CHAPTER 1
PURPOSE AND NEED

INTRODUCTION

This Environmental Impact Statement (EIS) discloses potential effects of implementing a noxious weed treatment project and alternative on the Helena National Forest (Helena NF). Currently, about 22,668 acres of the Helena NF and 198 miles of roads are infested with noxious weeds (Project File [PF] – Weed Database).

DOCUMENT ORGANIZATION

This document is organized into Chapters that follow direction in the Forest Service National Environmental Policy Act (NEPA) handbook (FSH 1909.15), which includes:

Chapter 1 - Purpose and Need: This chapter discusses the regulatory direction, federal and state regulations, purpose of and need for the Project, and scope of the analysis. A location map and maps of the Landscape Analysis Areas can be found at the end of the chapter.

Chapter 2 - Alternatives: This chapter provides a detailed discussion of issues identified from scoping comments received. It describes the issues that were used to develop alternatives. The alternatives are described in detail along with mitigation and design criteria. A comparison of alternatives and their potential effects on the environment as well as how they meet the purpose and need is presented. The agency preferred alternative is identified.

Alternative maps are located at the end of the chapter.

Chapter 3 - Affected Environment: This chapter explains the current condition of resources and issues that may be affected by the Proposed Action and alternatives. Regulations that apply to each resource are also explained. Maps displaying the existing condition of various resources can be found at the end of the chapter.

Chapter 4 - Environmental Consequences: This chapter summarizes the analysis conducted for each resource, describes potential effects that could result from implementation of the alternatives, and indicates whether the potential effects are consistent with regulatory direction.

Chapter 5 - Consultation, Coordination and Preparation: Agencies, groups, and individuals involved or contacted during EIS preparation are described.

Chapter 6 - References: This chapter contains the bibliographical information on the citations used throughout the EIS.

Appendix A - Proposed Treatment Acreage by Watershed.

Appendix B - Scientific Names of Plant, Fish, and Wildlife Species used in the document.

Appendix C - Spill Plan and Procedures.

Appendix D - FSM 2080 R1 Supplement – Noxious Weed Management.

Appendix E - RAVE/Site Evaluation Form.

Appendix F - Procedures For Mixing, Loading, and Disposal of Pesticides.

BACKGROUND INFORMATION

Since the late 1800s, exotic plant species have been spreading across the Pacific Northwest. From these historic trends, this pattern of expansion is expected to continue due to transport of seeds from increasing travel and trade, and through continued disturbance of land (agricultural, residential, recreational, and commercial developments).

The main weed species of concern are spotted and diffuse knapweed, leafy spurge, Dalmatian and common (or yellow) toadflax, ox-eye daisy, and sulfur cinquefoil. Other weed species of concern include Russian knapweed, Canada and musk thistles, St. Johnswort, and houndstongue. The rate of spread of these weeds is expected to expand 14 percent per year (Asher 1998) and may increase due to large wildfires (recent and future). A shift from trees, shrubs, and bunchgrass vegetation to noxious weeds will cause a decrease in wildlife forage, a reduction in species diversity, and an increase in soil erosion and overland flow due to a decrease in surface cover.

NOXIOUS WEEDS ON THE HELENA NF

An estimated 319,700 acres of the Helena NF are currently susceptible to weed invasion based on acres of rangeland and forested areas with less than 35 percent tree canopy coverage, including 43,000 acres burned in 2000. Future activities or events that reduce canopy cover could increase the acres susceptible to weed invasion.

Field inventories for noxious weeds have been conducted. These surveys indicate that at least eight noxious weeds species are currently present on the Helena NF (spotted and diffuse knapweed, ox-eye daisy, Canada thistle, houndstongue, leafy spurge, St. Johnswort, Dalmatian toadflax, and sulfur cinquefoil). In addition, one species (musk thistle) has been found, which is currently listed as "noxious" by several counties in the state. This species is also proposed for listing by the State of Montana. The most prevalent of existing weed species is spotted knapweed, which infests over 10,000 acres of the Helena NF (PF-Weed Database). Another species of particular concern, cheatgrass, exists in isolated patches throughout the forest. Weed infestations range from light (less than 10 percent cover) to dense (more than 70 percent cover).

Adjacent states and other areas in Montana have infestations of weeds that have not yet been found on the Helena NF. Weeds on the Montana State or county noxious weed lists known to occur in surrounding counties, but not yet found on the Helena NF, include absinth wormwood, field bindweed, purple loosestrife, common tansy, hoary cress, perennial pepperweed, orange hawkweed, tall buttercup, and tamarix (Rice 2003).

