Longley Meadows Fish Enhancement Project Invasive Species Report

Wallowa-Whitman National Forest
La Grande Ranger District

Prepared by: /s/ Scott Schaefer Date: **04/10/2019**

Schaefer, Scott
Invasive Plant Program Manager
Wallowa-Whitman National Forest – South Zone

Table of Contents

Introduction……..3
Existing Condition 5
Effects..... 5
Effects Analysis Methodology.....5
Assumptions.....5
Direct and Indirect Effects on Invasive Species 8
Cumulative Effects..... 12
References…….20

Invasive Species

Introduction

This report addresses the existing conditions and the potential effects of the Longley Meadows Fish Enhancement Project (Longley) as it pertains to non-native (invasive) species. Invasive species are defined as a non-native species whose introduction causes or is likely to cause economic, environmental, or human health harm. An invasive species is distinguished from other non-natives by their ability to spread in native ecosystems. “Noxious weeds” on the other hand, is a legal term used by state, county, and federal agencies to denote plants that pose particular threats, generally to agriculture. Many undesirable non-natives can be invasive and pose threats to healthy native ecosystems but do not meet the criteria for listing as a “noxious weed.” For that reason, this analysis will focus on all invasive non-native species and not just those listed as “noxious weeds.”

Analysis Framework: Statute, Regulatory Environment, Forest Plan and Other Direction

Regulatory Environment

Forest Plan

The Pacific Northwest Region Invasive Plant Program Record of Decision (ROD) (USDA 2005) amended the Forest Plan (amendment #RF-5) for the Wallowa-Whitman National Forest in 2005. The Region 6 ROD outlined 23 standards for the prevention and management of invasive non-native plants that have been added to all regional forest plans and require consideration of invasive species in all planning efforts. The regional ROD does not however, approve any site-specific treatment, instead requires a completed analysis by each National Forest (see the specific sections below for the specific analysis).

Of the 23 prevention and management standards in the regional ROD, only seven directly affect activities found in the Sparta project. These standards are:

1. Prevention of invasive plant introduction, establishment and spread will be addressed in watershed analysis; roads analysis…..vegetation management plans, and other land management assessments.
2. Actions conducted or authorized by written permit by the Forest Service that will operate outside the limits of the road prism, require the cleaning of all equipment (bulldozers, skidders, graders, backhoes, dump trucks, etc.) prior to entering National Forest System Lands.
3. Use weed-free straw and mulch for all projects, conducted or authorized by the Forest Service, on National Forest System Lands.
7. Use only gravel, fill, sand, and rock that are judged to be weed free by District or Forest weed specialists.
8. Conduct road blading, brushing and ditch cleaning in areas with high concentrations of invasive plants in consultation with District or Forest-level invasive plant specialists.
12. Develop a long-term site strategy for restoring/re-vegetating invasive plant sites prior to treatment (if invasive plant treatment is needed prior to project activities as a prevention measure).
13. Native plant materials are the first choice in re-vegetation for restoration and rehabilitation where timely natural regeneration of native plant community is not likely to occur.

Under the Region 6 ROD, these standards apply to the prevention and management of all invasive non-native species and not just those listed as “noxious weeds”.

Wallowa-Whitman National Forest Invasive Species Plan

In 2010 the Wallowa-Whitman National Forest Invasive Species Plan ROD was signed. This decision authorized the treatment of invasive non-native species on specific sites on the forest. This decision created the ability to conduct Early Detection Rapid Response (EDRR) on newly discovered sites. The ability to respond to new spread or establishment of invasive non-native species has given the Forest Service a tool that should help reduce the spread and establishment of invasive species by about one-half of the previous rate.

La Grande Ranger District Invasive Species Mitigation and Monitoring Recommendations

The following specific measures are recommended to be implemented along with any action undertaken in Longley in order to mitigate the effects of project activities.

1- Project personnel would inform invasive species personnel pre-seasonally annually of upcoming project activities (i.e. ground disturbing activities), so reprioritization of treatment (if deemed necessary) and inventory can begin prior to the start of project activities.
2- New infestations would be inventoried and managed under early detection rapid response (EDRR) guidelines. Treatment of the noxious weed sites located along haul route roads should be a high priority, along with monitoring. Previous year's dead plants/stalks should be removed.
3- To reduce the potential spread from known invasive plant sites, these occurrences would be identified as Areas-To-Avoid for moderate to high-risk ground disturbance activities. Rock pit, boulder, and large wood source areas should be inspected, and cleared prior to use of any materials. Coordination will occur with invasive species specialists for exceptions.
4- All landings and skid trails with soil disturbance would be rehabilitated and seeded with an approved native seed mix after completion of project activities on those sites.

Table 1. The monitoring of the mitigation measure implementation is described in the following chart.

