Clopyralid (late fall or early spring only) 2- Picloram 3- Metsulfuron methyl <p>Timing: Apply to rosette in late fall or up to early bolting stage in spring. Plants less than 5 years old respond best. Number of repeated treatments will be dependent on the herbicide used and the seed bank.</p> <p>Notes: The pappus on each seed allows the seed to be carried up to 20 miles by wind currents. A healthy plant can produce 1500 flower heads with the capability of producing 20000 viable seeds. Where sexual reproduction is prevented, the plant can re-grow from root fragments. Some seeds may remain viable up to</p>	<p>1 site is proposed for chemical treatment in a riparian area. Herbicide use buffers (see Tables 5, 6 and 7) would be applied. Clopyralid and metsulfuron methyl would be spot applied to rush skeletonweed if >15 feet from water (broadcast only if >100 feet from water). Picloram would be spot applied to rush skeletonweed only if >50 feet from water and broadcast application would only occur if > 100 feet from water. Buffers for dry intermittent streams may be smaller – see table 6.</p> <p>There are no sites with coarse or clay soils (see appendix D).</p>

Target Species - Common Name and Growth Habit	Acres and Number of Sites	Range of Effective Treatment Options	Site Specific Considerations
		5 years in the seed bank.	
<p>Russian Knapweed (ACRE3) (<i>Acroptilon repens</i>)</p> <p><i>Perennial with adventitious shoots</i></p>	<p>3 ac 1 site</p>	<p>Hand-pulling is very difficult, but can be effective for small infestations during the establishment year only. Pull plants when soil is wet and before seeds have formed. Remove all plant parts from site.</p> <p>Cutting or mowing reduces the current year growth and will eliminate seed production, but will not kill the roots of this species. Cut/mow several times annually (at least 3 times/year) to control existing top growth; re-emerging plants will be smaller in size and lower in vigor.</p> <p>Biocontrol available, however not effective in region (See appendix B).</p> <p>Lasting control requires an integration of mechanical, manual, biocontrols and herbicide:</p> <ul style="list-style-type: none"> 1- Chlorsulfuron 2- Clopyralid 3- Clopyralid + Triclopyr (Redeem) 4- Glyphosate, Imazapic, or Metsulfuron <p>Note: Late fall/early winter application is critical for Clopyralid</p> <p>Competitive plantings are usually necessary.</p>	<p>3 acres (1 site) of Russian knapweed is not in a riparian area and there are no sites with coarse or clay soils (see appendix D). Site is located on roadside 6401-030 and is proposed for chemical treatment.</p>
<p>Scotch Broom (CYSC4) (<i>Cytisus scoparius</i>)</p> <p><i>Perennial woody shrub</i></p>	<p>6 ac 5 sites</p>	<p>Hand pull, cutting, weed wrenching or digging small populations or when regular volunteers are available. Hand pulling or weed wrenching is most effective in moist soils. Plants can be left on site if no seed pods are present.</p> <p>Cutting will require multiple visits in one year. These treatments may take up to ten years due to long term seed viability.</p> <p>Biocontrols available (appendix B); moderate control effects noted.</p> <p>Herbicides:</p> <ul style="list-style-type: none"> 1- Triclopyr 2- Picloram 3- Glyphosate <p>Timing Apply during active growth preferably in the spring to young plants.</p> <p>Notes: Mowing prior to fruiting and follow up with spot spray to individual plants will reduce herbicide use.</p>	<p>One site of less than 1 acre in size of Scotch broom is proposed for chemical treatment in a riparian area. Herbicide use buffers (see Tables 5, 6 and 7) would be applied. Picloram and glyphosate would be spot applied to Scotch broom only if >50 feet from water and broadcast application would only occur if > 100 feet from water. Triclopyr would be spot applied 150 feet from water's edge with no broadcast application allowed. Buffers for dry intermittent streams may be smaller – see table 6. Aquatic triclopyr-TEA would be spot applied if >15 feet from water's edge. The aquatic formulation of glyphosate would be spot applied up to water's edge.</p> <p>There are no sites with coarse or clay soils (see appendix D).</p>
<p>Scotch Thistle (ONAC)</p>	<p>231 ac 39 sites</p>	<p>Cutting and mowing can be effective when combined with revegetation of native species. Repeated mowing, in combination with other</p>	<p>222 acres (5 sites) are proposed for chemical treatment in riparian areas. Herbicide use buffers (see Tables 5, 6</p>

Target Species - Common Name and Growth Habit	Acres and Number of Sites	Range of Effective Treatment Options	Site Specific Considerations
<p><i>Onopordum acanthium</i></p> <p><i>Biennial</i></p>		<p>management methods, often is necessary for long-term control. Manual removal is effective when entire aboveground plant growth is removed.</p> <p>Herbicide treatment is the most effective control.</p> <ol style="list-style-type: none"> 1- Picloram or Clopyralid 2- Chlorsulfuron 3- Metsulfuron 4- Aquatic-labeled Glyphosate <p>Timing: Spray in the spring before plants bolt or during the fall on the rosettes.</p>	<p>and 7) would be applied. Picloram and chlorsulfuron would be spot applied to Scotch thistle only if >50 feet from water and broadcast application would only occur if > 100 feet from water. Clopyralid and metsulfuron would be spot applied to Scotch thistle if >15 feet from water and broadcast application would only occur if >100 feet from water. Buffers for dry intermittent streams may be smaller – see table 6. The aquatic formulation of glyphosate would be spot applied up to water’s edge.</p> <p>1 site of Scotch thistle occurs on coarse soils and 3 sites include clay and coarse soils. Picloram would not be used where coarse soils are present. Chlorsulfuron would not be used where clay soils are present. See appendix D for listing of these sites.</p>
<p>Spotted knapweed (CEST8) (<i>Centaurea stoebe</i>)</p> <p>Diffuse knapweed (CEDI3) (<i>Centaurea diffusa</i>)</p> <p><i>Tap rooted Biennials or Perennials</i></p>	<p>2,413 ac 216 sites</p> <p>9,968 ac 1,187 sites</p>	<p>Biocontrols available for some knapweed species (see appendix B)</p> <p>Herbicides with manual and mechanical treatment as follow-up.</p> <ol style="list-style-type: none"> 1- Clopyralid, or Picloram 2- Glyphosate <p>Timing: Preferred treatment is spring before bud stage or early summer.</p> <p>Hand pull or dig small populations or when regular volunteers are available. Multiple entries per year are required.</p> <p>Revegetate with desirable species, at high priority sites when possible.</p> <p>Effective methods of control would likely vary based on species and site specific conditions.</p>	<p>649 acres (64 sites) of spotted knapweed and 1604 acres (241 sites) of diffuse knapweed are proposed for chemical treatment in riparian areas. Herbicide use buffers (see Tables 5, 6 and 7) would be applied. Picloram would be spot applied to knapweed only if >50 feet from water and broadcast application would only occur if > 100 feet from water. Clopyralid would be spot applied to knapweed if > 15 feet from water (broadcast only if >100 feet from water). Buffers for dry intermittent streams may be smaller – see table 6. The aquatic formulation of glyphosate would be spot applied up to water’s edge.</p> <p>16 sites of spotted knapweed and 77 sites of diffuse knapweed occur on sites with coarse soils. Picloram would not be used where coarse soils are present. See appendix D for listing of these sites.</p> <p>1 site of spotted and 1 site of diffuse knapweed occur with a shallow water table; neither picloram nor clopyralid would be applied.</p>
<p>St John’s wort (HYPE) (<i>Hypericum perforatum</i>)</p>	<p>2,783 ac 561 sites</p>	<p>Hand removal of small populations or isolated stems is possible, but repeated treatments will be necessary as lateral roots give rise to new plants. Pulled or dug plants must be removed from the area and burned. • These treatments</p>	<p>239 acres (29 sites) of St John’s wort are proposed for chemical treatment in riparian areas. Herbicide use buffers (see Tables 5, 6 and 7) would be applied. Metsulfuron methyl would</p>

Target Species - Common Name and Growth Habit	Acres and Number of Sites	Range of Effective Treatment Options	Site Specific Considerations
perennial		<p>may take up to ten years due to long term seed viability.</p> <p>Biocontrols available (appendix B). Biological controls will most likely not be effective in damp, cool climates.</p> <p>Herbicides:</p> <ol style="list-style-type: none"> 1- Metsulfuron methyl 2- Picloram 3- Glyphosate <p>Timing: Apply metsulfuron methyl when plants are fully emerged and in active growth. • Apply picloram in early growth stages before bloom.</p>	<p>be spot applied if > 15 feet from water and broadcast if >100 feet from water. Picloram and glyphosate would be spot applied to St. John's wort only if >50 feet from water and broadcast application would only occur if > 100 feet from water. Buffers for dry intermittent streams may be smaller – see table 6. The aquatic formulation of glyphosate would be spot applied up to water's edge.</p> <p>10 sites of St. John's wort occur on coarse soils and picloram would not be used at these sites. See appendix D for a listing of these sites.</p>
<p>Sulphur cinquefoil (PORE5) (<i>Potentilla recta</i>)</p> <p>Perennial</p>	<p>260 ac 152 sites</p>	<p>Hand-pulling is effective on small infestations provided the entire root is removed.</p> <p>Mechanical control by disking shown to be effective if reseeded. Mowing is not effective</p> <p>Herbicides:</p> <ol style="list-style-type: none"> 1- Picloram 2- Metsulfuron methyl (by itself not particularly an effective treatment) <p>Timing: Apply to actively growing plants or during the rosette to flower stage of growth.</p> <p>Notes: Repeated applications are needed to for the first couple of years ensure re-establishment does not occur. Seeds remain viable for 1 to 5 years</p>	<p>137 acres (46 sites) are proposed for chemical treatment in riparian areas. Herbicide use buffers (see Tables 5, 6 and 7) would be applied. Picloram would be spot applied to sulphur cinquefoil only if >50 feet from water and broadcast application would only occur if > 100 feet from water. Metsulfuron methyl would be spot applied if > 15 feet from water and broadcast if >100 feet from water. Buffers for dry intermittent streams may be smaller – see table 6. Chemical treatment would not be used for sulfur cinquefoil growing <15 feet from water.</p> <p>Two sites of sulphur cinquefoil occur on coarse soils and therefore picloram would not be used at these sites. See appendix D for a listing of these sites.</p>

