# Appendix G
# Invasive Plants

This appendix provides background on the methodology used in the analysis of invasive plants.

**In this appendix:**

# Analytical Methods Used to Determine Relative Risk of Introducing Invasive Plant Species Among the Alternatives

Analytical assumptions used for the effects analysis are integrated into the invasive plants portion of *Chapters 3* and *4*. The analytical methods used to determine the relative risk of introducing invasive plant species among the alternatives are described in this appendix.

The condition of invasive plant infestations on BLM-administered lands in western Oregon can be characterized by analyzing a few invasive species. The following representative sample of invasive species is used to describe the condition of invasive plants on BLM-administered lands in western Oregon on BLM-administered lands:

- Yellow starthistle
- Knotweeds
- False brome
- Spotted and diffuse knapweeds
- Meadow knapweed
- Scotch and French brooms
- Dyer's woad
- Canada thistle

## Step 1

Determined the current Invasive Plant Species Distribution Category at the fifth-field watershed level:

The representative invasive plant species' distribution data was imported from Weed Mapper in February 2008. All of the representative invasive plant species' distribution data was pooled for the analysis. The collective pool of reported sites was evaluated for each square mile in a grid applied to the planning area.

Invasive Plant Species Distribution Categories of *abundant*, *limited*, and *low* were based on the known representative species' distribution in the fifth-field watersheds:

### *Abundant*

The representative invasive plant species were reported from more than 25% of the square miles within the fifth-field watershed.

### *Limited*

The representative invasive plant species were reported from between less than *25%* and more than 1% of the square miles within the fifth-field watershed.

### *Low*

The representative invasive plant species were reported in no more than 1% of the square miles in the fifth-field watershed.

The results of *Step 1* are displayed in *Chapter 3*, in *Figure 3-63 (Distribution categories of invasive plant species for the fifth-field watersheds within the planning area)*.

# Step 2

Determined the relative risk of introducing invasive plant species into fifth-field watersheds over the first ten years of plan implementation as an inadvertent result of timber harvest activities for each alternative.

## Step 2a

Weights of 1 or 5 were assigned to the four timber harvest types based on their respective post-harvest light levels. Regeneration and partial harvests were assigned a weight of 5. Commercial thinning and uneven-aged management activities were assigned a weight of 1.

## Step 2b

Weights of 1, 3, and 5 were assigned to logging methods based on their respective levels of soil disturbance. Aerial harvests were assigned a weight of 1, cable yarding systems a weight of 3, and ground-based methods a weight of 5.

## Step 2c

A combined timber harvest activity weighted value was calculated by multiplying the weights from *Steps 2a* and *2b*.

## Step 2d

These combined timber harvest activity weights were multiplied by the total acres by harvest category per fifth-field watershed in the first ten years, to generate a set of values describing the level of susceptibility for invasive plant introduction as a result of probable timber harvest activities.

## Step 2e

The susceptibility values were evenly divided into three categories: *high*, *medium* and *low*.

Zero values were assigned to fifth-field watersheds where there are no BLM-administered lands.

The results of *Step 2e* are displayed in *Chapter 4*, in *Figure 4-72 (Relative susceptibility of fifth-field watersheds to invasive plant species introduction as a result of timber harvesting activities over the next 10 years)*.

## Step 2f

Representative invasive plant species presence were combined, with susceptibility generated by probable timber harvest activities to determine relative risk of introduction.

For each alternative, *Table G-1* (*Matrix to determine the relative risk for the introduction of invasive plant species that are associated with timber harvesting activities over the next 10 years*) was used to determine relative risk of invasive species introduction associated with timber harvest activities in the first ten years for each fifth-field watershed in the planning area.

Watersheds with a combination of *Low* representative invasive plant species distribution category and *Low* susceptibility for introduction of invasive plants from timber harvest activities would have the lowest risk of invasion. Fifth-field watersheds with the highest category for either distribution or susceptibility would have a greater risk of invasive plant species introduction than watersheds with lower categories.