ECOLOGICAL IMPACTS OF NOXIOUS WEEDS

Noxious weeds alter the structure, organization, and function of ecological systems (Olson 1999), including soil, plant, and animal relationships (Kurz 1995; Randall 1996). Spotted knapweed dominance on many open timber and grassland communities on the Bitterroot may be affecting soil properties such as microbial activity, nutrients and moisture, as well as increasing soil erosion. Native plant composition, diversity, species richness, and litter production are also affected. Changes in plant communities from native to non-native species affect wildlife species that depend on open timber and grassland for forage, breeding, and nesting habitat. Other noxious weed species are expected to result in similar impacts to ecosystem processes. Examples of ecological impacts from spotted knapweed will dominate the following discussion, but this does not preclude the impacts caused by the presence of other species.

SOILS

Noxious weeds affect the structure of ecosystems by altering soil properties. Soil in areas dominated by noxious weeds may have lower amounts of organic matter and available nitrogen than areas supporting native grasslands (Olson 1999). Organic matter can be affected in various ways. For example spotted knapweed has a deep taproot, which tends to decompose more slowly than the fine roots of native grasses, reducing the annual input of organic matter into the soil (Olson 1999). Biologically active organic matter occurs within the top 1 to 4 inches of soil and may be more prone to loss even during minor run-off events. A study conducted by Montana State University (Lacey *et al.* 1989) found runoff was 56 percent

higher and sediment yield was 192 percent higher on spotted knapweed plots compared to sites dominated by native bunchgrass.

Soil nutrient levels may be affected by the presence of noxious weeds. For example, potassium, nitrogen, and phosphorous levels were 44 percent, 62 percent, and 88 percent lower on soils from a spotted knapweed-infested site than from adjacent soils with a grass overstory in a study conducted by Harvey and Nowierski (Olson 1999). Plants that reduce soil nutrient availability to very low levels have a competitive advantage over neighboring plants (Olson 1999).

Soil micro-organisms can either benefit or be adversely affected by the presence of secondary compounds produced by some weedy species. Most microbial populations adapt to secondary compounds by increasing their populations, thereby increasing the rate of breakdown of secondary compounds (Olsen 1999). Conversely, these secondary compounds may limit activity and growth of aerobic soil microbial populations, resulting in thick litter layers and slowed nutrient cycling (Olson 1999).

Soil moisture can also be altered by the presence of taprooted weedy species. Taprooted forbs may reduce infiltration because they do not have the dense, fine root systems of grasses, which contribute organic matter and enhance soil structure (Olson 1999). Infested sites may also have more extreme temperature changes because of lower soil water content, poorer soil aggregation, and greater exposure of soil to direct sunlight (Olson 1999). Water has a very high capacity to store heat. By reducing soil water content in surface soils, greater evaporation enhances rapid heating and cooling of near-surface layers. This will increase runoff but lower infiltration, again reducing thermal conductivity and capacity of the soil, causing greater temperature extremes at the soil surface (Olson 1999).

NATIVE PLANT COMMUNITIES

Noxious weeds have a variety of mechanisms giving them a competitive advantage over native species. Noxious weeds can contain compounds that suppress other plants, produce abundant seed, establish and spread in a wide range of habitats, have fast growth rates, grow before native species initiate growth, exploit water and nutrients, have no natural enemies, and are often avoided by large herbivores. Once established, non-native plants threaten biological diversity of native plant communities and can alter ecosystem processes.

As mentioned above spotted knapweed is the most widespread weed species on the Helena NF. Invasion of knapweed into disturbed and undisturbed native bunchgrass communities is well documented (Myers and Berube 1983; Tyser and Key 1988; Bedunah and Carpenter 1989; Lacey *et al.* 1990). As spotted knapweed and other weedy species increase, cover of more desirable but less competitive grasses and forbs is significantly reduced, sometimes as much as 60 to 90 percent (Harris and Cranston 1979; Bucher 1984). A study conducted in Glacier National Park reported that spotted knapweed reduced the number and frequency of native species. In addition, seven species classified as "rare" and "uncommon" at the beginning of the study were not present three years later. These results suggested that spotted knapweed alters plant community composition (Tyser and Key 1988).