Target Species - Common Name and Growth Habit	Acres and Number of Sites	Range of Effective Treatment Options	Site Specific Considerations
<p>Tansy ragwort (SEJA) (<i>Senecio jacobaea</i>)</p> <p>Biennial or short-lived perennial</p>	<p>100 ac 91 sites</p>	<p>Hand pulling is effective if done in moist soils. This is most effective after the population has been brought under control.</p> <p>Mowing is the most common technique and is effective if done prior to flowering. These treatments may take up to ten years due to long term seed viability.</p> <p>Biocontrols available (appendix B). Ensure biological controls are present nearby or request their introduction.</p> <p>Herbicides: 1- Clopyralid 2- Chlorsulfuron 3- Picloram 4- Glyphosate</p> <p>Timing: During active growth, up through flowering stage.</p>	<p>12 acres (5 sites) are proposed for chemical treatment in riparian areas. Herbicide use buffers (see Tables 5, 6 and 7) would be applied. Clopyralid would be spot applied to tansy ragwort if > 15 feet from water (broadcast only if >100 feet from water). Chlorsulfuron, picloram, and glyphosate would be spot applied to tansy ragwort only if >50 feet from water and broadcast application would only occur if > 100 feet from water. Buffers for dry intermittent streams may be smaller – see table 6. The aquatic formulation of glyphosate would be spot applied up to water’s edge.</p> <p>One site of tansy ragwort occurs on coarse soil. Picloram would not be applied at this site. See appendix D for a listing of this site.</p>
<p>Whitetop (CADR) (<i>Cardaria draba</i>)</p> <p>Perennial</p>	<p>104 ac 9 sites</p>	<p>Hand pulling or digging can control small infestations, but plants must be completely removed within 10 days after emergence throughout growing season for two to four years</p> <p>Mowing followed a month later by herbicide may be effective. Mowing must be done during full flowering.</p> <p>Herbicide is most effective control method:</p> <ul style="list-style-type: none"> • Metsulfuron methyl • Chlorsulfuron, • Sulfometuron methyl • Glyphosate <p>Notes: Multiple applications are probably necessary for control. Handing pulling will stimulate plant growth if all plant parts are not removed.</p>	<p>96 acres (10 sites) are proposed for chemical treatment in riparian areas. Herbicide use buffers (see Tables 5, 6 and 7) would be applied. Metsulfuron methyl would be spot applied if > 15 feet from water and broadcast if >100 feet from water. Chlorsulfuron, sulfometuron methyl, and glyphosate would be spot applied to whitetop only if >50 feet from water and broadcast application would only occur if >100 feet from water. Buffers for dry intermittent streams may be smaller – see table 6. The aquatic formulation of glyphosate would be spot applied up to water’s edge.</p> <p>There are no sites with coarse or clay soils (see appendix D).</p>
<p>Yellow starthistle (CESO3) (<i>Centaurea solstitialis</i>)</p> <p>Annual</p>	<p>1,257 ac 42 sites</p>	<p>Hand-pull small patches. Remove all above ground material and get well below the root crown. Pull after bolted but before it produces viable seed.</p> <p>On relatively large populations of < 40 acres, start removing plants at outward edge of population and work toward interior (Bradley Method).</p> <p>Mowing can be useful but timing is critical (before viable seed production, but too early can result in rapid re-growth),</p> <p>Mazzu (2005) discusses biological control.</p>	<p>69 acres (4 sites) of yellow starthistle are proposed for chemical treatment in riparian areas. Herbicide use buffers (see Tables 5, 6 and 7) would be applied. Picloram and glyphosate would be spot applied to yellow starthistle only if >50 feet from water and broadcast application would only occur if > 100 feet from water. Clopyralid would be spot applied to yellow starthistle if > 15 feet from water (broadcast only if >100 feet from water). Buffers for dry intermittent streams may be smaller – see table 6. The aquatic formulation</p>

Target Species - Common Name and Growth Habit	Acres and Number of Sites	Range of Effective Treatment Options	Site Specific Considerations
		<p>Biological control insects can reduce seed production by 90 to 100 percent. (Wilson et al. 2003, Biology and Biological Control of Yellow Starthistle). Variable success results reported from eastern Oregon releases (appendix B).</p> <p>Herbicides are most effectively applied in rosette to seedling stage before flowering from late winter to May:</p> <ol style="list-style-type: none"> 1- Clopyralid or Picloram 2- Glyphosate 	<p>of glyphosate would be spot applied up to water's edge.</p> <p>8 sites of yellow starthistle occur on sites with coarse soils. Picloram would not be used where coarse soils are present. See appendix D for listing of these sites.</p> <p>Aerial application of clopyralid is proposed for some sites of yellow starthistle. .</p>

Chemical Methods

Chemical methods include use of herbicides and surfactants according to standards in the Umatilla Forest Plan (as amended by the R6 2005 ROD). The effectiveness, risks and properties of the herbicides and application methods proposed for use vary widely.

Ground-based or aerial application of herbicides would be used based on accessibility, topography, the size of treatment area and the expected efficiency and effectiveness of the method selected. The eventual goal is to reduce dependence on herbicide applications and maintain sites using non-herbicide methods.

The following are examples of the proposed methods of application:

Spot spraying – This method targets individual plants and is usually applied with a backpack sprayer. Spot spraying can also be applied using horse mounted spray tanks with pumps, or a hose off a truck-mounted or ATV-mounted tank.

Wicking – This hand method involves wiping a sponge or cloth that is saturated with chemical over the plant. This is used in sensitive areas, such as near water, to avoid getting any chemical on the non-target vegetation, soil, or water.

Stem injection – A new hand application technique currently is being used on Japanese knotweed in western Oregon and Washington.

Hand broadcast – Herbicide would be applied by hand using a backpack or hand spreader to cover an area of ground rather than individual plants.

Boom broadcast – This involves using a hose and nozzle from a tank mounted on a truck, or ATV. Herbicide is applied to cover an area of ground rather than individual plants. This method is used in areas where invasive plants occupy a large percentage of cover on the site and the area to be treated makes spot spraying impractical.

Aerial applications – In areas where physical features, such as topography, raise applicator safety concerns or where the cost of ground application is prohibitive, invasive plants may be treated with the use of helicopters. Aerial application of clopyralid would occur on 675 acres of the Pomeroy Ranger District (see figure 6).

Herbicide formulations and mixtures can contain one or more of the following 10 active ingredients: chlorsulfuron, clopyralid, glyphosate, imazapic, imazapyr, metsulfuron methyl, picloram,

sethoxydim, sulfometuron methyl, and triclopyr. The application rates and method depend on the presence of the target species, condition of non-target vegetation, soil type, depth to the water table, the distance to open water sources, riparian areas, special status plants, and requirements of the herbicide label. Applications would be scheduled and designed to minimize the potential impacts to non-target plants and animals (R6 2005 FEIS, appendix 1-5, 1-6) by applying project design features. Monitoring of treated sites would determine what follow-up treatments would be needed if treatment methods need to be changed or if a more effective herbicide should be used.

Though the invasive plant inventory was thorough, it is reasonable to assume not all invasive plants sites have been located and that new sites will emerge on the landscape. Therefore, ongoing monitoring of treated sites would also look for new infestations. Newly discovered infestations would likely receive a high priority for treatment under the early detection rapid response (EDRR) strategy. Such treatments would be done under the same guidance of the Umatilla Forest Plan as amended by the R6 2005 ROD, other Forest Plan standards, product labels, and PDFs used for known treatment sites.

Table 2 displays 10 herbicides proposed for use in the proposed action (PA). The range of application rates for each chemical was derived during the SERA Risk Assessments, which are the basis for the herbicides analyzed in the R6 2005 FEIS. Most of the time application rates would not exceed the typical rate and effects analyses assumes the typical rate; however the actual effective rate may vary depending on application method, target species, and project design features (site-specific measures of protection). Broadcast applications would not exceed typical label rates shown in Table 2. Non-broadcast methods such as spot spraying, wicking, wiping or stem injection may infrequently be applied at rates greater than typical, where necessary to be effective.

Effects analysis models assume all applications are broadcast, modeled at typical rates; non-broadcast methods are typically less likely to result in herbicide exposure and potential delivery to streams than predicted for broadcasting. Nonbroadcast methods are labor intensive and fewer acres can be completed in a day – this also results in less exposure than predicted for broadcast in a 24 hour period (based on 10 acres, a daunting target for hand treatments such as stem injection).

Table 2. High, Typical, and Low Application Rates for Herbicides

Herbicide	Highest Application Rate⁴ Lbs. a.i./acre	Typical Application Rate Lbs. a.i./acre	Lowest Application Rate Lbs. a.i./acre
Chlorsulfuron	0.25	0.056	0.0059
Clopyralid	0.50	0.35	0.10
Glyphosate	7.00	2.00	0.50
Imazapic	0.19	0.13	0.031
Imazapyr	1.25	0.45	0.03
Metsulfuron Methyl	0.15	0.03	0.013
Picloram	1.00	0.35	0.10
Sethoxydim	0.38	0.30	0.094
Sulfometuron Methyl	0.38	0.045	0.03
Triclopyr	10.00	1.00	0.10

⁴ Maximum rates reflect the annual cumulative maximum application rate per acre. Some formulations have one-time maximum application rates that are substantially lower than the annual maximum rate.