Type	Activity Monitored	Frequency and Timing	Responsible Person
Implementation	Noxious weed inspections, pretreatment, equipment cleaning, weed infestation avoidance, documentation and communication.	Prior to move onto NFS land and during active operations near noxious weed infestations.	Contract Administrator
Effectiveness	Noxious weed survey and inventory.	Annually for 3 years following project completion.	FS Invasive Plant Coordinator
Implementation	Noxious weed treatment.	Annually for 3 years following project completion.	FS Invasive Plant Crew
Implementation	Broadcast seeding of disturbed soils.	Within the recommended seeding period following the disturbance.	Contract Administrator
Implementation	Road rock sources, pits and/or quarry noxious weed inspections	Prior to use for road construction, reconstruction, or maintenance	Zone Invasive Plant Coordinator; Zone Engineer

Existing Condition

Invasive Plant Species Presence within Longley

The project area consists of both USFS and privately owned lands. There are 9 inventoried invasive non-native plant sites (5 different species) within Longley on USFS land. The inventoried acres within the project area are shown in the table below (Table 2). Acreages reflect current information in the Forest INSP GIS layer (GID query, September 20, 2016). In addition to these listed species, the project area also includes the annual grasses *Ventenata dubia* and *Bromus tectorum* which are potentially harmful invasive species but do not meet the requirement for listing on the state or county "noxious weed" lists.

Table 2. Invasive plant inventory on USFS land and Oregon Designations

Scientific Name	Common Name	Gross	Union	Oregon

		Acres	County Designation	State Designation
Centaurea diffusa	Diffuse knapweed	28	A	B
Cirsium arvense	Canada thistle	20	B	B
Euphorbea esula	Leafy spurge	1	A	B
Hypericum perforatum	Common St. Johnswort	21	N/A	B
Potentilla recta	Sulphur cinquefoil	29	N/A	B
Total		**99**		
Total Weed Footprint		**29**		

Union County and the Oregon Department of Agriculture (ODA) designate listed invasive species status using a similar system.

> "A" designated species – an invasive of known economic importance which occurs in the state in small enough infestations to make eradication or containment possible; or is not known to occur, but its presence in neighboring states makes future occurrence in Oregon seem imminent.
>
> Recommended Action: Infestations are subject to intensive control when and where found by Union County with possible assistance from the Oregon Department of Agriculture.
>
> "B" designated species – an invasive of economic importance which is regionally abundant, but which may have limited distribution in some counties.
>
> Recommended Action: Moderate to intensive control at the county level.

ODA also has "T" designated species, which are a priority noxious weed designated by the Oregon State Weed Board for which the ODA will develop and implement a statewide management plan. "T" designated noxious weeds are species selected from either the state "A" or "B" lists.

Table 3 provides site information in relation to activities in the proposed action for Longley. Many of the sites of varying species are located on the same piece of ground. A good example is the area encompassing the south side of the river upstream of the gun club. There, the same 28 acre site, containing diffuse knapweed, Canada thistle, leafy spurge, St. Johnswort, and sulfur cinquefoil, makes up five invasive plant inventory sites. In this case, there are 97 acres of weed inventory on a 28 acre footprint.

There have been intensive and focused efforts made during the 2017 and 2018 field seasons to hand pull, hoe, and apply herbicide to the invasive plants in the project area in anticipation of this project.

Table 3. Noxious weed proximity to activities in proposed action

Site Number	Common Name	Proximity to proposed activities
06160600032	Sulfur cinquefoil	1 acre site on the north side of river.
06160600038	St. Johnswort	1 acre site on the north side of the river. Overlapping site 032.
06160600389	Diffuse knapweed	28 acre rectangular site encompassing the largest common footprint of infested area on gravel bars on the south bank of the river where much of the channel reconstruction work is proposed.
06160600690	Sulfur cinquefoil	Completely overlapping the 28 acre common footprint of site 389.
06160600691	Canada thistle	0.1 acre site on the north side of river.

Site Number	Common Name	Proximity to proposed activities
06160600672	Diffuse knapweed	0.2 acre site on north side of river
06160600705	Leafy spurge	1 acre site inside the 28 acre common footprint of site 389.
06160600706	Canada thistle	20 acre site lying within the 28 acre common footprint of site 389.
06160600707	St. Johnswort	20 acre site lying within the 28 acre common footprint of site 389.

Treatment and monitoring records document all site visits by invasive plant specialists, spanning the years since initial discovery and inventory of the site. These records are on file at the La Grande Ranger District Offices in La Grande, Oregon. These sites are visited on a regular basis for treatment and monitoring and can be relocated and identified on the ground when necessary.

The privately owned land is not managed in the same way as USFS land. The Forest Service has no records of invasive plant treatment or inventory mapped as a GIS spacial layer on this section of the project area.