Cryptogamic ground crust may also be impacted by spotted knapweed. This crust, which is composed of small lichens and mosses and commonly covers undisturbed soil surfaces, is important for soil stabilization, moisture retention, and nitrogen fixation (Rychert and Skujins 1974, Anderson *et al.* 1982). Tyser (1992) compared a native fescue grassland site to one invaded by spotted knapweed in Glacier National Park. Results of the study indicated that the cryptogam ground cover within spotted knapweed infested sites was 96 percent less than the native fescue grassland site.

Cheatgrass is fast becoming a concern because of its reputation for altering fire regimes. Cheatgrass is commonly associated with disturbed areas, such as recently burned rangeland and wildlands, roadsides, and eroded

areas. However, cheatgrass also invades communities in the absence of any type of disturbance. Cheatgrass seedlings usually germinate with fall moisture, and the root system continues to develop throughout the winter, producing an extensive root system by springtime. This well-developed root system is ready to exploit available spring moisture and nutrients before native species are able to germinate. Cheatgrass typically dries out and disperses seed by mid-June. The fine structure of the plant and its ability to dry completely, and accumulate litter, make it extremely flammable. Cheatgrass invasion has increased the frequency of fires from once every 60 to 110 years to once every 3 to 5 years on millions of acres of rangeland in the Great Basin (Whisenant 1990). The high frequency of fire has eliminated native shrub communities (Randall 1996). Rapid growth and vigorous reproduction assure cheatgrass dominance.

WILDLIFE HABITAT

The introduction of exotic plants influences wildlife by displacing forage species, modifying habitat structure (such as changing grassland to a forb-dominated community), or changing species interactions within the ecosystem (Belcher and Wilson 1989; Bedunah 1992; Trammell and Butler 1995).

A study conducted by Thompson (1996) on the Three-Mile Wildlife Management Area suggested that elk are not obligate grazers and may lose foraging efficiency where knapweed dominates native ranges. Although elk can incorporate spotted knapweed into their diets, they have been observed using areas with a low relative abundance of knapweed more frequently than infested areas. Thompson (1996) concluded that management practices affecting vegetation on winter ranges are likely to have profound impacts on ungulate foraging efficiency during the season when energy balance is especially critical.

Elk migration patterns may be altered due to the presence and dominance of spotted knapweed (Thompson 1996). In general, use of spotted knapweed by wildlife and livestock is highest during the spring and early summer when plants are green and actively growing in the rosette and bolt stages (USFS 2002a). Spotted knapweed can have about 18 percent crude protein early in the season, but nutritional value decreases and fiber content increases later in the season (Kelsey 2002, Fletcher and Renney 1963). Although spotted knapweed infestations are considered more detrimental to elk than deer, Guenther (1989) found that the plant was not detected in mule deer diet even if it was common on winter ranges.

Spotted knapweed is not considered good forage, even though the plants can contain high amounts of crude protein. The bitter-tasting sesquiterpene lactone, cnicin, found primarily in the leaves reduces palatability (USFS 2002a). Even though animals may ingest spotted knapweed, the secondary compounds in the forage may affect rumen microbial activity (Olson 1999), thereby reducing forage intake, or may cause general malaise resulting in aversive post-ingestive feedback (Olson 1999).

HUMANS

Spotted knapweed has direct and indirect effects on humans. Beekeepers value spotted knapweed because of the quality of honey produced from its flowers. However, the flowers are also pollen sources, which produce positive allergic skin tests and are a significant allergen causing allergic rhinitis (Olson 1999). People residing in knapweed-infested areas are treated for a variety of knapweed allergies ranging from skin hives to knapweed-induced asthma attacks. Some individuals are required to carry artificial adrenaline kits and take weekly allergy shots (Olson 1999).

CHOOSING MANAGEMENT TECHNIQUES

Table 1-1 compares the limitations and effectiveness of weed management methods. Selecting weed management tools is not a choice of one tool over another, but rather selection of a combination of tools that would be most effective on the target species for a

particular location. Effectiveness and applicability of each tool depends on weed biology and ecology, location, and size of the infestation, environmental factors, management objectives, and costs.

PROJECT AREA

The Helena NF encompasses approximately 975,000 acres in central Montana within Lewis and Clark, Powell, Jefferson, Broadwater, and Meagher Counties. The project area consists of National Forest System (NFS) land within the boundaries of the Helena NF (**Figure 1-1**). Proposed treatments would occur throughout the Forest, on NFS land.

