

**Forsythe II Project
Invasive Plants Specialist Report**

**Boulder Ranger District
Arapaho and Roosevelt National Forests and Pawnee National Grassland**

Prepared by:



November 14, 2016

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Date

Introduction

The purpose of this report is to evaluate the impacts of the Forsythe II project on noxious weeds within the applicable legal and regulatory framework. The regulatory framework governing management of these resources is based on the Revised Land and Resource Management Plan for the Arapaho & Roosevelt National Forests and Pawnee National Grassland as amended (USDA Forest Service 1997), Decision Notice and Finding of No Significant Impact (FONSI) for Noxious Weed Management Plan on the Arapaho and Roosevelt National Forests and Pawnee National Grassland (USDA Forest Service 2003), Noxious Weed Prevention Practices (USDA Forest Service 2001), and the Executive Order on Invasive Species, Executive Order 13112, signed on February 3, 1999.

National policy (Forest Service Manual 2900: Invasive Species Management) outlines that preventing the introduction and establishment of noxious weed infestations is a high priority for the Forest Service. It also directs the Forest Service to determine the factors that favor the establishment and spread of noxious weeds and design management practices to reduce the risk of spread. Executive Order 13112 states that "...an agency should not authorize, fund, or carry out actions that it believes are likely to cause or promote the introduction or spread of invasive species in the United States or elsewhere unless, pursuant to guidelines that it has prescribed, the agency has determined and made public its determination that the benefits of such actions clearly outweigh the potential harm cause by the invasive species; and that all feasible and prudent measures to minimize risk of harm will be taken in conjunction with the actions."

The following analysis describes the relative risks of introduction and spread of invasive plants for No Action and the action alternatives: Alternative 1: Proposed Action, and Alternatives 2, 3, and 4. Design criteria included with all four action alternatives are expected to reduce the risk if introduction and spread of invasive plants from project activities.

Purpose and Need and Alternatives Description

Refer to the Environmental Assessment (EA) for Purpose and Need, Objectives, and description of No Action and Alternatives 1, 2, 3, and 4, including Design Criteria that apply to Alternatives 1, 2, 3, and 4.

Affected Environment

Vegetation across the project area includes meadows, shrublands, riparian vegetation, aspen stands, open ponderosa pine woodlands, and forested areas dominated by conifers. Mixed conifer stands include ponderosa pine, Douglas-fir, limber pine, and lodgepole pine, and usually interspersed quaking aspen. Some lodgepole pine stands are nearly pure lodgepole, established following large wildfires decades or

centuries ago. Depending on elevation and aspect, others are mixtures of lodgepole pine associated with ponderosa pine, Douglas-fir, limber pine, Engelmann spruce, subalpine fir, and aspen. Proposed treatments are based on the dominant overstory species. Topography is variable, with drainages leading into Gross Reservoir and into the larger and more developed drainages of South Boulder Creek and Middle Boulder Creek. Elevation ranges from about 6,082 feet to 8,945 feet.

Most noxious weeds invading the United States originated in Europe and Asia and were introduced beginning in the 1800s. These plants entered the U.S. by a variety of means, including ship ballast soil, contaminated animal feed and crop seed, and intentional introductions as ornamental or medicinal plants (Sheley and Petroff 1999). Some nonnative ornamental plants introduced for gardening and landscaping escape and become invasive (Colorado Weed Management Association 2009).

Systematic noxious weed inventories were conducted from 1998 through 2001 for the Winiger Ridge Ecosystem Management Pilot Project (Winiger project), which encompasses most of the Forsythe II Project Area. Vegetation treatments have occurred in Winiger project units, including some that overlap proposed Forsythe II treatment units. Noxious weed inventories included National Forest System (NFS) lands and lands managed by Boulder County, the City of Boulder, and Denver Water. Additional inventories specific to noxious weeds were not conducted for the Forsythe II Project; however noxious weed occurrences were noted during botany surveys in 2010 and 2011 for the Forsythe Fuel Reduction Project. Treatment of priority noxious weed infestations in the project area has been ongoing since 1999 on NFS lands and Denver Water lands, including infestations around Gross Reservoir being treated in cooperation with Denver Water.