Effects

Effects Analysis Methodology

The effects (expected and potential) were assessed using field surveys, literature documentation, documented site information, and professional judgment. The boundary of the direct, indirect and cumulative effects analysis is the project area boundary. This area encompasses all areas of potential project activities.

Assumptions

The following are assumptions were utilized for analyzing the effects of implementing the alternatives in Longley.

- Invasive non-native species populations are increasing at a rate of 8-12% per year on public lands (USDA 2005).
- The record of decision for the Wallowa-Whitman National Forest Invasive Specie Management EIS and the adoption of the standards from the Region 6 ROD should slow the annual rate of spread and establishment of invasive non-native species by up to 50% annually (down to 4-6%) (USDA 2005, USDA 2010).
- Mitigations described earlier are implemented in full.
- Timeframes – the following timeframes were used to discuss the direct, indirect and cumulative effects of project implementation on invasive species related to the potential for establishment and spread of invasives:

A. Potential for Establishment

- **Short-term timeframe:** 1-3 years. This period of time would be long enough to notice the germination and growth of any new invasive non-native species after project activities.
- **Long-term timeframe:** 25-30 years. This long term timeframe was chosen because climate change, unforeseeable future projects, demographic changes, etc., make assumptions beyond this timeframe speculative. Further, changes in the plant community

dynamics would have been identified by this point and establishment of invasive non-native plants due to project activities would have occurred

B. Potential for Spread

- **Short-term timeframe:** 1-3 years. This period of time would be long enough to notice the increase in size of a known infestation, and allow for the rapid response to potentially contain that site after project activities.
- **Long-term timeframe:** 25-30 years. This long term timeframe was chosen because climate change, unforeseeable future projects, demographic changes, etc., make assumptions beyond this timeframe speculative. Further, changes in the plant community dynamics would have been identified by this point and spread of invasive non-native plants would have been established.

Invasive non-native species are currently damaging the biological diversity and healthy native plant communities located both on and off national forest system (NFS) lands. The introduction and subsequent spread of invasive species can have a variety of environmental effects such as displacement of native species, reduction in suitable habitat, reduction in forage for livestock and wildlife, destruction of habitat and loss of threatened and endangered species (TES) species, increased soil erosion, water quality reduction, and significant reductions in soil productivity. The establishment and spread of non-native plants is a dynamic event that incorporates many diverse variables. Invasion theory, as it pertains to non-native species, contains three main principles: disturbance, propagule pressure, and competition (Hobbs & Huenneke 1992, Lockwood et al. 2005, Sutherland 2008).

The first factor in the invasion theory is disturbance. Invasive species are quick to colonize an area of disturbance and can use their "weedy" life-history traits to establish within novel habitats. Disturbance such as stream channel excavation, root wad excavation, landing creation, and temporary road construction can alter native plant communities and increase the chance of invasion by non-native species. Several factors such as type of disturbance, proximity to propagule source, and size or magnitude of disturbance can increase the propensity for invasion of an otherwise healthy plant community by non-natives.

The second factor in the invasion theory is propagule pressure. Propagule pressure is defined as the number of possible individuals (seeds, seedlings, etc.) released into a region in which they are not native and the number of such release events (Lockwood et al. 2005). In essence, the higher the propagule pressure (more seeds or more opportunities for a release) the greater the likelihood of a successful colonization. Many factors can lead to increased propagule pressure but the most likely cause is an increase in the number of release events. Many activities conducted on NFS lands can lead to an increase in the propagule pressure including use of heavy equipment, transportation of materials containing invasive plant seeds, recreation, and grazing.

The third principle of invasion theory is competition. Even though the ability of an invasive to spread or colonize new sites is generally species dependent, all invasive non-natives are considered potential threats to native plant communities due to traits that make them good competitors for resources. However, the presence of mature native plants, site conditions, and active management practices such as seeding disturbed ground can influence the competitive dynamic.

Methodology

Throughout this document, the potential for each of the proposed activities to increase the establishment and spread of invasive species is described using the following qualitative scale:

- NO – Project activities have no potential to introduce or spread invasive species.
- LOW – Activities identified as low would create little to no bare soils and have extremely limited potential for the introduction of invasive plant material to the project area. If left untreated, invasive species within these areas would not spread from current locations or expand from current levels at rates higher than those found in the absence of project activities.
- MODERATE – Moderate level activities are those that, with recommended mitigation could be treated and reduced to pre-project levels, but without the implementation of these measures could begin to spread beyond current levels.
- HIGH - A high level activity is one that is very likely to create opportunities for the spread and introduction of invasive species which could not be mitigated with prevention measures. To control a population of invasive species established under high intensity activities would likely require an increase in invasive treatment activities (including herbicide use) and funding in order to control the infestation.