The greatest risk of invasion would be in fifth-field watersheds where both representative invasive plant species are *Abundant* and where the susceptibility of introducing invasive plants associated timber harvest activities would be *High*.
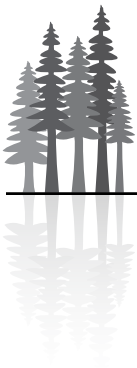
**TABLE G-1.** MATRIX TO DETERMINE THE RELATIVE RISK FOR THE INTRODUCTION OF INVASIVE PLANT SPECIES THAT ARE ASSOCIATED WITH TIMBER HARVESTING ACTIVITIES OVER THE NEXT 10 YEARS

| Species Distribution Categories | Susceptibility Categories for Introduction of Invasive Plant Species from Timber Harvesting Activities | | |
|---|---|---|---|
| | **Low** | **Moderate** | **High** |
| **Low** | Low | Moderately Low | Moderate |
| **Limited** | Moderately Low | Moderately High | High |
| **Abundant** | Moderate | High | Highest |

The results of *Step 2f* are displayed in *Chapter 4*, in *Figure 4-74 (Comparison of the risk by mapped watershed for the introduction of invasive plant species that are associated with timber harvesting activities over the next 10 years)* and *Figure 4-75 (Comparison of the risk by watersheds for the introduction of invasive plant species associated with timber harvesting activities over the next 10 years..*

# Step 3

Determined the relative risk of introducing invasive plant species into riparian habitats over the first ten years of plan implementation as a result of timber harvest and associated management activities

A similar analytical process as the one used to determine risk associated with timber harvest activities under all alternatives was used to compare the risk of introducing invasive plants into riparian habitats.

## Step 3a

Weights were applied to the different riparian management area prescriptions to compare the relative risk of invasive plant introduction into riparian areas as an inadvertent result of timber harvest activities.

Thinning that would occur within the riparian management areas was assumed to be a constant proportion of the total thinning acres under each alternative. Therefore, the thinning acres used to determine the relative risk of introducing invasive plants into fifth-field watersheds in the first ten years was also used for the riparian habitat risk analysis. The analytical assumption for the risk for the introduction of invasive plant species along intermittent streams under Alternatives 2 and 3 is that the light levels for the riparian areas associated with these streams would mimic the levels in the surrounding timber harvest units, because of the relatively narrow width of the riparian management areas along most intermittent streams under Alternatives 2 and 3. The intermittent stream post-harvest shade levels would be lower under Alternatives 2 and 3 than under the PRMP, No Action Alternative, and Alternative 1.

In addition to the riparian management areas under the PRMP which would be broader than those under Alternatives 2 and 3, there would be exclusion areas along both intermittent and perennial streams where there would be no thinning. The analytical assumption for risk of invasive plant introduction in the riparian habitats within the riparian management areas under the PRMP is that the post-harvest shade levels would be the same as the pre-harvest levels. Therefore, there would be no riparian susceptibility weight assigned to thinning under the PRMP.

Riparian susceptibility weights for invasive plant introduction to riparian habitats associated with timber harvest activities under all alternatives were assigned using *Table G-2 (Susceptibility weights for harvest activity types for introduction of invasive species into riparian areas).*

**TABLE G-2.** SUSCEPTIBILITY WEIGHTS FOR HARVEST ACTIVITY TYPES FOR INTRODUCTION OF INVASIVE SPECIES INTO RIPARIAN AREAS

| Alternative | Timber Harvest Type | Riparian Susceptibility Weight |
|---|---|---|
| All Alternatives | Thinnings | 1 |
| Alternatives 2 and 3 | Uneven-age management in Klamath Falls Resource Area | 1 |
| Alternative 3 | Uneven-age management in a portion of the Medford District | 1 |
| Alternative 2 | Regeneration harvest | 2 |
| Alternative 3 | Partial harvest | 2 |

## Step 3b

For each alternative, the weights were multiplied by total probable acres per fifth-field watershed for each harvest type in the first ten years to generate a set of values describing the level of susceptibility for invasive plant introduction into riparian areas.