Because the last systematic noxious weed inventory occurred over ten years ago, an accurate assessment of acres in the project area covered by noxious weeds is not currently available. In general, except for densely forested areas, weeds are abundant throughout much of the project area due to relatively high road and trail density; past disturbance including mining, timber harvest, and construction of residences, roads, utility corridors, etc; and high levels of human use, both recreational and residential. Weeds are most abundant along roads and in previously disturbed areas. Some high priority weed infestations have been reduced or eliminated with years of treatment.

Areas most likely to facilitate introduction of weeds through disturbance and the presence of vectors are roads, trails, stream corridors, dispersed recreation areas, individual residences, horse feeding or riding areas, areas with previous fire or timber cutting activity, wildfires, and heavily grazed areas (currently or in the past). All of these conditions occur in the Forsythe II Project area. Once established, weeds may spread to adjacent, less disturbed or even undisturbed areas. Weeds are most likely to establish and spread in open areas that receive plenty of sunlight and less likely to establish and spread in densely forested, more shaded areas. Riparian and open meadow habitats, including grass, forb and shrub cover types, are particularly susceptible to noxious weed invasion, due to the availability of sunlight, and in riparian areas, the presence of water as a vector. Higher elevations tend to have fewer occurrences of noxious weeds, due to a combination of harsh growing conditions that deter some species and generally fewer human disturbances providing sources of introduction.

Noxious weeds known to occur in the project area include diffuse knapweed, spotted knapweed, dalmatian toadflax, yellow toadflax, Canada thistle, musk thistle, houndstongue, scentless chamomile, and oxeye daisy. Other invasive plant species may occur and be undocumented or have the potential to be introduced and establish in the area. Orange hawkweed, a Colorado A list species (designated for eradication) and a high priority species for the ARP and the BRD, occurs within the project area boundary but is not known to occur within any treatment units.

Canada thistle is by far the most widespread noxious weed in the project area. Musk thistle also occurs in a number of proposed treatment units, but is more sparsely distributed. The highest priority species in the project area are orange hawkweed, diffuse knapweed, spotted knapweed, dalmatian toadflax, yellow toadflax, houndstongue, scentless chamomile, and oxeye daisy. These species are located in relatively few

areas, and weed treatments in the project area have focused on them, both because of their potential for spread and because of the feasibility of treating the relatively few and smaller infestations. Canada and musk thistle have been treated in some areas, where they are near higher priority species and in some locations where they have densely infested landings from past fuels treatments.

Other documented invasive plant species include cheatgrass, common mullein, and smooth brome. These species are not a priority for treatment, either because they are a ubiquitous Colorado List C species as with cheatgrass and common mullein – species where the goal is not to stop the spread of these weeds, but rather to provide additional educational, research and biological control resources to jurisdictions that choose to require management; or because they are not a Colorado designated noxious weed species, such as smooth brome.

Treatment of noxious weeds on the ARP is based on the concept of integrated weed management (IWM) and is consistent with the ARP Noxious Weed Management Plan included in the Decision Notice and Finding of No Significant Impact for Noxious Weed Management Plan on the ARP (2003). The goal of IWM is not total eradication of noxious weeds, but successful long-term management through a combination of biological, chemical, cultural, and physical methods. In general, noxious weeds are prioritized for treatment based on aggressiveness, current extent of infestation, and priority of species by state and county weed programs.

No Action

Noxious weeds and other nonnative invasive plants threaten biodiversity and ecosystem stability. They are aggressive and capable of out-competing native plants for moisture, nutrients and sunlight often leading to the establishment of undesirable vegetation monotypes. One reason for this is that nonnative plants seldom have natural controls, including predators such as insects, viruses or bacteria, etc, that feed upon them and help control their spread. Nonnative, invasive plants can alter soil properties and plant community composition, which can negatively affect native plant species diversity and forage for wildlife species, resulting in changes in animal communities that depend on the affected ecosystems. In extreme situations, negative effects on water quality can occur due to increased erosion and runoff (Sheley and Petroff 1999).