In order to analyze the effects of project activities on the potential establishment or spread of invasive non-native species, a qualitative estimate for the potential of the impact has been established for each action. They are based on the amount of ground disturbance proposed, the likelihood of spread of an existing site or new sites being established and the proximity of current invasive non-native species sites. An activity with little new ground disturbance and no known invasive non-native plants in the vicinity would be rated as having a low potential for invasive species establishment while an area that proposes large scale ground disturbance with invasive non-native plants nearby might be rated as a high. Likewise, if an activity would create little to no ground disturbance and there are no known invasive non-native species infestations nearby it would be rated as a "No" potential for spread while activities that propose large scale new ground disturbance with invasive non-native plants on site might be rated as having a high potential for spread.

Measurement Indicators

The following two indicators will be used to analyze the effects of implementing the alternatives on invasive species. Differences between alternatives will be displayed by comparing the potential change in the indicators from the existing conditions.

A. Potential for Establishment of Invasive Species

While direct/indirect effects on the potential establishment of non-native plants are difficult to predict and quantify, they would occur through ground disturbance and introduction of invaders into new areas. Disturbance is defined as a punctuated event or series of events that kill or damage existing organisms, directly or in-directly increase resource availability, and create an opportunity for new individuals to become established (Sousa 1984). Disturbance associated with vegetation management activities are expected through movement of heavy equipment, soil displacement, and vegetation compression; but the amount of disturbance can vary depending on activity density and type. Project activities can introduce new species into areas by transporting non-native plant material on machinery or personnel. Increased disturbance and access would increase the potential for new establishment of invasive non-native species in sites previously unoccupied.

B. Potential for the Spread of Invasive Species

The potential spread of non-native plants is also difficult to predict and quantify; however, it would occur through ground disturbance and the possible increase in "invasibility" or reduction in competition from native species after disturbance. Increased disturbance and pre-existing invasive

non-native sites in the vicinity of project activities would increase the potential for spread of invasive non-native species.

Direct and Indirect Effects on Invasive Species

Two alternatives are being analyzed for this project: Alternative 1 (no action), and Alternatives 2 (action alternative); to determine the magnitude of direct, indirect and cumulative effects on invasive non-native species. The action alternative activities in the Longley are delineated in Table 4 below. A more comprehensive summary of all activities is found in alternative description section of the Longley Environmental Assessment (EA). In the short term the activities of the action alternative would cause soil disturbance, transport material containing invasive plant seed, and alter the canopy cover which would create opportunities for invasive plants to establish and spread.

Alternative 1 – No-Action Alternative

No project activities would be authorized under this alternative. All inventoried invasive sites would continue to be managed in accordance with the Wallowa-Whitman Invasive Plant Program EIS (USDA 2010) and the Wallowa-Whitman Forest Plan as amended by Regional Forester Amendment #5 that incorporates the Pacific Northwest Region Preventing and Managing Invasive Plants Record of Decision (USDA 2005).

Potential for Establishment

There would be no direct effects to the establishment potential of invasive non-native species because no activities would be authorized. Many vectors for the establishment of new populations would still exist from on-going foot travel, water inundation, wind transport, and big game migration within the project area. Over time, with no additional disturbances to known sites, further treatment success, and no reduction to existing desirable vegetation cover and vigor the known sites could be eradicated or significantly reduced.

Potential for Spread

There would be no direct effects to the spread potential of invasive non-native species because no activity would be authorized; however, as described above, vectors which can spread seeds from known populations would still occur (recreation, water, wind, big game, etc.) within the project area. In the long-term, with no additional disturbances to known sites, further treatment success, and no reduction to existing desirable vegetation cover and vigor, the known sites could be eradicated or significantly reduced.

Alternative 2 – Action Alternative

The following table summarizes the effects of implementing the actions proposed in the action alternative and the potential intensity of those effects.