The Project Area has been divided into four "Landscape Areas" (LA) for display and discussion purposes. These include Belts/Dry Range, Elkhorns, Blackfoot, and Continental Divide. See **Figures 1-2** through **1-5**.

REGULATORY DIRECTION

Activities on the Helena NF are governed by the Helena NF Forest Plan (Forest Plan)(USFS 1986). To implement the Forest Plan and meet more recent direction, the Helena NF must develop a weed treatment program that incorporates federal, state, and county direction and regulations. An aggressive and effective weed treatment program is dictated by the Forest Plan and agency objectives for biodiversity, health and human safety, responsibility to neighboring land, and consistency with Federal and state laws.

FOREST PLAN

The Forest Plan (FP) sets forest-wide standards for resource management. The following standards apply to weed and vegetation management:

NOXIOUS WEED CONTROL

- Implement an integrated weed control program in cooperation with the state of Montana and County Weed Boards to confine present infestations and prevent establishment of new areas of noxious

TABLE 1-1
Comparison of Weed Management Methods

Methods	Limitations	General Effectiveness[1]
Grazing animals	Treatment must occur during proper phonological stage; herding required; non-selective; can reduce forage available for big game; ground disturbance; may increase spread.	Low
Mowing	Limited to level and gently sloping smooth-surfaced terrain; must be conducted for several consecutive years; treatment timing critical; impact on non-target vegetation	Very low
Hand-pulling/ grubbing	Labor intensive; not effective on deep-rooted or rhizomatous perennials; causes ground disturbance which may increase susceptibility of site to reinvasion by weeds; effective on single plants or small, low-density infestation	High for small infestations of tap-rooted weeds; low for high-density infestation >1 acres or rhizomatous perennials
Parasites, predators and pathogens	Often too selective; does not achieve eradication; cannot be used on weeds closely related to beneficial plants; long-term results only; may be ineffective without being integrated with other strategies.	High to very low depending on management agent and weed species
Ground application of herbicide	Not cost effective on slopes greater than 40%; must have accessible sites; potential impacts to non-target vegetation; application timing limited based on plant phenology and weather conditions	High
Aerial application of herbicide	Potential impacts to non-target resources; application timing limited based on plant phenology and weather condition	High

Note:

[1] Percent of target species killed in a treatment area: High = 75-100%, Moderate = 46-75%, Low = 24-46%, Very Low = 0-24%

weeds. Noxious weeds are listed in the Montana Weed Law and designated by County Weed Boards (FP page II/22);

- Integrated Pest Management, which uses chemical, biological, and mechanical methods, will be the principal control method. Spot herbicide treatment will be emphasized. Biological control methods will be considered as they become available (FP page II/22).

- Management Areas are included in the Forest Plan and contain specific management direction to achieve Forest-wide goals, objectives, and standards. The Proposed Action and alternatives would occur on all management area allocations identified in the Forest Plan. Some Management Areas limit noxious weed treatment methods as proposed, particularly when chemical control can be justified (for wildlife forage improvement), where grazing is allowed (some restricted areas), and use of motorized vehicles (some restricted areas).

WILDERNESS AREAS

Wilderness area direction in the Forest Plan (FP pages III/56 and III/66) states that a management goal of wilderness is to "maintain plants and animals indigenous to the area by protecting the natural dynamic equilibrium associated with natural, complete ecosystems."

INLAND NATIVE FISH STRATEGY

One of the riparian goals stated in the strategy (USFS 1995a) is to maintain or restore:

- Diversity and productivity of native and desired non-native plant communities in riparian zones;

- Riparian vegetation to help achieve rates of surface erosion, bank erosion, and channel migration characteristics of those under which the communities developed; and

- Habitat to support populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to the viability of riparian-dependent communities.

FOREST SERVICE MANUALS

FSM 2259.03

This manual directs the Forest Service to control noxious weeds and cooperate fully with State, County, and Federal officials in implementing 36 CFR 222.8 (see below) and the Carlson-Foley Act. Noxious weed management should be directed where it will be most effective in preventing or reducing spread of noxious weeds considered to be the greatest threat to economic, environmental, social, and other values.

FSM - 2080 – NOXIOUS WEED MANAGEMENT

The Forest Service Manual states as its objective to use an integrated weed management approach to control and contain the spread of noxious weeds on NFS land and to adjacent land. It further states: where funds and other resources do not permit undertaking all desired measures, address and schedule noxious weed prevention and control:

1. First Priority: Prevent introduction of new invaders;

2. Second Priority: Conduct early treatment of new infestations; and

3. Third Priority: Contain and control established infestations.

OTHER STATE AND FEDERAL REGULATIONS

- Code of Federal Regulations - 36CFR 222.8. This regulation directs the Forest Service to cooperate with local weed control districts to analyze and develop noxious weed control programs.

