Appendix B – Weed Risk Assessment

Introduction

The project area is located in the East Short Pines. Less than five acres of noxious weed infestations occur within the analysis area. Weed infestations can degrade native ecosystems. The proposed activities, without mitigation, could increase the risk of noxious weed spread.

Maintaining or improving National Forest System (NFS) lands requires the maintenance and improvement of the basic ecosystem elements of soil, water, and vegetation. The stability and ecological function of native systems depend on a diverse community of native plants. When an area is heavily infested with invasive weeds, they directly compete with native plants and can cause local displacement. In addition, weeds can have a number of indirect effects including changes to: aesthetic values, biological diversity and ecosystem services. Potential impacts include alteration of disturbance regimes (including wildfire), changes in the food base for ungulates, soil erosion and loss of soil carbon storage and decreased production.

Once weeds become established, it is hard to get rid of them. Weeds arrived in the United States (many come from Eurasia) without the insects and diseases that preyed on them and the plants that evolved in competition with them in their native land. Without insects, diseases, etc. to control these weeds, they can increase at a rapid rate.

The weed risk assessment is the evaluation of the actual or potential impact and distribution of a weed species. The protocol compiles evidence related to species characteristics, current and potential impacts and the degree to which a management response is likely to succeed. This information is then used to determine the most appropriate management action for the species in question.

The weed risk assessment considers susceptibility, threat, and exposure to determine risk of weed spread and appropriate mitigation measures. It is anticipated that risk of weed spread, given applied mitigation measures, will not impede wildlife or impair their habitat and therefore would not cause economic losses associated with wildlife and related recreation.

The effectiveness of the BMPs depends on the thoroughness of adhering to them. It seems reasonable to expect a moderate level of effectiveness. In addition, see Appendices C, D, and F of the 2006 Custer National Forest Weed Management FEIS for specific effectiveness information for overall integrated pest management.

This analysis considers the affected environment and environmental consequences to invasive plant species. The effects analysis considers the effect of No Action (Alternative 1) and the Proposed Action (Alternative 2). Refer to Chapters 1 and 2 for additional information.

METHODS

A weed risk assessment was used to evaluate the degree of risk of weed establishment and spread under the action alternatives. The degree of risk was first determined by an evaluation of the combination of susceptibility, threat and exposure inputs from the action alternatives using the USFS Northern Region Eastside Weed Susceptibility Assessment (Mantas). The findings from this evaluation were used in the USFS Northern Region Risk Assessment Rating protocol that determines the required project actions relative to mitigation and monitoring. This overall assessment was used to help design mitigation
measures to be implemented to reduce the risk of introduction or spread of undesirable plants into the area, including those required by policy (FSM 2081.2 - Prevention and Control Measures). These mitigation measures are outlined in Chapter 2 of the EA.

Fieldwork was conducted by National Forest weed personnel who annually monitors, maps and treats noxious weeds within the analysis area. The current weed inventory and mapping was last updated after the 2013 field season.

This analysis is tiered to the 2006 Custer National Forest (CNF) Weed Management EIS NEPA Record of Decision. This is the environmental document used to support the Sioux Ranger District’s Noxious Weed Treatment Program. The document covers various noxious weed treatment alternatives Forest-wide. It provides analysis and support for the use of herbicides and an integrated pest management approach to managing weeds.

**AFFECTED ENVIRONMENT FOR WEEDS**

Canada thistle occurs within the analysis area with less than 5 acres of infestation (see Figure 1 in the associated report).

**Weed Ecology**

The following summarizes the ecological considerations regarding the weed species found in the analysis area.

*Canada thistle* is a rhizomatous perennial. Reproduction occurs by seeds and shoots from lateral roots. Dormant, buried seeds can remain viable for up to 26 years. It readily roots from fragments less than an inch in length. Above ground parts will be killed by fire, but below ground parts will survive even severe fires. There is abundant evidence that post-fire establishment of Canada thistle is common where seed source is available. Canada thistle has a wide habitat range and has been in the United States long enough to have spread to most areas in which it has adapted. It is found in open areas with moderate or medium moisture levels. Canada thistle grows in clay to sandy soils in areas with moderate temperatures and precipitation of 16 to 30 inches. This species is present in the analysis area. Disturbed ground is a prime candidate for colonization.

**Level of Weed Spread Risk**

Noxious weeds are spread by various transport vectors including vehicles, humans, animals, water and wind. The source of many weed infestations has been traced to roads, trails, parking lots, gravel pits, railroads and other travel corridors. A weed-infested area, when driven through, may allow weed seeds to become lodged in the tire tread, undercarriage, or grill and in other cracks and crevices on the chassis of a vehicle. Such seeds may become dislodged hundreds of miles away, infesting new areas. Having knowledge of weed spread vectors and conditions in which weed establishment is most vulnerable can help in evaluating spread risk. The action alternative proposes use of approximately 7 miles of road.