Table 4. Element specific effects of action alternative

Alternative Elements	Potential Effects	Rationale	
Placement of wood and boulders instream include equipment used to install	Ground disturbance and introduction of invasive plant materials from trees, root wad debris, gravel material, people, and machinery.	The use of heavy equipment for handling trees and excavating river bank increases the possibility for ground disturbance as well as introduction of invasive plant material. -Mitigations 1, 3, and 4 and Regional ROD standard 2 would further reduce the risk involved with this activity element.	
Effects Comparison		**Alternative 1**	**Alternative 2**
*Treatment Acres		0 miles	4 miles
*Potential for Effect		No	Moderate
New channel construction Main channel and side channel	Increase in disturbance and short-term reduction in canopy cover and competition.	-Major excavation has the potential to increase disturbance thus favoring invasive non-native plants. The reduction in canopy cover may also reduce competition of native plants allowing increased spread. - Mitigations 1, 3, and 4 would reduce the effect intensity to “Moderate”.	
Effects Comparison		**Alternative 1**	**Alternative 2**
*Treatment Acres		0 miles	8.26 acres
*Potential for Effect		No	Moderate
Construction and decommissioning of stockpile sites Including staging area establishment and permanent excess fill areas	Ground disturbance and introduction of plant material	-Transportation of weed infested materials to new location would increase potential spread. -Regional ROD standards 3, 12, and 13 would reduce these effects.	
Effects Comparison		**Alternative 1**	**Alternative 2**
*Treatment Acres		0 acres	12.35 acres
*Potential for Effect		No	Moderate
Construction and decommissioning of temporary access roads	Ground disturbance and introduction of plant materials on people, machinery, and vehicles	-Road use creates situations that favor the spread of invasive plants by disturbing roadsides and carrying seeds to non-infested areas. Construction of roads can allow for the spread of invasive non-native plants to previously non-infested areas. - Mitigations 1 and 3 and Regional ROD standards 2, 3, 7, and 8 would help moderate the risk associated with this activity element, but would not reduce the intensity of that risk	
Effects Comparison		**Alternative 1**	**Alternative 2**
*Treatment		0 miles	3.23 acres
*Potential for Effect		No	Moderate

Alternative Elements	Potential Effects	Rationale	
Temporary river crossings	Ground disturbance and introduction of plant materials on people, machinery, and vehicles	-Road use creates situations that favor the spread of invasive plants by disturbing roadsides and carrying seeds to non-infested areas. Construction of roads and bridge abutments can allow for the spread of invasive non-native plants to previously non-infested areas. -Mitigations 1 and 3 and Regional ROD standards 2, 3, 7, and 8 would help moderate the risk associated with this activity element, but would not reduce the intensity of that risk	
Effects Comparison		**Alternative 1**	**Alternative 2**
*Treatment		0 crossings	3 crossings
*Potential for Effect		No	Low

Alternative Elements	Potential Effects	Rationale	
Construction of dewatering basins and placement of temporary coffer dams	Ground disturbance and introduction of plant materials on people, machinery, and vehicles	- Disturbance of river banks can allow for the spread of invasive non-native plants to previously non-infested areas. -Mitigations 1 and 3 and Regional ROD standards 2, 3, 7, and 8 would help moderate the risk associated with this activity element, but would not reduce the intensity of that risk.	
Effects Comparison		**Alternative 1**	**Alternative 2**
*Treatment		0 dams	10 dams
*Potential for Effect		No	Moderate
Dewatering river segments and fish salvage	Foot traffic could transport seed into or out of the activity site.	- Minimal disturbance renders this activity of Low impact on invasive plant spread. Material could be transported by people on foot. -Mitigations 1 and 4, and Regional ROD standards 2, 3, 7, and 8 would help moderate the risk associated with this activity element.	
Effects Comparison		**Alternative 1**	**Alternative 2**
*Treatment Acres		0 miles	0.74 miles
*Potential for Effect		No	Low
Planting and revegetation	Propogate native plants. Increase competition for invasive plants.	- Helping to establish desired plant species would increase competition and decrease potential for establishment of invasive plants. -Mitigations 4, and Regional ROD standards 3 and 13 are directly related and would moderate the risk associated with this activity element.	
Effects Comparison		**Alternative 1**	**Alternative 2**
*Treatment Acres		0 acres	25 acres
*Potential for Effect		No	Moderate
Mitigation Measures Erosion controls, temporary road pdfs, rock source pre-treatment, site restoration, monitoring plan, preference for minimal impact options	Inhibit invasive plants from moving into or out of project area. Inhibit invasive plants from being established on ground disturbance areas.	- Cleaning of machinery before entering and leaving project area would prevent introduction of new weed species to the project area and mitigate spread of species from within the project area to previously non-infested areas. EDRR and native plant seeding would inhibit establishment of infestation to disturbed site. - Restoration activities and project design features (pdfs) aimed at minimizing ground disturbance and material movement would minimize invasive plant establishment and spread. - All mitigations and Regional ROD standards listed at the beginning of this report would help moderate the risk associated with the activity elements.	
Effects Comparison		**Alternative 1**	**Alternative 2**
*Treatment Acres		0 mitigation measures	6 mitigation measures
*Potential for Effect		No	Moderate (positive effect)

Alternative 2 (Action Alternative)

Potential for Establishment

Direct effects to the establishment potential of invasive non-native species as a result of project activities would occur by ground disturbance generated by project activities and movement of invasive species materials on project personnel and equipment, as well as on trees, gravel, and soil that would be relocated according to project activities. As a result of project activities, the amount of personnel, equipment, and ground disturbance increases. Thus, the short-term risk of non-native species establishment also increases.