- Executive Order 13112. The purpose and need is directed by Executive Order 13112 (signed in 1999) to prevent introduction of invasive species and provide for their control and minimize economic, ecological, and human health impacts that invasive species cause. Specifically, it is ordered that Federal agencies "subject to the availability of appropriations, and within Administration budgetary limits…detect and respond rapidly to and control populations of such species in a cost-effective and environmentally sound manner…"

- The Federal Noxious Weed Act of 1974 (PL 93-629) authorizes the Secretary of Agriculture to cooperate with other agencies to control and prevent noxious weeds.

- Montana Weed Management Plan. The Montana Weed Management Plan was written to strengthen, support, and coordinate private, county, State, and Federal weed management efforts, and promote implementation of ecologically based integrated weed management programs (pg 1). It establishes the same priority for treatment as FSM 2080.

- Montana County Noxious Weed Control Act of 1948, amended in 1991 (MCA 7-22-2101). This act provides for designation of noxious weeds and directs control efforts. Provisions are made for registration of pesticides, licensing of distributors and applicators, and enforcement of State statutes. An enforcement responsibility for control of noxious weeds within Montana is delegated to county commissioners through district weed management boards.

PURPOSE AND NEED FOR ACTION

Damage from noxious weeds is increasing due to their expanding populations and distribution of weeds will continue to increase if action is not taken to control their spread. Noxious weeds can crowd out native plants and diminish the productivity, bio-diversity, and appearance of land.

Although only a small portion (approximately 23,000 acres) of the Helena NF is now infested with weeds, experience shows weeds become epidemic when an aggressive weed control program is delayed (Lolo, Bitterroot, Flathead, and Idaho Panhandle National Forests). Infested acres continue to increase because all identified infestations cannot be effectively treated under the existing program. Ongoing inventory and monitoring shows that there is a need to:

- Control Noxious Weeds - New weed species are coming into the Helena area from all directions with potential for new weed species to move in and spread. Adjacent states and other areas in Montana already have infestations of weeds that have not yet arrived on the Helena NF. Some examples are weeds on the Montana State or county noxious weed lists known to occur in the Counties but not yet found on the Helena NF, such as orange hawkweed, common tansy, perennial pepperweed, and tamarix (Rice 2003). New invaders need to be treated aggressively to limit establishment of new weed populations.

- Treat Weeds on Rangeland - A healthy rangeland provides high quality forage for native herbivores and domestic livestock as well as providing cover and foraging habitat for many small animals and birds. Establishment of weeds reduces forage production, which can result in reduced wildlife numbers (Duncan 1997). Rangeland with a good cover of native vegetation holds the soil, reducing erosion from runoff. Soil erosion from a weed-dominated site may contribute sediment to waterways (Lacey et al. 1989), which can decrease productivity of a stream by reducing availability of aquatic habitats.

- Treat Weeds in Burned Areas - Two large wildfires on the Helena NF in 2000 burned about 43,000 acres including both rangeland and timber. Other previous fire areas such as the Scapegoat fire (1988), Warm Springs fire (1988), and the North Hills Fire (1984) have experienced weed spread. Susceptibility of burned areas to new weed invasion is increased due to decreased canopy cover and increased bare ground (Goodwin and Sheley 2001). Nearby weed infestations are poised to invade burned areas if management measures are not taken.

- Treat Weeds in Remote Areas - Large weed infestations continue to expand on the Helena NF because of arduous access for equipment and personnel, creating difficult and sometimes unsafe working conditions. As a result, about 6,800 acres of the total infested acres are not currently being treated. Weed infestations have doubled and in some cases tripled in inaccessible areas over the last decade; while weed populations in accessible areas, such as roads, have shown decreases due to consistent treatment measures. Cost-effective and safe methods are needed to control spread of weeds in these areas.

PROPOSED ACTION

The Helena NF proposes to implement an aggressive noxious weed control program, which includes aerial application of water-soluble herbicides, increased ground application of water-soluble herbicides, and increasing biological and mechanical control efforts through use of insects and grazing. All of these methods would become part of the Helena NF's integrated weed management program.