USFS Region One Eastside Weed Susceptibility Assessment¹ was used to help determine the level of risk depending upon the environmental settings and invasiveness of the weed. Data from the three input sources (susceptibility, threat and exposure) were used to determine the level of risk to a site from each species.

¹ The Eastside Susceptibility Assessment was completed for several weeds occurring in the USFS Northern Region, East of the Continental Divide.
**Susceptibility** refers to the vulnerability of a native plant community to colonization and establishment of an invasive species. Susceptibility is rated using a categorical system where each combination of a species is coded as invasive in undisturbed and disturbed settings (I), invasive in disturbed settings (D), closed to invasion (C), or unknown (U). These ratings are applied to the vegetation types found within the analysis area.

**Threat** refers to the degree of change to the structure, composition, or function of a native community from an exotic species. Threat is displayed using a qualitative ranking of three classes: low, high, and none. These ratings are applied to the vegetation types found within the analysis area.

The following Table displays the susceptibility of undisturbed vegetation types within the Analysis Area, to weed establishment and spread.

<table>
<thead>
<tr>
<th>Species</th>
<th>Ponderosa Pine</th>
<th>Riparian grass - wet</th>
<th>Riparian grass - dry</th>
<th>Riparian shrub</th>
<th>Riparian deciduous</th>
<th>Aspen</th>
<th>Dry grass</th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada thistle</td>
<td>DL</td>
<td>CN</td>
<td>DH</td>
<td>DH</td>
<td>DL</td>
<td>DH</td>
<td>CN</td>
</tr>
</tbody>
</table>

There are some species (such as spotted knapweed - not known in the analysis area) that can spread in undisturbed conditions with increasing ability to spread in disturbed conditions. The next worst case setting for susceptibility are species (such as Canada thistle that is found within the analysis area) labeled above as Disturbance with High Threat (color-coded in yellow above) as this situation allows for weed spread in disturbed conditions such as those found in and along roads or in areas following mechanical or other types of disturbance.

Surface disturbance can provide a suitable seedbed for weeds to get a foothold and become established. All proposed ground disturbance areas under Alternative 2 are generally in dry grasslands (dry grass and riparian). These areas are considered susceptible given Canada thistle’s invasiveness into disturbed settings (those identified as Invasive (“I”) or Disturbance (“D”) species in the susceptibility matrix).

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2 **Susceptibility Codes:**
- **U - Unknown:** Susceptibility of this PNV to the species is unknown;
- **C - Closed:** The species generally does not occur within this PNV under any condition;
- **I - Invasive:** The species is invasive in undisturbed conditions within this PNV. If a species is rated as “I”, the assumption is that it would also invade with disturbance;
- **D - Disturbance:** The species occurs in this PNV where there has been evidence of recent disturbance.

**Threat Codes:**
- **L - Low Threat:** Species can become established; however, they cannot compete well with native vegetation, even in disturbed settings. Species with low threat never increase substantially in cover without the aid of severe site disturbance. Even in cases of moderate to mild disturbance events (e.g. low intensity fires, moderate grazing) native plants still are able to compete successfully;
- **H - High Threat:** Species are rated as having high threat if once established they can compete successfully with native vegetation. These changes would have to be significant enough to where the function of the plant community is substantially altered. These changes would include alteration in natural pathways of succession, a change in the natural fire regime, and/or significant changes to the composition and canopy cover of native plant species;
- **N - No Threat:** A species can only be assigned no threat to a PNV if it is closed (C) to that PNV; **U - Threat Unknown**
For the proposed action alternative, frequent vehicle trips into the project are anticipated. These trips into and out of the analysis area during project operations could have increased weed spread due to increased exposure to weed seed transport vectors. Under Alternative 2, approximately one mile of Forest System roads and 6 miles of temporary roads would be used. These travel routes are considered as weed spread vectors. About 73 acres under Alternative 2 of travel corridor are susceptible to weed infestation due to increased exposure to weed seed transport vectors.

**Risk Rating for the Proposed Action**

Susceptibility, threat and probability of exposure were combined to determine the degree of risk for weed spread across this analysis area from the known noxious weed species. Proposed disturbance information was combined with potential natural vegetation (PNV) data to identify which areas are susceptible to the weed species analyzed. Canada thistle poses a high threat in riparian and aspen systems and low to moderate exposure during project operations for an overall moderate risk rating for the proposed action.