Weeds become established in areas disturbed by motorized and non-motorized recreation, road construction and maintenance, timber harvest, and other activities and by natural disturbances such as fire, and are spread by people, vehicles, wind, water, and wild and domestic animals (Sheley and Petroff 1999). Roads are frequently sources of noxious weed introduction, increasing both the potential for new infestations and the spread of weeds and weed seeds to new, uninfested areas. Weed seeds can be picked up, transported, and deposited by vehicles, in mud sticking to the vehicle, in wheels, and in other parts of the undercarriage of the vehicle. Road building, off-road vehicles, logging, and construction also damage native vegetation and disturb the soil surface, making it easier for noxious weeds to invade.

Over time, without vegetation management or wildfire, surface and canopy fuel loads will continue to increase and the potential for extreme wildfires will likely continue to rise. As discussed above, in general weeds are abundant throughout much of the project area, particularly along roads and in previously disturbed areas. Without treatment, existing noxious weed occurrences can be expected to continue to spread into disturbed areas and possibly into native ecosystems. The rate of weed spread without further disturbance from project activities would most likely be less than the rate of spread after project implementation. The exception would be if no fuel reduction occurs, and the forests experience extreme wildfire; in that case openings for weed establishment would be created, soil nutrients would be released, and weed spread may be more rapid than spread resulting from proposed fuel reduction activities.

Given the projected continuation and increase of many of the past and ongoing activities that cause soil disturbance, discussed below under Action Alternatives: Cumulative Effects, it is expected that the potential for introduction and spread of noxious weed infestations would continue to rise in the future under No Action.

Action Alternatives – Direct/Indirect Effects

As discussed above, in general weeds are abundant in much of the project area, including occurrences in most proposed treatment units. In fuels reduction project areas, the risk of establishment and spread of noxious weeds is highest in more heavily disturbed areas such as landing and staging areas, burned pile areas, areas with temporary road construction or road reconstruction, other areas of heavy activity, and any other areas where mineral soil is exposed.

Project activities are expected to increase risk of introduction and spread of noxious weeds. This risk is greater where: 1) weeds already occur in or near potential treatment units; 2) project activities involve use of mechanical equipment versus hand crews; 3) project activities involve prescribed fire, including broadcast burning and slash pile burning; 4) project activities involve creation of temporary or permanent skid roads, fire lines, landings, and other areas of soil disturbance; and 5) treatments will open up the forest canopy the most, as most weed species grow well in open areas.

Some treatment units are specified for manual vegetation treatment under Alternatives 1, 2, 3, and 4 (Refer to EA Appendix A), and remaining units could be treated manually or mechanically or a combination of the two. No new permanent roads are proposed for this project for vegetation treatments. Two possible ingress/egress routes are proposed adjacent to the Big Springs neighborhood, which would include widening of the currently existing single-track trails, installing gates, and cutting trees in a 30-foot corridor. Temporary road construction is proposed on approximately seven miles under Alternatives 1 and 2 and five miles under Alternatives 3 and 4; however, specific locations of temporary roads are not determined. Reconstruction of existing roadways may occur on National Forest System Roads throughout the project area, as needed for project activities. Skid trails will be created as needed, may occur in any unit, and will be obliterated once work is completed.

Any ground disturbance increases the possibility of invasion and establishment of nonnative plant species. Use of large mechanical equipment and creation of roads is likely to create greater disturbance than thinning by hand, and weeds can be introduced by equipment. Heavy equipment operation increases soil compaction and ground disturbance, particularly within skid-trail, landing, and temporary road areas, which can increase the risk of noxious weed invasion. Road reconstruction with equipment also increases weed invasion risk due to both the additional ground disturbance and the potential of introducing weeds with equipment. Fuels treatments that leave some overstory canopy, minimize exposure of bare ground, and occur on sites that already host species capable of resprouting may be less likely to promote invasives, suggesting that patch cuts and clearcuts are more likely to promote weed establishment than thinning treatments (Erickson and White 2007). Gibson and colleagues (Erickson and White 2007) also found that plant communities that retain greater levels of overstory shading and litter or surface cover mitigate the risk of increasing exotic plant cover.