The project would be implemented over a 12-year period. Not all acres would be treated in the first year, but some areas would be treated repeatedly on a 2 or 3-year rotation to ensure effective control, as part of a "maintenance mode of action." Follow-up maintenance treatments are expected to require reduced amounts of herbicide from initial application. Maintenance treatments may be ground based, but in some cases, a second or third aerial treatment may be required. See description of *Alternative A* in Chapter 2 for more detail. Monitoring would identify areas that would need to be re-treated or if treatment areas can be reduced, based on effectiveness of previous treatments. **Table 1-2** shows proposed weed spray acres by Landscape Areas. Maps are at the end of Chapter 2.

This project is part of the Helena NF's effort to implement integrated weed management. The purpose of the project is to implement the Forest Plan and expand implementation of the "managing weed infestation" portion of integrated weed management. Treatments are proposed for reducing growth or reproduction of existing noxious weed plants. Prevention methods are ongoing and those currently in use on the Helena NF are described in more detail in Chapter 2.

SCOPE OF THE DECISION

Geographic Scope

Table 1-2 shows the geographic scope of the Proposed Action. Treatments would occur on NFS land within the Helena NF only, however, the number of acres treated would change with the Adaptive Management Strategy. For each resource, an analysis area was determined that could be used to adequately measure cumulative effects of the proposed alternatives. Unless otherwise stated, the cumulative effects area is the treatment area.

Temporal Scope

The timeframe for project implementation is 12 years. Direct, indirect, and cumulative effects, if any, would occur during that period. For cumulative effects analysis, an additional 10 years past the final implementation year is considered. In some cases, longer-term effects are discussed.

TABLE 1-2 Alternative A Weed Treatment by Landscape Area		
Treatment Acres	**Weeds of Concern**	**Proposed treatments**
Belts/Dry Range		
9,903 (5817 aerial) (1330 grazing*)	Spotted, diffuse and Russian knapweed, Dalmatian toadflax, leafy spurge, musk thistle and Canada thistle	Ground and aerial chemical treatment, biocontrols, grazing, mechanical
Elkhorns		
1,792 (710 aerial)	Spotted and diffuse knapweed, Dalmatian and common toadflax, leafy spurge, hounds tongue, musk thistle and Canada thistle	Ground and aerial chemical treatment, biocontrols
Blackfoot		
5,328 (2,895 aerial)	Spotted knapweed, St Johnswort, musk thistle and Canada thistle	Ground and aerial chemical treatment, biocontrols
Continental Divide		
5,645 (1664 aerial) (26 grazing*)	Spotted knapweed, musk thistle and Canada thistle, common toadflax, Dalmatian toadflax, and leafy spurge	Ground and aerial chemical treatment, biocontrols, grazing

Note:

*Grazing occurs on acres counted in "ground " application.

Decision Framework

Based on the environmental analysis and public comments, the Helena NF will decide:

- Where treatments would occur;
- Which treatment methods would be used;
- Which mitigation and monitoring measures (if any) would be required; and
- Whether to include an adaptive approach to address future spread of existing infestations.
- Whether to amend the Forest Plan.

The Proposed Action and decision are not intended as a general management plan or a Forest-wide strategy. The scope of the project is confined to issues and potential environmental consequences relevant to the decision being made. Reconsideration of other existing project level decisions is beyond the scope of this document, as are broad travel management decisions.

TABLE 1-3 Alternative A Weed Treatment by Landscape Area		
Treatment Acres	**Weeds of Concern**	**Proposed treatments**
Belts/Dry Range		
9,903 (5817 aerial) (1330 grazing*)	Spotted, diffuse and Russian knapweed, Dalmatian toadflax, leafy spurge, musk thistle and Canada thistle	Ground and aerial chemical treatment, biocontrols, grazing, mechanical
Elkhorns		
1,792 (710 aerial)	Spotted and diffuse knapweed, Dalmatian and common toadflax, leafy spurge, hounds tongue, musk thistle and Canada thistle	Ground and aerial chemical treatment, biocontrols
Blackfoot		
5,328 (2,895 aerial)	Spotted knapweed, St Johnswort, musk thistle and Canada thistle	Ground and aerial chemical treatment, biocontrols
Continental Divide		
5,645 (1664 aerial) (26 grazing*)	Spotted knapweed, musk thistle and Canada thistle, common toadflax, Dalmatian toadflax, and leafy spurge	Ground and aerial chemical treatment, biocontrols, grazing

Note:

*Grazing occurs on acres counted in “ground “ application.