<table>
<thead>
<tr>
<th>Susceptibility</th>
<th>Threat</th>
<th>Exposure</th>
<th>= Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not susceptible</td>
<td>None</td>
<td>Any level</td>
<td>No risk</td>
</tr>
<tr>
<td>Susceptible</td>
<td>Low</td>
<td>Any level</td>
<td>Low</td>
</tr>
<tr>
<td>Susceptible</td>
<td>Unknown</td>
<td>Any level</td>
<td>Unknown</td>
</tr>
<tr>
<td><strong>Susceptible</strong></td>
<td>High</td>
<td>Low</td>
<td><strong>Moderate</strong></td>
</tr>
<tr>
<td>Susceptible</td>
<td>High</td>
<td>Moderate</td>
<td>High</td>
</tr>
<tr>
<td>Susceptible</td>
<td>High</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>Unknown</td>
<td>Unknown</td>
<td>Any level</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

The following Table summarizes information for the risk of weed spread from implementation of the action alternative. The action alternative has a high risk of introducing weeds into new areas and spreading weeds from areas that are already infested with weeds.

<table>
<thead>
<tr>
<th>Factors</th>
<th>Variables</th>
<th>Risk</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Known noxious weeds</strong></td>
<td>There are many weed occurrences known to occur along Federal and County roads and jeep trails leading to the analysis area. Noxious Weed occurrences are predominantly Canada thistle which is invasive and can threaten disturbed lands and less invasive to undisturbed lands.</td>
<td>Low to Moderate risk</td>
</tr>
<tr>
<td><strong>2. Habitat vulnerability</strong></td>
<td>Motorized vehicle use disturbs habitats they pass through creating conditions favorable for weed introduction and spread. They are recognized as vectors for introducing and spreading weeds into new areas. Project operation activities such as temporary road construction and landings also create conditions favorable for weed introduction and spread.</td>
<td>Low to moderate risk</td>
</tr>
<tr>
<td><strong>4. Non-project dependent vectors</strong></td>
<td>People use roads and trails for a variety of activities including grazing access and ATV/UTV use. These activities add to the likelihood of weed introduction.</td>
<td>Low to moderate risk</td>
</tr>
<tr>
<td><strong>5. Habitat alteration expected as a result</strong></td>
<td>Implementation of this project will reduce the amount of ground cover and shade in and along the motorized vehicle roads/trails/areas and will</td>
<td>Low to moderate risk</td>
</tr>
</tbody>
</table>
USFS PROJECT RISK ASSESSMENT PROTOCOL

The following USFS Northern Region Risk Assessment Rating protocol (Forest Service Manual Zero Code 2080 - Noxious Weed Management) used the findings from the analysis above to evaluate the risk of weed spread under the action alternatives in order to help design mitigation measures to be implemented to reduce the risk of introduction or spread of undesirable plants into the area. The rating numbers are on a scale of 0-10.

Factor 1 - Likelihood of Undesirable Plant Species, Including Noxious Weeds Species, Spreading in the Analysis Area3 - All Action Alternatives. Canada thistle is a noxious weed that occurs in low densities within the project disturbance areas. Canada thistle occurs in low amounts along Box Springs Road which are considered potential spread vector areas along these travel routes to and from the project area. This species exhibits a susceptibility to weed invasion with a higher threat to riparian and aspen vegetation types in the analysis area.

Given the risk analysis conducted at the beginning of this section and the protocol’s risk rating criteria, the risk criteria rating is low to moderate. A rating of 10 in the high category would be too high since the infestation densities are low and the infested areas are low. A rating higher than 5 in the moderate category would be too high given the moderate degree of risk due to species invasiveness and threat in disturbed and less so in undisturbed settings in the analysis area. Therefore, a rating of 3.5 was given for this factor.

Project activities, even with preventative management actions, are likely to result in the establishment and spread of undesirable plants on disturbed sites throughout much of the analysis area, without additional mitigation, due to the nature of the species and to continuing source vectors such as frequent vehicle travel.