## Step 3c

Likewise, for each alternative, weights assigned to the logging methods as described in *Step 2b* were multiplied by total probable acres per fifth-filed watershed for each logging method in the first ten years to generate a set of values describing the level of riparian susceptibility for invasive plant introduction into riparian areas.

## Step 3d

Together, the riparian susceptibility values associated with harvest types and logging methods determine the overall riparian susceptibility to invasion in the first ten years of plan implementation under each alternative.

These two values were multiplied together to generate a comprehensive riparian susceptibility value for each fifth-field watershed. These values were divided into three equal categories: *high*, *moderate* and *low*.

The results of *Step 3d* are displayed in *Chapter 4*, in *Table 4-47 (Susceptibility comparison for the introduction of invasive plant species into riparian habitats that are associated with timber harvesting in the fifth-field watersheds over the next 10 years).*

## Step 3e

The riparian susceptibility category and invasive plant distribution category were used to determine the relative risk of introducing invasive species in riparian habitats for the first ten years of plan implementation using the same methods described for timber harvest activities in *Step 2e* above.

The results of this analysis are displayed in *Chapter 4*, in *Figure 4-77 (Relative risk of introducing invasive plant species in riparian habitats over the next 10 years)* and *Figure 4-78 (Riparian risk category comparison for the introduction of invasive plant species over the next 10 years).*

# Step 4

Determined the relative susceptibility of invasive plant introductions as an inadvertent result of off-highway vehicle designation.

## Step 4a

Assigned off-highway vehicle designation weights, as identified below, to each part of the fifth-field watershed having a different off-highway vehicle designation.

### Off-Highway Vehicle Designation Susceptibility weights:

Open, Off-Highway Vehicle/limited Off-Highway Vehicle emphasis areas and potential emphasis areas = 5

Limited = 3

Closed = 0

## Step 4b

Determined the relative susceptibility for introduction of invasive species related to off-highway vehicle use as an inadvertent result of the off-highway vehicle designations.

For each alternative, the susceptibility weights were multiplied by total probable acres per watershed for each designation to generate a set of susceptibility values for the fifth-field watersheds. These values were divided into three equal categories: *high*, *medium* and *low.*

## Step 4c

The susceptibility category and invasive plant distribution category were used to determine the relative risk of introducing invasive species as an inadvertent result of off-highway vehicle use, in fifth-field watersheds using the same methods described for timber harvest activities in *Step 2e* above.

The products of this step are displayed in *Chapter 4*, in *Figure 4-80 (Relative risk for the introduction of invasive plant species that are associated with off- highway vehicle designations)* and *Figure 4-81 (Risk comparison for introduction of invasive plant species that are associated with off-highway vehicle use).*

# Step 5

Determined the risk to fifth-field watersheds of roadside invasive plant introductions from their invasive plant distribution categories and the relative amounts of new road construction and road related activities, by alternative.

## Step 5a

Divided total new road mileage from the total square miles per fifth-field watershed to determine New road miles by fifth-field watershed.

## Step 5b

Divided the amount of new road construction and road related activities per fifth-field watershed, evenly into three categories, *high*, *moderate* and *low*.

## Step 5c

Used *Table G-3* to determine the relative risk categories of invasive plant introduction from the amounts of new road construction and road related activities and species distribution categories.

The products of *Step 5c* are displayed in *Chapter 4*, in *Figure 4-79 (Risk comparison for the introduction of invasive plant species associated with new road construction over the next 10 years)* and *Table 4-49 (Risk comparison for the introduction of invasive plant species associated with new road construction by fifth-field watershed over the next 10 years)*.

**TABLE G-3.** MATRIX TO DETERMINE THE RELATIVE RISK CATEGORIES OF INVASIVE PLANT INTRODUCTION FROM NEW ROAD CONSTRUCTION AND RELATED ACTIVITIES

| Species Distribution Categories | Relative Levels of Road Construction and Related Activities | | |
| --- | --- | --- | --- |
| | **Low** | **Moderate** | **High** |
| **Low** | Low | Moderately Low | Moderate |
| **Limited** | Moderately Low | Moderately High | High |
| **Abundant** | Moderate | High | Highest |