CHAPTER 1

PROPOSED ACTION - PURPOSE AND NEED

INTRODUCTION

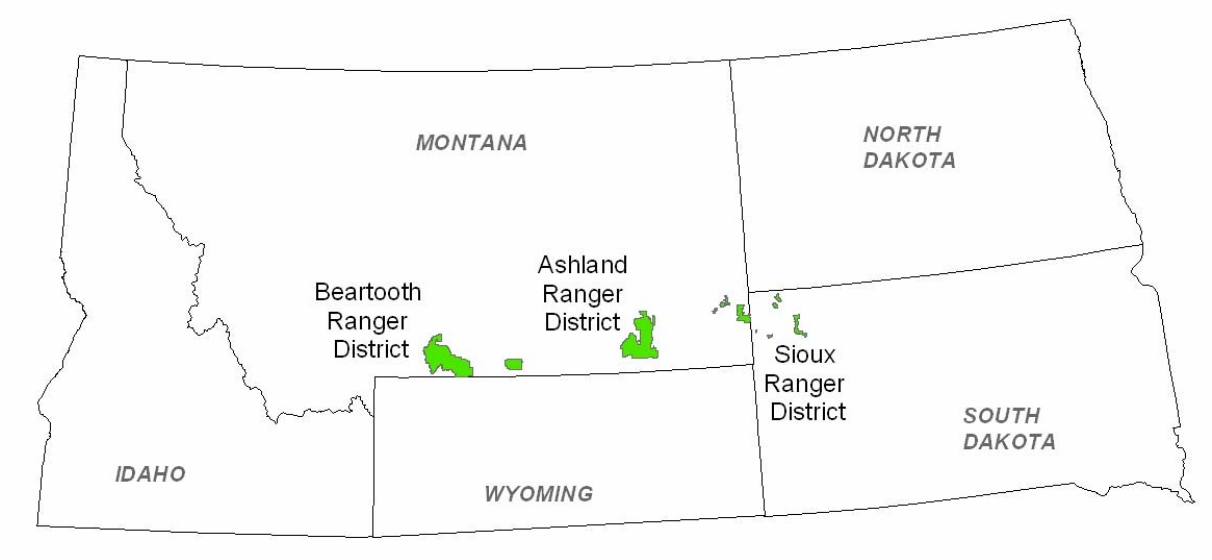
The Custer National Forest proposes to implement specific invasive weed treatments on approximately 14,000 gross managed acres (1,500 net treatment acres) in support of the 1987 Custer National Forest Land and Resource Management Plant (Forest Plan), Forest Service policy, Executive Order 13112, and other public land laws, rules, and regulations.

Custer National Forest lands reside in portions of Carbon, Stillwater, Sweet Grass, Park, Powder River, Rosebud, and Carter counties of Montana and Harding County of South Dakota. The Custer National Forest encompasses about 1.2 million acres in south central and southeastern Montana, and in northwestern South Dakota. The Forest shares boundaries with Yellowstone National Park, Bighorn National Recreation Area, Bureau of Land Management, the state border with Wyoming, the Gallatin and Shoshone National Forests, the Crow and Northern Cheyenne Indian Reservations, and numerous state and private lands. The project area covers the entire Custer National Forest, and includes existing, as well as future potential weed infestation areas. See Vicinity Map below for the project area location.

This Environmental Impact Statement (EIS) has been prepared to disclose the environmental effects of a proposal to expand upon the current Custer National Forest weed control program. When developing a weed management strategy it is critical to consider all available resources and tools. The integrated pest management (IPM) strategies utilize various weed management options that focus on the most economical and effective control of weeds. Anything that weakens the weed, prevents spreading, or prevents seed production can be a valuable tool. Proposed methods to control invasive weeds include a combination of ground and aerial application of herbicides, mechanical, biological, and cultural weed treatments. This document follows regulations as defined by the Council of Environmental Quality for implementing procedural provisions of the National Environmental Policy Act of 1969 (NEPA, as amended, 40 CFR1500-1508); US Forest Service Environmental Policy and Procedures Handbook (FSH 1909.15); and US Forest Service Handbooks 2109 Pesticide Use Management and 3409 on Forest Pest Management.

The current weed control program provides for annual control or containment of noxious and other undesirable weeds on the Custer National Forest (CNF) under the umbrella of an overall integrated pest management strategy. However, the current 1987 Environmental Impact Statement and subsequent National Environmental Policy Act decisions for weed control on the CNF did not authorize use of herbicides in the Absaroka - Beartooth Wilderness Area, nor did it analyze effects of new herbicides or aerial application of herbicides. This analysis will assess forest-wide treatment effects, and application of adaptive management strategies for new weed infestations.

VICINITY MAP



DOCUMENT STRUCTURE

The Forest has prepared this environmental impact statement in compliance with the National Environmental Policy Act and other relevant federal and state laws and regulations. This document is organized into chapters, appendices, and map section.

Additional documentation, including detailed analyses of the project can be found in the project record at the Custer National Forest's Supervisor's Office, Billings, Montana.