Potential for Spread

Direct effects to the spread potential of invasive non-native species due to project activities may occur due to ground disturbance as a result of project activities. As the number of acres of total activities increases there is more potential disturbance and increased traffic of project equipment. The displacement of established native grasses and forbs, and over-story trees and shrubs creates a condition of 'invasibility' which correlates with an increase of propagule pressure and the risk of non-native species spread. Many of the activities of the action alternative have a potential to increase the risk of spreading invasive species in the short-term beyond the current extent of known sites; however, implementation of the prevention mitigation measures such as pre-treatment of known infestations, avoiding active infestation sites, and machinery cleaning requirements, as well as restoration prescriptions should limit the potential for spread. Road activities (including use and construction of temporary roads and construction of temporary bridges) can create situations that favor the spread of invasive plants by disturbing ground and conveying seeds to un-infested areas. The risk associated with road activities and non-native species would increase as miles of temporary road use and channel construction increases. Exact estimates of this risk however, are unknown and difficult to predict. Because the area where the trees would be collected from has not been surveyed, it is especially recommended that the area is inspected before activities so that discovered invasive plant materials can be removed, treated, or avoided.

The overall effect of the actions in the alternative on the potential to establish and spread invasive non-native species is estimated to be **Moderate**, due to the controlled area of proposed activity and ground disturbance moderated by the mitigation measures and project design features and post disturbance restoration prescriptions.

Cumulative Effects

Cumulative effects are the sum of all past and present actions, and reasonably foreseeable future actions in combination with the activities proposed in Longley. Past activities are considered in the existing condition baseline for this project. Present and reasonably foreseeable future activities on Forest Service and private lands are described in Table 5 below. The purpose of this table is to determine which of the present and reasonably foreseeable future activities overlap in time and space with Longley and if they do, if there is a measureable cumulative effect for non-native plants in the project area. Generally, overlapping activities with the risk of ground disturbance combined with movement of equipment, organisms, and materials have the greatest potential to create cumulative effects on invasive plants within Longley.

Table 5. Cumulative Effects for Longley on Non-native Invasive Species

Project	Potential Effects	Overlap in:		Measurable Cumulative Effect?	Effects
		Time	Space		
Noxious Weed Management W-W Invasive Species Treatment ROD	Reduction of invasive species establishment and spread.	Yes	Yes	Yes (Beneficial)	Project would increase invasive plant management activities due to anticipated need along with project mitigation and monitoring requirements. Involvement

Project	Potential Effects	Overlap in:		Measurable Cumulative Effect?	Effects
		Time	Space		
TriCounty CWMA					of TriCounty would contribute more resources to manage invasives.
Vegetation Management: Vegetation Management: BTS Fuel Reduction Project BTS Campground Project Spring Crk Small Sale	Thinning, which would remove over-story density, and prescribed burning potentially increase invasive plant establishment and spread.	Yes	Yes	No	The negative effects of vegetation management are offset by the benefits of mitigating the effects of high intensity catastrophic wild fire. (Zouhar, et. al.)
Special Uses: • OTEC Powerline • Fly Fishing O/G Permit • LG Rifle & Pistol Club	Powerline maintenance could require traffic and ground disturbance.	Yes	Yes	No	No impacts expected from this powerline or fly fishing along this stretch of river. Minimal impacts from five day annual special use permit associated with gun club activities.
Recreation – BTS Interpretive Trail	Foot/pet travel and trail maintenance could spread invasive seed and create ground disturbance.	Yes	Yes	No	Trail will be constructed as a part of the BTS project. Foot travel has a low impact. This sort of recreation site would have a higher invasive plant management priority.
Recreation- Dispersed Camping	Vehicle and foot traffic carrying invasive seed.	Yes	Yes	No	Dispersed camping within project area is very limited.
Recreation- Snowmobile Trails	People and machines could transport invasive seeds.	No	No	No	Timing of this activity is not conducive to ground disturbance or plant seed dispersal.
Recreation -Firewood Cutting	People and machines could transport invasive seeds	Yes	Yes	No	Firewood cutting within the project area is restricted because it is within the riparian area.
Recreation – OHV Use	Introduction of invasive seeds, ground disturbance from OHV use, and user	Yes	Yes	No	Unauthorized user built OHV trails and OHV use is spread across most of the landscape within the Spring Creek area contributing ground disturbance and