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3 None (0) - Undesirable plants, including noxious weed species not located within or immediately adjacent to the analysis area. Project activity is not likely to result in the establishment of undesirable weed species on the analysis area; Low (1) - Undesirable plant species present in areas adjacent to but not within the analysis area. Project activities can be implemented and prevent the spread of undesirable plants into the analysis area; Moderate (5) - Undesirable plant species located immediately adjacent to or within the analysis area. Project activities are likely to result in some areas becoming infested with undesirable plant species even when preventative management actions are followed. Control measures are essential to prevent the spread of undesirable plants or noxious weeds within the analysis area; High (10) - Heavy infestations of undesirable plants are located within or immediately adjacent to the analysis area. Project activities, even with preventative management actions, are likely to result in the establishment and spread of undesirable plants on disturbed sites throughout much of the analysis area.
FACTOR 2 - Consequence of Undesirable Plant Establishment in Analysis Area\(^4\)- All Action Alternatives. Given the risk analysis conducted at the beginning of this section and the protocol’s risk rating criteria, the protocol’s risk criteria rating is between low and moderate. The project area is largely devoid of noxious weeds, where ecosystem processes prevail unhindered by expansive weed threats. The proposed activities, without mitigation, could increase the risk of noxious weed spread not only within the analysis area, but potentially within the local area (i.e. potential weed seed spread into adjacent uninfested areas; potential weed seed transport from traffic to and from haul locations) and on up to regional scales (i.e. potential weed seed transport from traffic and equipment servicing operations from many locales in a regional scale). A rating of 5 to 10 in the moderate to high category would be too high since the infestation densities are low and the infested areas are low. A rating of low would be too low given that the species invasiveness and threat in disturbed settings are present and that there would be increased exposure from the frequency of project related trips along spread vectors into and out of the analysis area. Therefore, a rating of 3.5 was given for this factor.

Following the protocol, the level of likelihood of adverse effects rating of 3.5 multiplied by the level of consequences rating of 3.5 equals 12.25. The Risk Rating of 12.25 is in the low end of the low to moderate category for the applicable project action for all action alternatives and depicted in red in the following Protocol Table.

<table>
<thead>
<tr>
<th>Value</th>
<th>Risk Rating</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>NONE</td>
<td>Proceed as planned.</td>
</tr>
<tr>
<td>1-10</td>
<td>LOW</td>
<td>Proceed as planned. Initiate control treatments on undesirable plant populations that get established in the area.</td>
</tr>
<tr>
<td>25</td>
<td>MODERATE</td>
<td>Develop and Implement preventative management measures for the proposed project to reduce the risk of introduction or spread of undesirable plants into the area. Monitor the area for at least three consecutive years and provide for control of new infestations.</td>
</tr>
<tr>
<td>50-100</td>
<td>HIGH</td>
<td>Modify project design and implement preventative management measures for the proposed project to reduce the risk of introduction or spread of undesirable plants into the area. Monitor the area for at least five consecutive years and provide for control of new infestations.</td>
</tr>
</tbody>
</table>

These findings, along with required mitigation found in FSM 2080, requires that mitigation measures outlined in Chapter 2 be implemented to reduce the risk of introduction or spread of invasive weeds into the area. Since the risk assessment is on the low end of the low to moderate category, it is recommended that the analysis area be monitored for at least one year after final activity and control of new infestations on NFS lands be provided.

Effectiveness of Mitigation Measures

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\(^4\) **Low (1)** - None. No cumulative effects expected; **Moderate (5)** - Possible adverse effects on site and possible expansion of infestation within analysis area. Cumulative effects on native plant community are likely, but limited; **High (10)** - Obvious adverse effects within the analysis area and probable expansion of undesirable plants, including noxious weed infestations to areas outside the analysis area. Adverse cumulative effects on native plant community are probable.
Forest Service policy (FSM 2080) and 2006 Custer Weed EIS mitigation measures, as outlined in Chapter 2, are required to be followed. The effectiveness depends on the thoroughness of adhering to mitigation measures. It seems reasonable to expect a moderate level of effectiveness from these prevention measures. However, the most important weed management item required by the regional risk assessment protocol is monitoring and treatment of existing noxious weeds before and after existing road use, landing construction and temporary road building.

Weed treatment should occur on all known weed infestations within, and adjacent to, proposed activity areas before implementation occurs if during the growing season. If proposed activities would occur outside of the growing season, then weed treatment should occur during the previous growing season. All activity areas must be monitored and treated for noxious weeds during construction and the life of the project. In addition, all activity areas must be monitored and treated for noxious weeds for at least one year after final activity related to the project and again in five years.

Weed treatment with herbicide is considered highly effective with continued treatment in consecutive years. The Sioux District monitors sites and right-of-ways that are routinely treated or checked for re-infestations. The program implements required mitigation measures outlined in FSM 2080 and the 2006 Custer Weed EIS. In general, monitoring has determined that integrated pest management of the area noxious weeds (primarily through herbicide and biological control) has reduced existing infestations, as well as prevented a landscape scale infestation. Repeated roadside spraying has reduced many infestations along main roads, although with frequent public traffic, these areas will continue to need treatment. Many roads and trails on the Forest that have been treated repeatedly have fewer infestations than when treatments first began.

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\[7 \text{ miles} \times 5280 \text{ ft/mile} \times 100 \text{ foot road corridor (50 foot buffer on each side of roads)} = 3168000 \text{ sq ft or 73 acres}\]