Additives and Impurities

***Adjuvants** are compounds added to the formulation to improve its performance. They can either enhance the activity of an herbicide's active ingredient (activator adjuvant) or offset any problems associated with its application (special purpose or utility modifiers). For example, surfactants are one type of adjuvant that makes the herbicide more effective by increasing absorption into the plant. Project design features have been developed to reduce potential impacts from adjuvants.*

***Inert compounds** are those that are intentionally added to a formulation, but have no herbicidal activity and do not affect the herbicidal activity. Inert additives facilitate the herbicide's handling, stability, or mixing.*

***Impurities** are inadvertent contaminants in the herbicide, usually present as a result of the manufacturing process.*

Physical Methods

Physical treatment type includes manual and mechanical control methods.

Manual Control Methods

These include non-mechanized approaches, such as hand pulling or using hand tools (e.g., grubbing), to remove plants or cut off seed heads. Manual treatments are labor intensive, effective only for relatively small areas, and require repeated treatments several times throughout the growing season depending on the species. Manual treatments can be effective for annual and tap-rooted weeds, but are ineffective against perennial weeds with deep underground stems or roots, or fine rhizomes that can be easily broken and left behind to re-sprout.

Manual treatments are typically used to treat selected plants, small infestations, and sensitive areas to avoid potential negative impacts to non-target species or water quality. Where sites are small or there are few individual target species, handsaws, axes, shovel, rakes, machetes, grubbing hoes, mattocks, brush hooks, and hand clippers may all be used to remove invasive plant species. Axes, shovels, grubbing hoes, and mattocks are also used to dig up and cut below the surface to remove the main root of plants. To meet control objectives or reduce the risk of activities spreading invasive plants, seed heads and flowers are removed and disposed of properly. Other manual methods could include mulching, hot water steaming, foaming, or solarization techniques such as using black plastic to cover invasive species in order to shade out and kill pieces of roots (i.e. rhizomes). These techniques could be used in specific areas where there is a desire to minimize herbicide use such as areas with an abundance of sensitive wildlife or plant species.

Mechanical Control Methods

This method uses hand power tools and includes such actions as mowing, weed whipping, road brushing, root tilling methods, or foaming, steaming, infrared and other techniques using heat to reduce plant cover and root vigor. Choosing the appropriate treatment depends on the characteristics of undesired species present (for example, density, stem size, brittleness, and sprouting ability); the size of the treatment area, seedbed preparation and revegetation; the sites location (inside or outside a riparian area), and soil or topographic considerations. These activities would typically occur along roadsides, rock sources, or other confined disturbed areas and dispersed use areas.

Mowing and cutting would be used to reduce or remove above ground biomass. Seed heads and cut fragments of species capable of re-sprouting from stem or root segments may be collected and properly disposed of to prevent them from spreading into noninfested areas.

Biological Methods

Animal and Plant Health Inspection Service (APHIS) and State approved insects or plant pathogens that are proven control agents of specific weed species would be released to selectively suppress, inhibit, or control herbaceous and woody target species.

The insect or plant pathogen attacks and weakens the targeted weed species and reduces its ability to compete or reproduce. Biological control release would be used when the target species occupies extensive portions of the landscape, other methods of control are prohibitive based on cost and location, and an effective biological control regime exists. Biological weed control activities typically include the release parasitic, "host specific" insects, mites, nematodes and pathogens. Presently, insects are the primary biological control agent in use. Treatments do not eradicate the target species but rather reduce target plant densities and competition with desired plant species for space, water and nutrients.

Biological control activities may include collection of beetles/insects, development of colonies for collection, transporting, and transplanting parasitic beetles/insects, and supplementing stocking of existing populations. Bio-control agents are transported in containers that safely enclose the agent until release.

In some situations, a suite of biological control agents is needed to reduce weed density to a desirable level. As an example; a mixture of five or more biological control agents may be needed to attack flower or seed heads, foliage, stems, crowns and roots all at the same time or during the plant's life cycle. Typically, 15 to 20 years are needed to bring about a successful control level.

The treated areas would continue to be inventoried and monitored to determine the success of the treatments and when the released bio-control agents have reached equilibrium with the target species. Repeat visits may need to be made several times a season, and over a series of years to determine if additional releases are needed or if a different agent needs to be released.

The use of biological control usually results in delayed effectiveness, often requiring 5-10 years for successful reduction of infestations. However, the increase of native vegetation is simultaneously occurring that often eliminates the need for restoration. Because of this fact, it is the preferred method in remote areas where access is limited, and on species where bioagents are available and proven successful.

Cultural Treatment Methods/Restoration

Cultural controls are defined in the R6 2005 FEIS as: "The establishment or maintenance of competitive vegetation, use of fertilizing, mulching, prescribed burning, or grazing animals to control or eliminate invasive plants" (page 10). Any of these methods except prescribed burning and grazing animals may be used in this project.

Cultural treatment methods would be used in the context of encouraging native vegetation to out-compete invasive plants. Some infestations can be treated once and some require multiple treatments to be effective. Mulching, seeding, planting and fertilizing are the cultural treatments that could be integrated with chemical, physical or biological methods to encourage native plant growth and spread. Native seed would be used to help native species re-establish, enhance competition over invasive plants, and provide erosion protection. In other areas, where 30 percent or more of the desirable vegetation exists, it may naturally replace target invasive plant species that have been removed.

Restoration and competitive plantings of native flora is essential to long term control of invasive plants. Restoration can be accomplished in some areas by removing competition from invasive plants and allowing native flora to occupy a site. Other areas would require active restoration, which would

include competitive seeding with native plants, mulching, and/or outplanting. Meadows and forested areas are most likely to respond favorably to passive restoration, while roadsides and other highly disturbed areas may require active assistance through mulching and/or competitive seeding/planting with desirable vegetation. The intent is to re-establish competitive local, native vegetation post-treatment to promote resilient habitat conditions that are less susceptible to invasive plants.

Cultural treatments and restoration would follow *Guidelines for Revegetation for Invasive Weed Sites on National Forests and Grasslands in the Pacific Northwest* (Erickson et al. 2003). The revegetation guidelines state:

“Plan ahead for revegetation. First assess the need for revegetation. It may not always be necessary if a healthy native population is already in place. Not every inch of bare ground needs to be revegetated. If revegetation is needed, make sure you have materials available to seed or plant treated sites as soon after treatment as possible...The planting of competitive desirable species can sometimes be the most effective method of control available for an invasive species.”

Local native species are always preferred, but use of other desirable species such as non-native species that do not persist could be used as an interim step. A combination of native and desirable non-natives could be an initial mix for revegetation. A fast growing desirable non-native such as sterile wheatgrass can germinate quickly and start filling in bare ground until a slower to germinate native species can start competing effectively.

Evaluation for site restoration may occur before, during and after herbicide, manual and mechanical treatments. Passive site restoration would be favored in areas having a stable, diverse, native plant community and sufficient organics in the soil to sustain natural revegetation. If the soils lack sufficient organics, mulch and/or mycorrhizae could be added. Deep-rooted shrubs may also be seeded or planted to more fully utilize resources from the lower soil profile, especially late in the growing season. Shrubs allow for easier establishment of understory species by increasing water availability and reducing understory temperatures and evapotranspiration.

The degree of disturbance, as indicated by the proportion of the existing plant cover that consists of desirable native species, will also affect revegetation outcome. Ten to twenty percent native cover is considered a minimum required to facilitate natural recovery of a site (James 1992, Sheley et al. 1996, Goodwin and Sheley 2003). The diversity, abundance, and viability of plant propagules of desirable species in the seed bank or within the immediate vicinity are additional important determinants in natural recruitment and recovery.

Project design features in group P (in this section) address restoration for areas that are highly disturbed and for areas where potential re-infestation by new or nearby invasive plants threatens the introduction of, or existing, native vegetation as well as soils.

Project Design Features

The following project design features (PDFs) minimize the potential adverse impacts of invasive plants treatment and provide sideboards for EDRR. The PDFs are in addition to, and do not duplicate, the Forest Plan standards and guidelines. The PDFs were developed to respond to the site-specific resource conditions within the treatment areas, including (but not limited to) the current invasive plant inventory, the presence of special interest species and their habitats, potential for herbicide delivery to water, and the social environment. Implementation of the PDFs would be mandatory. The analysis assumes buffers approximate horizontal (map) distances.

The effectiveness of the PDFs is addressed throughout chapter 3. In some cases, the PDFs eliminate an herbicide exposure of concern, for instance, limits the method or rate of herbicide application to avoid a specific type of exposure that risk assessments indicate is over a level of concern for people

or the environment. In other cases, the PDFs reduce potential for herbicide exposure to have an effect, but do not necessarily eliminate that potential. The purpose and source of each PDF is provided in the list below.

These PDFs were developed for application to new detections as well as known sites, to ensure that the effects of treating new sites are similar to the effects of treating existing sites. The PDFs have been edited for clarity or to reduce redundancy since the release of the DEIS, however the substance remains the same.

A-Pre-Project Planning

A-1: Prior to treatment, confirm species/habitats of local interest, sensitive areas (e.g. streams, lakes, roadside treatment areas with higher potential to deliver herbicide to water, municipal watersheds, domestic water sources, shallow water table), recreation and administrative sites, and range allotments. Apply appropriate PDFs described in the following text.

For EDRR sites follow the decision process (Chapter 2, figure 9) to determine the type and method of treatment and apply applicable PDFs.

- Purpose: Ensure project is implemented appropriately.
- Source: This approach follows several previous NEPA documents. Pre-project planning also discussed in the previous section.

B-Coordination with Other Landowners and Agencies

B-1: Work with owners and managers of neighboring lands to respond to invasive plants that straddle multiple ownerships. Coordinate treatments within appropriate distances based on invasive plant species reproductive characteristics, and current use of area. Cooperators within the National Forest System will be informed of any proposed treatments within their areas of interest (such as the PNW Research Station for treatments within or adjacent to Research Natural Areas).

- Purpose: To ensure that neighbors and cooperators are fully informed about planned herbicide use and to increase the effectiveness of treatments on multiple ownerships
- Source: A variable distance based on site and species specific characteristics was chosen because it adjusts for various conditions that exist in these areas. All PDFs related to riparian areas and buffer distances will be followed.