Overall ground disturbance is generally less in manually treated areas than in mechanically treated areas. Ground disturbance in manually treated areas is primarily related to burn pile effects. On average, in manually treated fuels reduction project areas on the Boulder Ranger District (BRD), there are about 17 slash piles, covering approximately 100 square feet of ground each, created and burned per acre. In other areas with similar fuels treatments, Canada thistle is especially aggressive to invading burned pile areas, depending on the seed source, availability of light, and other conditions. These infestations usually occur within one to two years subsequent to pile burning.

Monitoring of burned slash piles in 2009 in a Canyon Lakes Ranger District fuels treatment project area showed much variation in percentages of observed slash piles invaded by noxious weeds. Weed invasion in burned piles in four units monitored ranged from 2 to 41 percent. In the two units receiving primarily thinning treatments, weed invasion occurred in about two and four percent of burned piles monitored. In the two units receiving clearcuts, weed invasion occurred in about 14 and 41 percent of burned piles monitored. These results are consistent with the increased risk of weed invasion in treatment areas that open up the canopy the most, since clearcuts open up the canopy more than thinning. Other factors that

likely influenced weed invasion in burned piles monitored include weeds present before fuels treatment and methods of fuels and slash treatment, for example hand vs. mechanical.

Approximately 968 acres are proposed for prescribed broadcast burning. These areas are west of Gross Reservoir and include units south of Winiger Ridge and units south of Winiger Gulch. Overstory vegetation in the proposed broadcast burn areas is dominated by ponderosa pine, with tree cover percent ranging from about 10 to 40 percent. Understory vegetation is a mix of grasses, forbs, and shrubs. Canada thistle is widespread throughout this area, and cheatgrass is widespread especially in the eastern and southern portions of the proposed prescribed broadcast burn area. Musk thistle occurs in a few locations in small patches. In Winiger Gulch, yellow toadflax and houndstongue occur along with abundant Canada thistle. All of these weed species have the potential to be spread by prescribed broadcast burning activities, including vehicles, people, and hand line. Opening up the canopy generally favors weed species, and prescribed broadcast burning would be expected to create areas of soil disturbance favorable to weed invasion and spread. Based on known weed infestations in the area and potential for spread from prescribed burning, weeds, particularly Canada thistle and cheatgrass, would be expected to increase after prescribed broadcast burning.

Seed and straw for rehabilitation of disturbed areas such as landings can have weed seeds transported in it. Design Criteria provide for use of non-agricultural materials such as wood straw or shred, or certified weed-free agricultural materials. Wood straw or other non-agricultural products are naturally weed-free and pose little to no risk of weed introduction. Agricultural products, even certified, can contain weed seeds and pose some risk of introduction. Source sites of crushed rock or gravel can become infested with noxious weeds, and seeds produced by infestations on the stockpile can be transported with the aggregate when it is hauled and placed on roads.

Studies have found that mitigation strategies may be effective. On sites that exhibit species invasions following wildfire, active intervention with herbicides or other treatments designed to control or eliminate the invasive can be highly effective (Erickson and White 2007). Seeding treatments can increase invasives, especially when not carefully screened for purity (Erickson and White 2007).

Project design criteria are expected to reduce the risk of weed invasion and spread under Alternatives 1, 2, 3, and 4, using feasible and prudent prevention measures including equipment inspection, avoidance and/or treatment of high priority weed infestations, use of government-furnished seed if available, and use of certified weed-free hay, straw, and mulch. Previous inventory and treatment within Winiger project units have helped to reduce or eliminate some of the highest priority noxious weed infestations in those areas, which include many of the Forsythe II project proposed treatment units. Monitoring measures provide for post-implementation monitoring of areas with the highest risk of noxious weed introduction or spread.

Action Alternatives - Cumulative Effects

Past, present, and reasonably foreseeable future activities with potential to increase introduction and/or spread of invasive plants and lead to cumulative effects are listed below.