Project	Potential Effects	Overlap in:		Measurable Cumulative Effect?	Effects
		Time	Space		
	built trail construction				invasive seed transportation. This, in combination with the impacts from project implementation has a potential to impact invasives in the short term; however, the long term benefits of the Longley project and implementation of travel management which will restrict motor vehicle use to designated roads, trails and areas will have a minor net beneficial effect to invasive plant management related to the project area.
Recreation – BTS Campground	Introduction of invasive plant seed by vehicles, pets, and people.	Yes	Yes	No	This activity has a minimal effect. Camping areas will not sustain disturbed ground.
Roads & Trails – Travel Management Plan	Introduction of invasive plant seeds by OHVs	Yes	Yes	No	See OHV use above.
Road Maintenance On Hwy 244	Invasive plant management activities contributed by ODOT. Introduction of invasive seeds from fill materials and maintenance equipment.	Yes	Yes	Yes	ODOT herbicide application along Hwy right-of-way adds to invasive plant management within project area. Equipment activities and material brought in could transport invasive seed to project area.
Roads – Danger Tree Removal	Foot travel introducing invasive seeds.	Yes	Yes	No	Saw falling trees is a low impact activity.
Grazing Allotment – Spring Creek Sheep Allotment Special #2 Allotment	Sheep transporting invasive seeds into project area. Sheep eating invasive plants.	Yes	Yes	Yes	Sheep potentially carry invasive plant material from adjacent rangeland into disturbed ground within the project area. This effect is offset by the benefits of sheep eating invasive plants in the project area.
Fisheries Enhancement – Fish logs from BTS Campground	Ground disturbance	Yes	Yes	Yes	BTS project activities have created large areas of ground disturbance,

Project	Potential Effects	Overlap in:		Measurable Cumulative Effect?	Effects
		Time	Space		
Bird Track Springs Fish Habitat Enhancement					increasing potential for invasives establishment.
Wildlife Enhancement – GG Owl Platforms Aspen Enhancement	Foot travel. Increasing upper story cover and native plant density.	Yes	Yes	No	Low impact activity from foot travel. Aspen enhancement would increase competition with invasive plants.
Mining	Ground disturbance and machinery/ foot traffic.	No	No	No	No approved plans of operation
Private Land Activities • Private Structures • Roads • Grazing	Ground disturbance and machinery/ foot traffic.	Yes	Yes	Yes	Cattle grazing, vehicle and machinery traffic, hay farming, all have potential to increase potential for invasive plant introduction and spread.

Alternative 1

There will be no direct/indirect effects to invasive non-native plants as a result of the no action alternative because project activities will not be authorized. All current conditions and trends will continue unchanged. Since there are no direct/indirect effects there will be no cumulative effects.

Alternative 2

Based on the analysis in Table 5 above, potential cumulative effects for the action alternative will only be discussed related to noxious weed management, road maintenance, fish enhancement projects, grazing allotment, and private land activities because they were determined to overlap in time and space and result in a measurable cumulative effect when considered in combination with the activities proposed in Longley.

Monitoring and treatment of invasive plants as part of the WWNF Invasive Plant EIS would take place if Longley were not implemented. However, there would be an increase of these activities within the project area due to the anticipated risk of infestation caused by project activities and because of the monitoring requirements. The overall effect would be of increased focus, vigilance, and funding to control and eradicate invasive plants within the project area. TriCounty CWMA plans to continue treatment of invasives along the riverbank up and downstream of the project area, which would contribute to invasive plant management.

There is a slight potential for invasive spread and introduction from machinery involved in ongoing road maintenance work along Hwy 244 and from transportation of materials in the form of gravel fill into the ODOT right-of-way within the project area. Road maintenance in the form of roadside herbicide application within this region of the project area would have the beneficial effect of inhibiting invasive plant spread within the project area.

The sheep allotment activities that overlap the project area would have a cumulative effect because sheep could carry invasive seeds from outside to inside the project area when there would be ground disturbance associated with the project. Also, sheep grazing causes a seasonally punctuated ground disturbance event. However, sheep would contribute what is referred to as cultural invasive plant control by grazing invasive plants in the area. Timing would influence the benefit of this activity.

The Bird Track Springs Fish Enhancement Project effects 6,301 acres and is less than 5 miles upstream of Longley. There is a potential for disturbed ground within that project area to become infested with invasive plants. Increased invasive weed management is expected to keep the invasion and spread in check, but the cumulative number of acres disturbed in the general area does increase the overall threat. Active treatment and management for three years throughout the project area including the privately owned portion would be effective in the early stages of invasive plant establishment.

There is a potential for weed seeds to be carried from private land which may not have an active invasive plant management program to locations within the project area. Invasive weed management would mandated on private land under the action alternative which would reduce the extent and amount of invasive plant sites through active treatment and management for three years throughout the project area including the privately owned portion.

Utilization and maintenance of private farm facilities can create situations that favor the establishment and spread of invasive plants by disturbing ground and carrying seeds to un-infested areas. Longley activities overlap some of these sites and would increase the potential for spread of invasive species populations. Mitigations and project design features, which apply to private land associated with the project, would help to lessen the effects of these activities.