C-To Prevent the Spread of Invasive Plants during Treatment Activities

C-1: Ensure vehicles and equipment (including personal protective clothing) does not transport invasive plant materials.

- Purpose: A prevention measure to minimize risk of spreading invasive plants
- Source: Umatilla LRMP as amended by the R6 2005 ROD Standard #1

D-Wilderness Areas⁵

D-1: For EDRR in wilderness, invasive plants could be treated using non-mechanical hand methods or herbicides. Herbicide treatments may use application methods such as wicking, stem injection, spray bottle, hand pressurized pumps, battery or solar powered pumps and propellant based systems such as those that use pressurized carbon dioxide.

- Purpose: To reduce the effects of invasive plant treatments on the untrammeled quality of wilderness character

⁵ Invasive plant eradication within Wilderness meets the “no impact” intent of the Wilderness Act and associated land use policies

E-Non-herbicide Treatment Methods

E-1: Limit the numbers of workers on any one site at any one time while treating areas within 150 feet of creeks.

- Purpose: To minimize trampling, protect riparian and aquatic habitats, and prevent potential invasive plant spread via waterway dispersal
- Source: The distance of 150 feet was selected because it incorporates the Aquatic Influence Zone for fish bearing streams⁶

E-2: Fueling of gas-powered equipment with tanks larger than 5 gallons would not occur inside the RHCA unless there is no other alternative.

- Purpose: To protect riparian and aquatic habitats
- Source: The distance of 150 feet was selected because it incorporates the Aquatic Influence Zone for fish bearing streams

F-Herbicide Application

F-1: Herbicides would be used in accordance with label instructions, except where more restrictive measures are required as described below. Herbicide applications would only treat the minimum area necessary to meet site objectives. Herbicide formulations would be limited to those containing one or more of the following 10 active ingredients: chlorsulfuron, clopyralid, glyphosate, imazapic, imazapyr, metsulfuron methyl, picloram, sethoxydim, sulfometuron methyl, and triclopyr. Herbicide application methods include wicking, wiping, injection, spot, and broadcast, as permitted by the product label and these project design features. The use of triclopyr is limited to spot and hand/selective methods. Herbicide carriers (solvents) are limited to water or specifically labeled vegetable oil.

- Purpose: To limit potential adverse effects on people and the environment
- Source: Umatilla LRMP as amended by the R6 2005 ROD Standards 16 and 18, Pesticide Use Handbook 2109.14

F-2: Herbicide use would comply with standards in the Forest Plan, as amended by the R6 2005 ROD, including standards on herbicide selection, restrictions on broadcast use, tank mixing, licensed applicators, and use of adjuvants, surfactants and other additives. An average of 4,000 acres per year (maximum 40,000 acres total) would be treated with herbicides over the life of the project.

- Purpose: To limit potential adverse effects on people and the environment
- Source: Umatilla LRMP as amended by the R6 2005 ROD Treatment/Restoration Standards (see chapter 1)

F-3: POEA surfactants, urea ammonium nitrate or ammonium sulfate would not be used in applications within 150 feet of surface water, wetlands or on roadside treatment areas having high potential to deliver herbicide.

⁶The Aquatic Influence Zone is defined by the innermost half of the RHCA. For instance, a 300-foot RHCA established for a fish bearing stream would have an aquatic influence zone of 150 feet.

- Purpose: To protect aquatic ecosystems
- Source: The distance of 150 feet was selected because it is wider than the largest buffer and incorporates the Aquatic Influence Zone for fish bearing streams. This distance is sufficient to avoid harm to the aquatic environment, based on risk assessments, previous monitoring, and studies related to chemical behavior in the environment (see chapter 3).

F-4: Lowest effective label rates would be used. No broadcast applications of herbicide or surfactant will exceed typical label rates. NPE surfactant would not be ground-based broadcast at a rate greater than 0.5 lbs. a.i./ac (pounds of active ingredient per acre). Favor other classes of surfactants wherever they are expected to be effective. Use Washington state approved surfactants in aquatic influence zones.

- Purpose: To eliminate possible herbicide or surfactant exposures of concern to human health, wildlife, and aquatic organisms
- Source: SERA Risk Assessments

F-5: Herbicide applications would occur when wind velocity is between two and eight miles per hour to reduce the chance of drift. During application, weather conditions would be monitored periodically by trained personnel.

- Purpose: To ensure proper application of herbicide and reduce drift
- Source: These restrictions are typical so that herbicide use is avoided during inversions or windy conditions

F-6: To minimize herbicide application drift during broadcast operations, use low nozzle pressure; apply as a coarse spray, and use nozzles designed for herbicide application that do not produce a fine droplet spray, e.g., nozzle diameter to produce a median droplet diameter of 500-800 microns.

- Purpose: To ensure proper application of herbicide and reduce drift
- Source: These are typical measures to reduce drift. The minimum droplet size of 500 microns was selected because this size is modeled to eliminate adverse effects to non-target vegetation 100 feet or further from broadcast sites (see chapter 3 for details).

F-7: Use of sulfonylurea herbicides (Chlorsulfuron, Sulfometuron methyl and Metsulfuron methyl), will require soils on site to be evaluated prior to treatment. Treatment of powdery, ashy dry soil, or light sandy soil can only be treated if rainfall is expected within 24 hrs of treatment.

- Purpose: To avoid herbicide drift caused by wind erosion of dry soils containing sulfonylurea chemical residue
- Source: Label advisory

F-8 - Additional design features specific to aerial application

F-8a: Aerial application of herbicide will not be used for treatment of EDRR sites.

- Purpose: To reduce potential adverse effects to non-target species

F-8b: Chlorsulfuron, metsulfuron methyl, sulfometuron methyl and triclopyr will not be applied aerially⁷.

- Purpose: To reduce potential adverse effects to non-target species
- Source: Umatilla LRMP as amended by the R6 2005 ROD

F-8c: Provide a minimum buffer of 300 feet for aerial application of herbicides near developed campgrounds, recreation residences and private land (unless otherwise authorized by adjacent private landowners).

- Purpose: To minimize impacts to human health
- Source: Umatilla LRMP as amended by the R6 2005 ROD

F-8d: Prohibit aerial application of herbicides within congressionally designated municipal watersheds.

- Purpose: To protect water supplies
- Source: Umatilla LRMP as amended by the R6 2005 ROD

PDFs F8-e and -f were removed; these were redundant with existing management direction or other PDFs.

F-8g: Buffer distances for federally listed SOLIs will follow Recovery Plan recommendations. No aerial application would occur within 300 feet of non-federally listed SOLIs. Spray cards to monitor drift can be used in conjunction with monitoring to adjust buffers if needed.

- Purpose: To protect SOLIs and reduce non-target effects. To comply with Umatilla LRMP as amended by the R6 2005 ROD Standards 19 & 20
- Source: Forest Service Manual 2670 and applicable federally listed recovery plans

F-8h: Aerial spraying of invasive species will not occur in areas with 30 percent or more live tree canopy cover. For live tree canopy cover between 10-29 percent an on-site decision whether or not to aerial spray would be based on factors such as target invasive species, herbicides (specificity) proposed for treatment, and potential impacts to non-target tree species.

- Purpose: To reduce potential adverse effects to non-target species
- Source: Common measure

F-8i: Aerial spray units (and perennial seeps, ponds, springs, and wetlands in proposed aerial units) will be ground-checked, flagged and marked using GPS prior to spraying to ensure only appropriate portions of the unit are aerially treated. A GPS system will be used in spray helicopters and each treatment unit mapped before the flight to ensure that only areas marked for treatment are treated. Plastic spray cards will be placed out to 350 feet from and perpendicular to perennial creeks to monitor herbicide presence.

⁷ Clopyralid is the only herbicide currently proposed for aerial spraying.

- Purpose: To reduce potential adverse effects to non-target species
- Source: Common measure

F-8j: Press releases will be submitted to local newspapers indicating potential windows of treatment for specific areas. Signing and on-site layout will be performed one to two weeks prior to actual aerial treatment.

- Purpose: To ensure public is aware of and can avoid activities
- Source: Umatilla LRMP as amended by the R6 2005 ROD Standard #23

F-8k: Grazing permittees will be notified at annual permittee meeting that aerial application will be conducted. Permittee will also be notified of specific time frames in which treatment would occur to ensure grazing animals are removed from the area.

- Purpose: To ensure grazing animals are not exposed to aerial herbicide applications

F-8l: Enforceable temporary area, trail, and road closures will be used.

- Purpose: To ensure public safety during aerial spray operations
- Source: Umatilla LRMP as amended by the R6 2005 ROD Standard #23

F-8m: Constant communications will be maintained between the helicopter and the project leader during spraying operations. Ground observers will have communication with the project leader. Observers will be located at various locations adjacent to the treatment area to monitor wind direction and speed as well as to visually monitor drift and deposition of herbicide.

- Purpose: To prevent effects to non-target species

F-8n: Aerial swath displacement buffers would be applied as needed (see table 10 below)

- Purpose: To minimize drift
- Source: Common Measure

F-8o: Aerial application rates for clopyralid would not exceed 0.35lb ai/acre.

- Purpose: To prevent adverse effects of aerial application
- Source: SERA Risk Assessments, aerial drift modeling

G-Herbicide Transportation and Handling Safety/Spill Prevention and Containment

G-1: An Herbicide Transportation and Handling Safety/Spill Response Plan would be the responsibility of the herbicide applicator. At a minimum the plan would:

- Address spill prevention and containment.
- Estimate and limit the daily quantity of herbicides to be transported to treatment sites.