Past Projects/Activities

- Forsythe Fuels Reduction Project (thinning, patchcutting, clearcutting, pile burning) – 2012
- Lump Gulch Fuel Treatment Project (thinning, patchcutting, clearcutting, pile burning) – 2009
- Residential Development
- Mining
- Four Mile Canyon fire (6,181 acres) – 2011
- Black Tiger fire (1,804.6 acres) – 1989
- Winiger Ridge Ecosystem Mgmt. Project (thinning, patchcuts, pile and broadcast burning) – 2001
- Fuels treatments on private property and Boulder County lands

- Timber stand improvement (lodgepole regeneration thinning)
- Campsite and parking area construction in Winiger Ridge area – 2010
- Jenny Creek Restoration and Motorized Trail Reroute Project – 2013
- Caribou and West Magnolia Travel Management – 2003
- Nederland Water Treatment Plant Hazardous Fuels Reduction – 2012
- Forest-wide Hazard Tree Removal – 2010
- Emergency Power Line Clearing Project – 2010
- Toll Property Conservation Easement – 2015
- Existing Public and Private Road and Trail Systems
- Recreational use on National Forest System lands

Present and Reasonably Foreseeable Projects/Activities

- Eldora Ski Area Operations and Proposed Expansion – 2015
- Magnolia Trails Project – 2016
- Denver Water/FERC – Gross Reservoir Expansion
- Boulder County Reynold’s Ranch Fuels Project
- Boulder County Reynold’s Ranch Trails System Project
- Residential and other development on private land
- Outfitter and guides in West Magnolia area
- Annexation of property in Town of Nederland near high school
- Timber stand improvement (lodgepole regeneration thinning) of clearcut/patchcut lodgepole pine stands
- Fuels treatments on private property and Boulder County lands
- Recreational use on National Forest System lands

Fuels treatments on NFS and County lands have created relatively large forest openings in the West Magnolia area, north and south of Magnolia Drive east of Highway 119, and around Kelly Dahl campground. Other areas, primarily east of Highway 119, have been thinned. Clearcuts on NFS lands have become infested with noxious weeds, in many areas heavily.

All of the above-described activities have facilitated introduction and spread of invasive plants, to varying degrees, depending on disturbance size and severity and weeds already present. Cumulatively, past and ongoing activities have resulted in soil disturbance, native vegetation removal, modification of hydrology, establishment of many noxious weed infestations throughout the project area, and high risk for invasion in areas not currently occupied. Given the projected continuation and increase of many of these land uses, it is also reasonably foreseeable that the potential for introduction and spread of noxious weed infestations will continue to rise in the future.

According to the Final Environmental Impact Statement for the ARP Forest Plan (USDA Forest Service 1997), it is reasonable to expect that, left unchecked, noxious weeds will increase at an annual rate of 10 to 15 percent. Weed management programs have been initiated or improved in recent years on the ARP, including the Boulder Ranger District, and on adjacent lands. In general, invasive plant infestations can be expected to increase over time, unless all landowners and managers dedicate sufficient resources to implement and maintain proactive, integrated weed management programs.

Under Alternatives 1, 2, 3, and 4, both direct and indirect effects would be expected to result in an increase in noxious weed infestations over time, contributing to the long term cumulative impacts of increased infestations from other past, present, and future activities. Project design criteria and a proactive weed management program will help to reduce these risks.

Forest Plan Consistency

All alternatives are consistent with Forest Plan direction for undesirable species. Direction is listed in the following section.

Forest Plan Direction for Undesirable Species

128. **(GO)** Manage undesirable vegetation, including noxious weeds, using an integrated pest management approach.

129. **(ST)** Control undesirable nonnative and noxious plants throughout the Forests, with priority given to new species (new to Colorado or the ARNF-PNG), and to wilderness areas.

130. **(ST)** Use only certified "noxious weed-free" hay or straw for feed or revegetation projects anywhere on the ARNF-PNG.

131. **(ST)** For all proposed projects or activities, determine the risk of noxious weed introduction or spread, and implement appropriate mitigation measures.

132. **(GL)** Develop a noxious-weed and pest-management program that addresses awareness, prevention, inventory, planning, treatment, monitoring, reporting and management objectives.

Priorities for controlling noxious weeds are:

- a. new invaders
- b. new areas
- c. spreading or expanding infestations
- d. existing infestations

References

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