Summary of Effects

The estimated effects for the two alternatives are compared in Table 6 below. Although risks are present with or without project activities, the danger of invasive species establishment and spread due to project activities under the action alternative is higher than the 'no action' alternative. The historic presence of invasive plants within the project area combined with sheep grazing and activities on private land under unknown invasive plant management accounts for a heightened potential for spread under the no action alternative. With implementation of project design features to reduce and control the introduction and spread of non-native species we can minimize the impacts that do exist. Specific mitigations and required standards would additionally reduce the chances of new introductions, establishment, and spread of invasive non-native plants. We could, therefore, predict an establishment and spread rate at the upper end of the natural level, or about 6-8% for the action alternative.

Table 6. Summary of estimated effects for alternatives in Longley

Estimated Effect*	Alternative 1	Alternative 2
Establishment Potential	1	3
Spread Potential	2	3

* Estimated effect is based on increases (from pre-project levels) in establishment and spread of invasive non-native species due to project level activities. Higher number equates to higher risk but is only used for comparison between alternatives and is not an estimate of the intensity of the effect.

Compliance with the Forest Plan and Other Direction

The Forest Plan (as amended by the 2005 Region 6 ROD, amendment RF #5) provides direction for the control of noxious weeds and other competing vegetation where such activities are not precluded by management area

direction. The goals focus on maintaining or enhancing ecosystem function to provide for long-term integrity and productivity of biological communities, treatment of priority infestations, and monitoring the effects of all activities to reduce the impacts of non-native plants. The site specific treatment requirements are further amended by the Wallowa-Whitman National Forest Invasive Plant Treatment Program EIS (USDA, 2010). Longley is consistent with these goals by implementing the standards requiring emphasis of prevention of invasive plant introduction, requiring the use of weed-free materials (straw, mulch, gravel, fill sand, etc.), requiring the cleaning of all equipment prior to entering National Forest System lands, managing road maintenance activities in areas with high concentrations of noxious weeds and coordinating activities with pre-treatment, and requiring the use of native plant materials for rehabilitation and restoration work. Longley is consistent with these goals through adherence to the EIS and the Forest Plan.

Literature Cited

Bradley, B.A., Oppenheimer, M., & Wilcove, D.S. 2009. Climate change and plant invasions: restoration opportunities ahead? Global Change Biology, 15, 1511-1521.

Chapin, F.S., Zavaleta, E.S., Eviner, V.T., Naylor, R.L., Vitousek, P.M., Reynolds, H.L., Hooper, D.U., Lavorel, S., Sala, O.E., Hobbie, S.E., Mack, M.C., & Diaz, S. Diaz. 2000. Consequences of changing biodiversity. Nature, 405, 234-242.

D'Antonio, C.M. 2000. Fire, plant invasions, and global changes. Pages 65-93 *in* H.A. Mooney and R.J. Hobbs, editors. Invasive species in a changing world. Island Press, Covelo, California, USA.

Hellman, J.J., Byers, J.E., Bierwagen, B.G., & Dukes, J.S. 2008. Five potential consequences of climate change for invasive species. Conservation Biology, 22(3), 534-543.

Hobbs, R.J. & Huenneke, L.F. 1992. Disturbance, diversity, and invasion: implications for conservation. Conservation Biology, 6(3), 324-337.

Lockwood J.L., Cassey, P., & Blackburn, T. 2005. The role of propagule pressure in explaining species invasions. Trends in Ecology and Evolution, 20(5), 223-228.

Mack, M.C. & D'Antonio, C.M. 1998. Impacts of biological invasions on disturbance regimes. Trends in Ecology and Evolution, 13(5), 95-198.

Merriam, K.E., Keeley, J.E., & Beyers, J.L. 2006. Fuel breaks affect nonnative species abundance in Californian plant communities. Ecological Applications, 16(2), 515-527.

Sousa, W.P. 1984. The role of disturbance in natural communities. Annu. Rev. Ecol. Syst., 15, 353-391

USDA Forest Service, 1990. Wallowa-Whitman National Forest Land and Resource Management Plan Record of Decision. USDA Forest Service, Pacific Northwest Region, Wallowa-Whitman National Forest, Baker City, OR. April 1990.

USDA Forest Service, 2005. Pacific Northwest Region Invasive Plant Program Record of Decision. USDA Forest Service, Pacific Northwest Region, Portland, OR. October 2005.

USDA Forest Service, 2010. Wallowa-Whitman National Forest Invasive Plants Treatment Project Record of Decision. USDA Forest Service, Pacific Northwest Region, Wallowa-Whitman National Forest, Baker City, Or. May 2010.

Vitousek, P.M., D' Antonio, C.M., Loope, L.L., & Westbrooks, R. 1996. Biological invasions as global

environmental change. American Scientist, 84, 468-478.

Zouhar, Kristin; Smith, Jane Kapler; Sutherland, Steve; Brooks, Matthew L. 2008. Wildland fire in ecosystems: fire and nonnative invasive plants. Gen. Tech. Rep. RMRS-GTR-42-vol. 6. Ogden, UT: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. p. 355