- Require that impervious material be placed beneath mixing areas in such a manner as to contain small spills associated with mixing/refilling.
 - Require a spill cleanup kit be readily available for herbicide transportation, storage and application (minimum FOSS Spill Tote Universal or equivalent).
 - Outline reporting procedures, including reporting spills to the appropriate regulatory agency.
 - Ensure applicators are trained in safe handling and transportation procedures and spill cleanup.
 - Require that equipment used in herbicide storage, transportation and handling are maintained in a leak proof condition.
 - Select transportation routes to minimize exposure to traffic, domestic water sources, and adjacent water sources.
 - Specify conditions under which guide vehicles would be required.
 - Specify mixing and loading locations away from water bodies so that accidental spills do not contaminate surface waters.
 - Require that spray tanks be mixed or washed further than 150 feet of surface water.
 - Ensure safe disposal of herbicide containers.
 - Identify sites that may only be reached by water travel and limit the amount of herbicide that may be transported by watercraft (see H12).
- Purpose: To reduce likelihood of spills and contain any spills.
 - Source: FSH 2109.14

H- Soils, Water and Aquatic Ecosystems

H-1: Herbicide use buffers have been established for perennial and wet intermittent streams; dry streams; and lakes and wetlands. These buffers are depicted in table 5, table 6, and table 7 below. Buffers vary by herbicide ingredient and application method. Tank mixtures would apply the largest buffer as indicated for any of the herbicides in the mixture.

- Purpose: To reduce likelihood that herbicides would enter surface waters in concentrations of concern
- Source: Treatments within RHCAs are allowed if they meet Riparian Management Objectives (RMOs) including minimizing adverse effects to listed fish; therefore, buffers are based on label advisories, SERA risk assessments and Berg's 2004 study of broadcast drift and run off to streams. Buffers are intended to demonstrate compliance with Umatilla LRMP as amended by the R6 2005 ROD Standards 19 and 20.

H-2: No broadcast of picloram, non aquatic glyphosate, and/or sethoxydim on roads that have a high risk of delivery to water (generally roads in RHCAs).

- Purpose: To ensure high risk herbicides are not delivered to streams in concentrations that exceed levels of concern
- Source: SERA Risk Assessments, R6 2005 FEIS Fisheries Biological Assessment

H-3: In riparian and aquatic settings, vehicles (including all terrain vehicles) used to access invasive plant sites for invasive plants treatment, apply foam, or for broadcast spraying would remain on roadways, trails, parking areas to prevent damage to riparian vegetation, soil, water quality and aquatic habitat.

- Purpose: To protect riparian and aquatic habitats

- Source: Common measure

H-4: Avoid use of clopyralid on high-porosity soils (coarser than loamy sand).

- Purpose: To avoid leaching/ground water contamination
- Source: Label advisory

H-5: Avoid use of chlorsulfuron on soils with high clay content (finer than loam).

- Purpose: To avoid excessive herbicide runoff
- Source: Label advisory

H-6: Avoid use of picloram on shallow or coarse soils (coarser than loam.) according to herbicide labels. No more than one application of picloram would be made within a two-year period.

- Purpose: To reduce the potential for picloram to enter surface and/or ground water and/or accumulate in the soil. Picloram has the highest potential to impact organisms in soil and water, and tends to be more persistent than the other herbicides.
- Source: SERA Risk Assessment. Based on quantitative estimate of risk from worst-case scenario and uncertainty

H-7: Avoid use of sulfometuron methyl on shallow or coarse soils (coarser than loam.) No more than one application of sulfometuron methyl would be made within a one-year period.

- Purpose: To reduce the potential for sulfometuron methyl accumulation in the soil; sulfometuron methyl has some potential to impact soil and water organisms and is second most persistent.
- Source: SERA Risk Assessments: Based on quantitative estimate of risk from worst-case scenario and uncertainty

H-8: Lakes and Ponds – No more than half the perimeter or 50 percent of the vegetative cover within established buffers or 10 contiguous acres around a lake or pond would be treated with herbicides in any 30-day period. This limits area treated within riparian areas to keep refugia habitat for reptiles and amphibians.

- Purpose: To reduce exposure to herbicides by providing some untreated areas for some organisms to use
- Source: SERA Risk Assessments: Based on quantitative estimate of risk from worst-case scenario and uncertainty regarding effects to reptiles and amphibians

H-9: Wetlands would be treated when soils are driest. If herbicide treatment is necessary when soils are wet, use aquatic labeled herbicides. Favor hand/selective treatment methods where effective and

practical. No more than 10 contiguous acres or fifty percent individual wetland areas would be treated in any 30-day period.

- Purpose: To reduce exposure to herbicides by providing some untreated areas for some organisms to use
- Source: SERA Risk Assessments. Based on quantitative estimate of risk from worst-case scenario, uncertainty in effects to some organisms, and label advisories

H-10: Foaming would only be used on invasive plants that are further than 150 feet from streams and other water bodies.

- Purpose: To limit the amount of foam that may be delivered to streams and other water bodies
- Source: No label regulations are associated with this naturally occurring organic compound. The distance of 150 feet was selected because it incorporates the Aquatic Influence Zone for fish bearing streams

H-11: Herbicide use would not occur within 100 feet of wells or 200 feet of spring developments. For stock tanks located outside of riparian areas, use wicking, wiping or spot treatments within 100 feet of the watering source.

- Purpose: Safe drinking water. Also to reduce the potential chance of herbicide delivery to watering systems used for grazing animals
- Source: Label advisories and state drinking water regulations

H-12: When chemicals need to be carried over water by boat, raft or other watercraft, herbicides will be carried in water tight, floatable containers.

- Purpose: Lower the risk of herbicide being delivered to streams in concentrations that exceed levels of concern

H-13: In aquatic settings, herbicide applications from water's edge to bank-full width will be limited to 2 acres within a 6th field HUC. Treatments above bankfull, within the aquatic influence zone (riparian area), would not exceed 10 acres along any 1.6 mile of stream length per 6th field HUC.

- Purpose: Limits the extent of treatment from the water's edge through the aquatic influence zone so that adverse effects are within the scope of analysis
- Source: Analyses based on SERA risk assessment worksheets. Ten acres is based on GLEAM model factors.

I - Vascular and Non-Vascular Plant and Fungi Species of Local Interest (SOLI)

I-1: Botanical surveys may be necessary prior to treatment applications to identify vascular and non-vascular SOLI occurrence in or near areas proposed for invasive plant treatments. Lists of target SOLI to include in each treatment area will be developed by qualified botanical personnel based on the range and distribution of SOLI species and the presence of suitable SOLI habitat. If surveys are

deemed necessary, they will be conducted within the proposed treatment area and immediately adjacent to the treatment area as follows: 300 to 1000 feet of planned aerial treatments (see I-7), 100 feet of planned broadcast treatments, and 10 feet of planned spot treatments and/or 5 feet of planned hand herbicide treatments.

- Purpose: To ensure SOLI are protected and surveys are conducted when appropriate
- Source: Forest Service Manual 2670 and applicable federally listed recovery plans

I-2: If surveys are deemed necessary (see I-1) but circumstances will not permit surveys prior to treatment, suitable SOLI habitat will assume to be occupied.

- Purpose: To ensure SOLI are protected and surveys are conducted when appropriate
- Source: Forest Service Manual 2670 and applicable federally listed recovery plans

I-3: Modify treatments to protect SOLI occurrences based on their distance from the treatment area:

Greater than 100 feet: All ground based treatments are permitted (see I6 and aerial section for additional buffer restrictions) 100 to 10 feet: Manual and mechanical methods permitted. Broadcast herbicide methods permitted if SOLI can be completely protected using a protective cover, otherwise use other protective measures such as low-pressure spot-spray, directed spray applications or hand application methods to eliminate any potential for drift.

Less than 10 feet: No broadcast spraying is permitted. Spot treatment using hand application methods is permitted. For saturated or wet soils see I-6. Manual treatment methods are permitted. Precautions must be taken to avoid any contact with individual SOLI.

- Purpose: To ensure SOLI are protected and surveys are conducted when appropriate
- Source: Forest Service Manual 2670 and applicable federally listed recovery plans

I-4: When vascular or non-vascular SOLI plant species are within 10 feet of saturated or wet soils at the time of herbicide application, only hand methods (wiping, stem injection, etc.) would be used.

- Purpose: To ensure SOLI are protected and surveys are conducted when appropriate
- Source: Forest Service Manual 2670 and applicable federally listed recovery plans.

I-5: Picloram will not be used within 50 feet of the threatened plant species *Silene spaldingii*.

- Purpose: To ensure protection of emerging seedlings and potential non-target plant root uptake due to herbicide soil persistence
- Source: US FWS Conservation Strategy (2004).

I-6: Aerial herbicide applications will follow Recovery Plan recommendations for listed species (FWS). Presently, one federally listed species (*Silene spaldingii*) is documented on the forest. The recovery plan recommends no aerial herbicide within 1000 feet of occurrence for *S. spaldingii*. For non-federally listed SOLI, no aerial herbicide applications would occur within 300 feet of known

location of SOLI and spray cards to monitor drift would be used to monitor drift and adjust buffers if needed.

- Purpose: To ensure SOLI are protected and surveys are conducted when appropriate
- Source: Forest Service Manual 2670 and applicable federally listed recovery plans.

I-7: Compliance monitoring would occur before implementation to ensure that prescriptions, contracts and agreements integrate appropriate project design features. This will be done via a pre-work review. Monitoring would also occur during implementation to ensure Project Design Features are implemented as planned. An implementation monitoring form will be used to document daily field conditions, activities, accomplishments and/or difficulties. Contract administration mechanisms would be used to correct deficiencies. Herbicide use will be reported as required by the Forest Service Health Pesticide Use Handbook (FSH 2109.14)

- Purpose: To ensure SOLI are protected
- Source: Pesticide Use Policy

I-8: Effectiveness monitoring results will be used to refine buffers in order to adequately protect vascular and nonvascular plant species of local interest.

- Purpose: To prevent any repeated effects to SOLI populations, thereby mitigating any long term effects
- Source: Broadcast buffer sizes are based on tests on vascular plants (Marrs 1989). Spot and hand/select buffer distances are based on reports from experienced applicators. Uncertainty about effects on non vascular plants would be addressed through monitoring (See I-9)

I-9: The impacts of herbicide use on plant Species of Local Interest (SOLI) are uncertain, especially regarding lichen and bryophytes. The potential for variances in aerial drift due to uncontrolled weather conditions during treatment may also be uncertain. To manage this uncertainty, representative samples of herbicide treatment sites adjacent to vascular and non-vascular plant SOLIs would be monitored. Non-target vegetation within 1000 feet of aerial treatment sites, 500 feet of herbicide broadcast treatment sites and 20 feet of herbicide spot and hand treatment sites would be evaluated before treatment, immediately after treatment, and two to three months later as appropriate. Treatment buffers would be expanded if damage is found as indicated by: (1) Decrease in the size of the SOLI plant population, or (2) Leaf discoloration or chlorophyll change

- Purpose: To prevent any repeated effects to SOLI populations, thereby mitigating any long term effects

I-10: In the vicinity of *S. spaldingii*, and all other SOLI, restoration and cultural treatments, including seeding and/or use of fertilizer, will be under the direct supervision of the district or forest botanist to ensure that plant communities are restored to their desired condition without negative impacts to existing SOLI populations or individuals. The vicinity areas will be evaluated on a case by case basis.

J - Wildlife Species of Local Interest

J-1: Bald Eagle

J-1a: Treatment of areas within 0.25 mile, or 0.50 mile line-of-sight, of bald eagle nests would be timed to occur outside the nesting/fledging season of January 1 to August 31, unless treatment activity is within ambient levels of noise and human presence (as determined by a local specialist). Occupancy of nest sites (i.e. whether it is active or not) would be determined each year prior to treatments.

- Purpose: To minimize disturbance to nesting bald eagles and protect eggs and nestlings
- Source: Bald Eagle Management Guidelines for OR-WA (Anonymous); U.S. Fish and Wildlife Service 2003, p. 9

J-1b: Noise-producing activity above ambient levels would not occur between October 31 and March 31 during early morning or late afternoon near known winter roosts and concentrated foraging areas. Disturbance to daytime winter foraging areas would be avoided.

- Purpose: To minimize disturbance and reduce energy demands during stressful winter season
- Source: Bald Eagle Management Guidelines for OR-WA (Anonymous); t Programmatic BO (U.S. Fish and Wildlife Service 2003, p. 9)

J-2: Gray Wolf

J-2a: Treatments within 1 mile of active wolf dens would be timed to occur outside the season of occupancy (April 1 through June 30)

- Purpose: To minimize disturbance and reduce energy demands on denning wolves
- Source: Federal Register, Vol, 68, No, 62 4(d)

J-2b: Treatments within 0.50 mile or 0.50 mile line-of-sight of occupied rendezvous sites would be timed to occur outside the season of occupancy unless treatment activity is within acceptable ambient noise levels and human presence would not cause wolves to abandon the site (as determine by a local specialist)

- Purpose: To minimize disturbance/impacts to wolves at rendezvous sights.
- Source: Buffer is based on expected range of disturbance

J-2c: Consultation with FWS would be reinitiated (unless determined otherwise by FWS) if/when wolf dens or rendezvous sites are discovered in the vicinity of treatment sites.

J-3 Peregrine Falcon

J-3a: Seasonal restrictions (J3-c to g) will be applied based on the spatial and temporal factors listed in J3-b. Restrictions would apply to all known peregrine falcon nest sites for the periods listed below based on the following elevations:

Low elevation sites (1000-2000 ft 01 Jan - 01 July

Medium elevation sites (2001 - 4000 ft) 15 Jan - 31 July

Upper elevation sites (4001+ ft) 01 Feb - 15 Aug

- Purpose: To reduce disturbance to nesting falcons and protect eggs and nestlings. Agitated parents can damage the eggs with thin shells resulting in failed reproduction for that nest.
- Source: Pagel J. 2006. Peregrine falcon nest site data, 1983-2006.

J-3b: Seasonal restrictions would be waived if the site is unoccupied or if nesting efforts fail and monitoring indicates no further nesting behavior. Seasonal restrictions would be extended if monitoring indicates late season nesting, asynchronous hatching leading to late fledging, or recycle behavior which indicates that late nesting and fledging would occur. The nest zones associated with those nest sites are described below:

(1) Primary: average of 0.5-mile radius from the nest site. Site-specific primary nest zones would be determined and mapped by a local Biologist for each known nest site.

(2) Secondary: average of 1.5- mile radius from the nest site. Site-specific secondary nest zones would be determined and mapped for each known nest site.

(3) Tertiary: a three-mile radius from the nest site including all zones. The tertiary nest zones are not mapped; they apply to a circular area based on the three-mile radius.

- Purpose: To reduce disturbance to nesting falcons and protect eggs and nestlings. Agitated parents can damage the eggs with thin shells resulting in failed reproduction for that nest.
- Source: Pagel J. 2006. Peregrine falcon nest site data, 1983-2006

J-3c: Protection of nest sites would be provided until at least two weeks after all young have fledged.

- Purpose: To reduce disturbance to nesting falcons and protect eggs and nestlings. Agitated parents can damage the eggs with thin shells resulting in failed reproduction for that nest
- Source: Pagel J. 2006. Peregrine falcon nest site data, 1983-2006

J-3d: Invasive plant activities within the secondary nest zone requiring the use of machinery would be seasonally restricted. This may include activities such as mulching, chainsaws, vehicles (with or without boom spray equipment) or other mechanically based invasive plant treatment.

- Purpose: To reduce disturbance to nesting falcons and protect eggs and nestlings. Agitated parents can damage the eggs with thin shells resulting in failed reproduction for that nest.
- Source: Pagel J. 2006. Peregrine falcon nest site data, 1983-2006

J-3e: Non-mechanized or low disturbance invasive plant activities (such as spot spray, hand pull, etc.) within the secondary nest zone would be coordinated with the wildlife biologist on a case-by-case basis to determine potential disturbance to nesting falcons and identify mitigating measures, if necessary. Non-mechanized invasive plant activities such as back pack spray, burning, hand-pulling, lopping, and/or re-vegetation planting may be allowed within the secondary nest zone during the seasonal restriction period.

- Purpose: To reduce disturbance to nesting falcons and protect eggs and nestlings. Agitated parents can damage the eggs with thin shells resulting in failed reproduction for that nest.
- Source: Pagel J. 2006. Peregrine falcon nest site data, 1983-2006

J-3f: All foot and vehicle entries into Primary nest zones would be seasonally prohibited except for the following reasons:

1. Biologists performing monitoring in association with the eyrie and coordinated with the District Biologist.
2. Law enforcement specialists performing associated duties with notice to the District Ranger.
3. Access for fire, search/rescue, and medical emergencies under appropriate authority (Forest Service line officer or designee).
4. Trail access, when determined by a biologist to be non-disturbing.
5. Other exceptions on a case-by-case basis as determined by the Deciding Official
 - Purpose: To reduce disturbance to nesting falcons and protect eggs and nestlings. Agitated parents can damage the eggs with thin shells resulting in failed reproduction for that nest.
 - Source: Pagel J. 2006. Peregrine falcon nest site data, 1983-2006

J-3g: Picloram and clopyralid would not be used within 1.5 miles of peregrine nest more than once per year.

- Purpose: To reduce exposure to hexachlorobenze, which has been found in peregrine falcon eggs
- Source: Pagel J. 2006. Peregrine falcon nest site data, 1983-2006

J-4 Columbia Spotted Frog and Leopard Frog

J-4a: Avoid broadcast spraying herbicides, and avoid spot spraying glyphosate with POEA surfactant, sulfometuron methyl, and NPE-based surfactants, in occupied or suitable (within 150 feet) spotted or leopard frog habitat. Coordinate treatment methods, timing, and location with local Biologist.

- Purpose: To minimize exposure of frogs to herbicides or surfactants that pose risk to frogs.
- Source: Appendix P of the R6 2005 FEIS; SERA 2003, 2004; Bakke 2003

J-5 Painted Turtle (discussed in Appendix C of the DEIS, now available on line)

J-5a: The local Forest Service Biologist will review treatment locations, timing, and methods to minimize adverse impacts to painted turtles. PDF H-8 defines herbicide treatment limitations to protect amphibian habitat.

- Purpose: To minimize disturbance, trampling, and herbicide exposure to painted turtles
- Source: David Anderson, WA Dept. of Fish and Wildlife, personal communication, 2005

K-Public Notification

K-1: The public would be notified about upcoming herbicide treatments via the local newspaper or individual notification, fliers, and posting signs. Forest Service and other websites may also be used for public notification.

- Purpose: To reduce the risk of inadvertent public contact with herbicide
- Source: Umatilla LRMP as amended by the R6 2005 ROD Standard 23

L-Special Forest Products

L-1: Triclopyr would not be applied to foliage in areas of known special forest products or other wild food collection areas.

- Purpose: To reduce the chance that people might be exposed to harmful doses of triclopyr
- Source: Appendix Q of the R6 2005 FEIS

L-2: Special forest product gathering areas may be closed for a period of time to ensure that no inadvertent public contact with herbicide occurs.

- Purpose: To reduce the risk of inadvertent public contact with herbicide
- Source: Umatilla LRMP as amended by the R6 2005 ROD Standard 23

L-3: Popular berry and mushroom picking areas would be posted, marked on the ground or otherwise posted.

- Purpose: To reduce the risk of inadvertent public contact with herbicide
- Source: Umatilla LRMP as amended by the R6 2005 ROD Standard 23

L-4: Special forest product gatherers would be notified about herbicide treatment areas when applying for their permits. Flyers indicating treatment areas may be included with the permits, in multi-lingual formats if necessary. See section K.

- Purpose: To reduce the risk of inadvertent public contact with herbicide
- Source: Umatilla LRMP as amended by the R6 2005 ROD Standard 23

M- American Indian Tribal and Treaty Rights

M-1: American Indian tribes would be notified annually as treatments are scheduled so that tribal members may provide input and/or be notified prior to gathering cultural plants.

- Purpose: To ensure that no inadvertent public contact with herbicide occurs and that cultural plants are fully protected.
- Source: Government to government agreements between American Indian tribes and the Umatilla National Forest

M-2: The Forest Archaeologist will annually assess areas where mechanical treatment that could cause damage to cultural resources is proposed. Weed wrenching and grubbing techniques will not be used in known archaeological sites. Instead, treatment methods that would have no potential to affect cultural resources will be used.

- Purpose: To avoid adverse impacts to cultural resources
- Source: Common practice

N-Rangeland Resources

N-1: Permittees will be notified of annual treatment actions at the annual permittee operating plan meeting, and/or notified within two weeks of planned treatments of infestations greater than one acre in size.

- Purpose: To ensure permittee has knowledge of activities occurring within the allotment
- Source: Common practice

N-2: Follow most current EPA herbicide label for grazing restrictions

- Purpose: To ensure grazing animals are not exposed to chemicals
- Source: EPA labeling requirements

O-Human Health (See R6 2005 FEIS, Appendix Q for more information)

O-1: Backpack application rate for Sulfometuron methyl will not exceed 0.2 lb a.i./ac., and for NPE surfactant it will not exceed 1.67 lb a.i./ac

- Purpose: To reduce the potential of adverse effects to human health

O-2: Spot spray application rate for Picloram will not exceed 0.35 lb a.i./ac., and for Sulfometuron methyl it will not exceed 0.12 lb a.i./ac

- Purpose: To reduce the potential of adverse effects to human health

O-3: Triclopyr application rate will not exceed 1.0 lbs a.i./ac. Use spot spraying techniques to further reduce dermal exposure. Favor other herbicides wherever they are expected to be effective

- Purpose: To reduce the potential for adverse effects to human health from dermal contact or consumption of contaminated vegetation

P-Restoration

P-1: Long-term site strategy for highly disturbed areas that have high potential for weed invasion such as old fields or old homesteads, follow guidelines and techniques outlined in *Guidelines for Revegetation for Invasive Weed Sites on National Forests and Grasslands in the Pacific Northwest* (Erickson et al.2003)

- Purpose: To ensure highly invisible/disturbed sites are successfully restored or revegetated with desirable vegetation
- Source: Umatilla LRMP Standard #12

P-2: On dry grassland habitat below 3000 feet in the highly disturbed areas where live vegetative groundcover will be reduced by 70 percent of existing vegetation by herbicide treatment, restoration and/or revegetation would occur following *Guidelines for Revegetation for Invasive Weed Sites on National Forests and Grasslands in the Pacific Northwest* (Erickson et al.2003) and Umatilla National Forest LRMP as amended by the R6 2005 ROD standards

- Purpose: To ensure highly invisible/disturbed sites are successfully restored or revegetated with desirable vegetation,
- Source: *Guidelines for Revegetation for Invasive Weed Sites on National Forests and Grasslands in the Pacific Northwest* (Erickson et al. 2003), Water Erosion Prediction Project (WEPP) erosion data, and Goodwin et al. 2002, Umatilla LRMP Standard #12

P-3: In areas where broadcast herbicide is used to treat highly infested areas, evaluation of potential re-infestation by new or nearby invasive plant species would be considered, and restoration and/or revegetation measures would be implemented to ensure protection of native vegetation and soils. Also see treatment restoration standard #12 in the Umatilla Forest Plan as amended by the R6 2005 ROD.

- Purpose: To ensure those sites are successfully restored with desirable vegetation
- Source: Treatment Restoration Standard 3, 12 (RFEIS), and *Guidelines for Revegetation for Invasive Weed Sites on National Forests and Grasslands in the Pacific Northwest* (Erickson et al. 2003)

Herbicide Use Buffers

Herbicide treatments would become more restrictive as they occur close to water. PDFs and herbicide use buffers within the aquatic influence zone were developed based on label advisories; SERA risk assessments, and various studies of drift and runoff to streams such as Berg 2004.

Tables 5, 6, and 7 specify buffers according to treatment methods, herbicides used, risk, and type of aquatic zone.

Ephemeral streams exist in the project area but are not buffered. These areas flow rarely during very high water events when herbicide use would not likely occur. By the time water flowed in these areas, the herbicides would not be biologically active. The amount of precipitation necessary to cause ephemeral streams to flow would rapidly dilute any herbicide present in the watershed.

Table 5. Herbicide Use Buffers in feet – Perennial and Wet Intermittent Streams - Proposed Action

Herbicide	Perennial and Wet Intermittent Stream			
	Aerial	Broadcast	Spot	Hand/Select
Aquatic Labeled Herbicides				
Aquatic Glyphosate	Not proposed	100	Water's edge	Water's edge
Aquatic Triclopyr-TEA	None Allowed	None Allowed	15	Water's edge
Aquatic Imazapyr*	Not proposed	100	Water's edge	Water's edge
Low Risk to Aquatic Organisms				
Imazapic	Not proposed	100	15	Bankfull
Clopyralid	300	100	15	Bankfull
Metsulfuron Methyl	None Allowed	100	15	Bankfull
Moderate Risk to Aquatic Organisms				
Imazapyr	Not proposed	100	50	Bankfull
Sulfometuron Methyl	Not proposed	100	50	5
Chlorsulfuron	Not proposed	100	50	Bankfull
High Risk to Aquatic Organisms				
Triclopyr-BEE	None Allowed	None Allowed	150	150
Picloram	Not Proposed	100	50	50
Sethoxydim	Not proposed	100	50	50
Glyphosate	Not proposed	100	50	50

Table 6. Herbicide Use Buffers in feet – Dry Intermittent Streams - Proposed Action (Alternative B)

Herbicide	Dry Intermittent Stream			
	Aerial	Broadcast	Spot	Hand/Select
Aquatic Labeled Herbicides				
Aquatic Glyphosate	Not proposed	50	0	0
Aquatic Triclopyr-TEA	None Allowed	None Allowed	0	0
Aquatic Imazapyr*	Not proposed	50	0	0
Low Risk to Aquatic Organisms				
Imazapic	Not proposed	50	0	0
Clopyralid	100	50	0	0
Metsulfuron Methyl	None Allowed	50	0	0
Moderate Risk to Aquatic Organisms				
Imazapyr	Not proposed	50	15	Bankfull
Sulfometuron Methyl	None Allowed	50	15	Bankfull
Chlorsulfuron	None Allowed	50	15	Bankfull
High Risk to Aquatic Organisms				
Triclopyr-BEE	None Allowed	None Allowed	150	150
Picloram	Not Proposed	100	50	50
Sethoxydim	Not proposed	100	50	50
Glyphosate	Not proposed	100	50	50

Table 7. Herbicide Use Buffers in Feet–Wetlands-Proposed Action (Alternative B)

Herbicide	Wetlands			
	Aerial	Broadcast	Spot	Hand/Select
Aquatic Labeled Herbicides				
Aquatic Glyphosate	Not proposed	100**	Water's edge	Water's edge
Aquatic Triclopyr-TEA	None Allowed	None Allowed	15	Water's edge
Aquatic Imazapyr*	Not proposed	100**	Water's edge	Water's edge
Low Aquatic Hazard Rating				
Imazapic	Not proposed	100	15	high water mark
Clopyralid	300	100	15	high water mark
Metsulfuron Methyl	Not proposed	100	15	high water mark
Moderate Aquatic Hazard Rating				
Imazapyr	Not proposed	100	50	high water mark
Sulfometuron Methyl	None Allowed	100	50	5
Chlorsulfuron	None Allowed	100	50	high water mark
Greater Aquatic Hazard Rating				
Triclopyr-BEE	None Allowed	None Allowed	150	150
Picloram	Not proposed	100	50	50
Sethoxydim	Not proposed	100	50	50
Glyphosate	Not proposed	100	50	50

*Aquatic Imazapyr (Habitat) may not be used until the risk assessment (currently underway) is completed for inert ingredients and additives.

** If wetland, pond or lake is dry, there is no buffer.

Table 8. Buffer widths required for aerial application

Buffer width for a 25 foot release height, 7-8 mph winds	Buffer width for a 35 foot release height, 7-8 mph winds	Buffer width for a 50 foot release height, 7-8 mph winds
Designated buffer	Add 1 swath width to buffer	Add 2 swath widths to buffer

Ensure little to no drift by applying these buffers and low drift technology (i.e. nozzle design and/or additives), as directed in PDFs

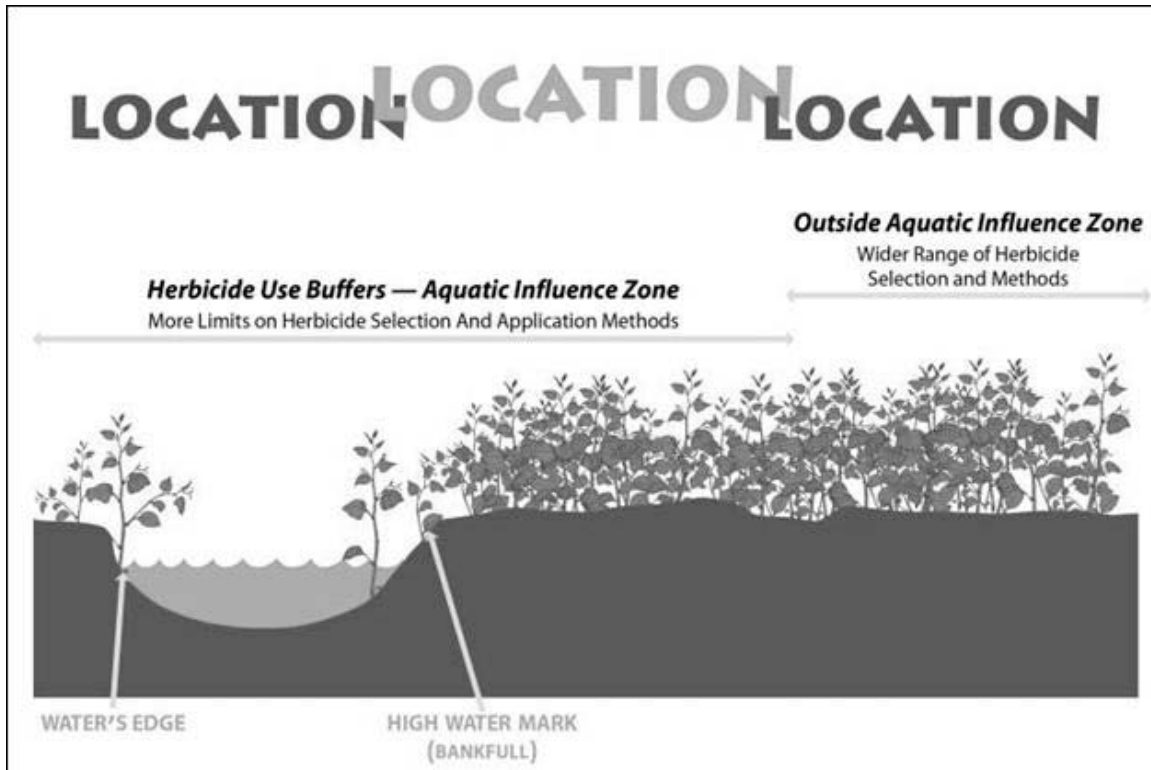


Figure 8. Illustration of how herbicide selection and application methods in the established buffer widths are more limited in Aquatic Influence Zones

Figure 8 illustrates how the Aquatic Influence Zone restricts application methods and herbicides to only those approved for use in aquatic areas. “Aquatic Influence Zone” is not equal to the “buffer widths” listed in the tables above. For purposes of analysis in this EIS, the Aquatic Influence Zone is defined by the innermost half of the RHCA. For instance, a 300-foot RHCA would have an aquatic influence zone of 150 feet. Establishing buffer widths reduces the potential for herbicides to come in contact with water via drift, leaching, and runoff at or near concentrations of concern.

Early Detection and Rapid Response

As described previously, Early Detection/Rapid Response (EDRR) is aimed at controlling new infestations that are small in size thus decreasing cost and the need for repeated applications. It is also advantageous because: 1) the precise location of individual target plants is subject to rapid and/or unpredictable change; and 2) presently known infestations may grow during the time it typically takes to complete the NEPA process. The 2006 inventory is an extensive list of existing sites, however these sites may be spreading and new sites may likely become established during the life of the project.

The proposed action would allow treatment of new detections, as long as the treatment method is within the scope of this EIS. Limitations associated with the PDFs would apply to new as well as existing sites. Invasive plant sites that are discovered subsequent to the current invasive plant inventory would require evaluation to determine that the invasive plants treatments and environmental impacts are consistent with those analyzed in this EIS.

New sites would be treated under the auspices of this project, even if it involves a new invasive species, as long as the effective treatment is similar to the common control measures and treatment methods described previously. The exception to this is aerial treatment; no aerial treatment is

authorized under EDRR. New sites that require aerial treatment would be subject to additional NEPA analysis. If a new site needs a treatment that has not been analyzed in this document, or if PDFs cannot be applied effectively to a new site, additional NEPA analysis may also be required.

New detections are usually small in size and would likely have a higher priority for treatment. The annual herbicide treatment cap averaging 4,000 acres, and life of the project treatment cap of 40,000 acres include EDRR as well as known sites. EDRR sites would be subject to the following herbicide use decision process. Annual and life of the project treatment caps are assumed to include herbicide use in riparian areas.

This process does not apply to ongoing manual treatments along roadsides or within administrative sites.

1. Is the target population associated with a size, phenology, density or distribution that warrants herbicide use (alone or in combination with other methods)? Consider whether or not herbicides are required for treatment effectiveness and/or whether or not the use of herbicides substantially increases cost-effectiveness of treatment? Consult common control measures. Consider whether volunteers may be available to reduce the cost of manual treatments. Determine that annual or life-of-the-project caps have not been reached.

Yes (use herbicides): List potential herbicide choices and integrated prescription. Review label directions and project design criteria. Consider non-target vegetation surrounding treatment sites and use selective herbicides as appropriate. Consider soil conditions at the treatment site. Consider previous treatments that have occurred on the site. Were they effective? Would another herbicide or combination of methods be more effective? Also note that triclopyr may not be used in areas of known special forest product or subsistence collection. Go to 2.

No: Use non-herbicide methods.

2. Do the size, density and/or distribution of invasive plants warrant the broadcast application method? Would another herbicide besides triclopyr be effective? (Please note that triclopyr may not be broadcast)

Yes: Is the treatment site within the aquatic influence zone and/or on a road that has high potential to deliver herbicide to surface waters? Is the site in a wildlife habitat that has specific restrictions to broadcasting? Go to 3a.

No: Go to 3b.

3a. Apply surface water buffers as appropriate. Is this site within an area where broadcasting is prohibited?

Yes: Do not broadcast. Go to 4.

No: Go to 3b.

3b. Are there botanical species of local interest/suitable habitat within 100 feet of the proposed broadcast site?

Yes: Survey as needed within suitable habitats. Apply botanical buffers as appropriate (see table 25). Broadcast may still be acceptable if botanical species of local interest are covered by barrier. Go to 4.

No: Broadcasting is an acceptable treatment method for herbicides except triclopyr. Use lowest effective label rates for each given situation. Do not exceed typical label rates. Favor other surfactants besides NPE and do not broadcast NPE at a rate exceeding 0.5 lbs. active ingredient per acre. Do not broadcast imazapyr at a rate greater than 0.7 lbs per acre. Consider wildlife habitats in the area and implement seasonal restrictions if required.

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

Yes: Apply spot/selective buffers and use aquatic labeled herbicides as appropriate.

No: Seek approval for treatment through additional decision process (NEPA Section 18 or a new NEPA process).

Figure 9. EDRR Herbicide Use Decision Process

Annual Implementation Planning Process

This section outlines the process for making sure the selected alternative is properly implemented. The method follows Integrated Weed Management principles (R6 2005 FEIS, 3-3) and satisfies pesticide planning requirements at FSH 2109.14. It applies to currently known and new sites found during ongoing monitoring (EDRR)⁸. Appendix B includes an itemized example of a site-scale prescription derived following this process.

1. Characterize the invasive plant infestation to be treated. This includes:

- Map and describe the target species, density, extent, treatment strategy, and site conditions.
- List any resource of concerns and determine if additional surveys are needed. Coordinate with resource specialists to get additional information or new information about specific locations. Identify and perform pre-treatment surveys for species of local interest and/or their habitats.

2. Develop site prescriptions

- Use Integrated Weed Management principles (R6 2005 FEIS, 3-3) to identify possible effective methods of treatment. Non-herbicide treatments should be considered when sites are small or target plant densities are low, particularly after several years of herbicide treatments. Prescribe herbicides as needed based on the biology of the target species and size of the infestation (for instance, manual treatment alone cannot effectively eradicate rhizomatous species). Determine that the prescribed treatment is within the scope of those analyzed in the EIS.⁹
- Apply appropriate project design features. Consider the soil texture and type and potential for ground water contamination to ensure that label guidance and PDFs related to soils are followed. Consider the presence of small unmapped small wetlands and ensure PDFs are appropriately applied.
- Determine that the prescribed treatment is consistent with the ESA consultation. Review updated lists of species of local interest and prepare supplemental information report as needed (FSH 1909.15).
- Review compliance criteria for the Forest Plan and any other environmental standards indicated by the label or state regulations. Develop a public notification plan, and coordinate with local Tribes.
- Complete Form FS-2100-2, Pesticide Use Proposal. This form lists treatment objectives, specific herbicide(s) that would be used, the rate and method of application, and project design features that apply. Apply for any herbicide application permits when needed for treatments in Riparian Areas.
- Confirm that acceptable plant or mulch materials are available for cultural treatments/restoration.
- Coordinate with adjacent landowners, water users, agencies, and partners.
- Apply herbicide treatment caps including:
 - An average of 4,000 acres per year Forest-wide

⁸ This process does not apply to manual and mechanical treatments along roadsides or within administrative sites that are part of ongoing maintenance for which a decision document is unnecessary.

⁹ For EDRR sites, the decision to use herbicides follows the decision protocol shown in figure 9. If treatments would not be effective once project design features are applied, further NEPA would also be required to authorize the effective treatment.

- A maximum for the life of the project of 40,000 acres

3. Accomplishment and Compliance Monitoring

- Develop a project work plan for herbicide use as described in FSH 2109.14.3. This plan presents organizational and operational details including treatment objectives, the equipment, materials, and supplies needed; the herbicide application method and rate; field crew organization and lines of responsibility, and a description of interagency coordination. The plan will also include a job hazard analysis to assure applicator safety.
- Ensure contracts and agreements include appropriate prescriptions and that herbicide ingredients and application rates meet label requirements, Standards 16 and 18, and site specific project design features.
- Document and report herbicide use and certify applicator information in the National Pesticide Use Database, via the Forest Service Activity Tracking System (FACTS).
- The Biological Opinions written by NMFS and FWS include reasonable and prudent measures to minimize “take” of species listed under federal Endangered Species Act (fish). Two of these measures are reporting requirements:
 - *Report annual invasive plant control proposals to the Service via the Level 1 Team by March 1, prior to the start of the spray season (2009 to 2018). The proposals will include the treatment methods, herbicide application methods and rates, objectives of treatments, locations, maps of treatment areas, acreages, proposed start and stop dates, and special mitigation measures that will be applied.*
 - *Provide an annual report by January 31 to the Service on activities implemented during the 2009 to 2018 seasons and the results of Regional monitoring efforts. If no activities occur, a report of no action is still required by January 31, following each spray season (2009 to 2018).*
- Document the implementation of the public notification plan.

4. Post Treatment Monitoring

- Post-treatment reviews would occur on a sample basis or when required by a Project Design Feature to determine whether treatments were effective, if damage to non-target species occurred, or whether or not passive restoration occurred as expected.
- Post-treatment monitoring would also be used to detect whether project design features were appropriately applied and effective. Contract administration and other existing mechanisms would be used to correct deficiencies.
- Additional monitoring may be done consistent with the Umatilla National Forest Plan (R6 2005 ROD Monitoring Framework).