BACKGROUND

The term "weed" means different things to different people. In the broadest sense, it is any plant growing where it is not wanted. Generally, weeds are defined in terms of interference with the economic value of the land. Weeds can be native or non-native, invasive or non-invasive, and noxious or not noxious. Legally, a noxious weed is any plant designated by a Federal, State or county government as injurious to public health, agriculture, recreation, wildlife or property. The establishment and spread of invasive weeds often may signal the ecological decline of entire watersheds because of the detrimental impact of their spread on the diversity of plant communities. Declines in vegetative diversity are usually quickly followed by declines in plant and animal diversity. Implementing weed management strategies early while infestations are manageable reduces the economic, cultural, and environmental impact these populations can have on the ecosystem and economy.

In order to maintain consistency during this analysis, the following definitions are used to describe the classification of these undesirable plants on the Custer National Forest.

- **Exotic Plants:** In most cases, plants not native to North America.
- **Noxious Weeds**: A legal term, these are exotic plants regulated by law that are aggressive, difficult to manage, and invasive. These species may displace or significantly alter native plant communities.

- **Invasive Plants**: All State- and County-listed "noxious weeds" are considered invasive plants. In addition, other exotic species (not listed by State or Counties as noxious weeds) that can successfully out-compete native plants and displace native plant communities are included.
- **Poisonous Plants:** Plants that when touched or ingested in sufficient quantity can be harmful or fatal to an organism.
- **Other Undesirable Plants:** Vegetation that may be interfering with other activities or investments. For example, there may be undesirable vegetation growth creating fractures along shoulders of paved roads or hazards on a helibase.

Exotic species continue to become established in this portion of Montana and South Dakota, both on and off National Forest lands. Most of these species only occur in severely disturbed habitats such as roadways, gravel pits, trailheads, or horse corrals.

A small percentage of these exotic species, however, have been designated as noxious weeds and are highly invasive, with the potential to colonize and dominate native plant communities, thus severely altering the natural ecological function of these environments. Many of these invasive plants have become established in the area and are now "widespread invaders" throughout the CNF, while others ("new invaders") are just getting a foothold.

There are still other invasive weed species that have yet to be seen on CNF lands, but are known to occur in adjacent counties or states. These are the "potential invaders". These species can also be highly destructive to native plant diversity, wildlife habitat, and can even increase erosion as they crowd out other vegetation that provides more total ground cover, thus contributing sediment to streams and rivers.

For purposes of this analysis, a weed is defined as any plant that interferes with management objectives for a given area of land (or body of water) at a given point in time. Throughout this document references to weeds include noxious, exotic, invasive, or undesirable poisonous species. Appendix A outlines the current weed list.

WEEDS ON THE CUSTER NATIONAL FOREST

Non-native plants have infiltrated North America and, subsequently, Montana and South Dakota ecosystems on a continual basis for many decades, and in some cases, centuries. Some of these plants have been accepted, promoted, or utilized as part of this country's agricultural heritage (such as barley or alfalfa). Others have been less accepted and designated as undesirable.

Over the past 100 years, noxious weeds have been spreading at an alarming rate. For example, spotted knapweed arrived on the west coast in 1893 on the San Juan Islands Washington. By 1920, this weed had established itself in over 24 counties in three Northwestern states, with several large infestations near Missoula, Montana. Now, spotted knapweed is established in every county in the western United States and has invaded five million acres in Montana alone.

Large infestations continue to expand, especially along waterways and major transportation routes. Many other knapweeds, such as yellow starthistle, diffuse knapweed, Russian knapweed, and squarrose knapweed have similar invasion rates throughout the western United States.

Leafy spurge and many other noxious weeds are invading from the east, rather than the west. If these weeds continue to spread at their current rate for the next 100 years, they will dominate most western rangelands.

From these trends, we expect the pattern of expansion to continue onto the Custer National Forest. Transport of seeds from increasing recreation and commercial travel and continued disturbance on all lands (agricultural, residential, recreational and commercial developments) contribute to the spread of weeds. The spread of weeds from non-Forest lands inside and adjacent to the Forest will also contribute to increased weed infestation.

Results of uncontrolled weed spread are well documented. Without treatment, weeds increase about 14% a year under natural conditions (USDA, Forest Service 2005). These studies show the number of invader species and their distribution on the Forest will continue to increase if not aggressively treated.

Noxious weeds and invasive plant species pose an increasing threat to native ecosystems, croplands, and other plant communities throughout the United States. While weeds have long been recognized as a problem for agriculture, the potential impact to other plant communities, including wildlands, is receiving greater attention for some of the following reasons:

- Adverse influence on rare and sensitive native plant species;
- Detrimental impacts to wildlife, especially big game species that use foothill and mountain slopes as critical winter range;
- Degrade habitat for upland game bird and waterfowl;
- Degradation of water quality through increased soil erosion;
- Reduction on native plant communities and forage for wildlife and livestock; and
- Diminished quality of recreational and wilderness experience.

Existing conditions on the Custer Forest vary widely in relation to landform, topography, land management objectives, land use, proximity to population centers, and other public and private land. Historic land management, land use, and natural disturbances (e.g., fire, landslides, floods, and activity corridors) have resulted in varying severity of invasive weed infestations and potential for new infestations across the Forest.

CNF infested lands total less than one percent of the 1.2 million acres, but it is estimated that about 550,400 acres are vulnerable to infestation or 46% of the CNF (see Ch. 3, Table 3 - 7). Many spread vectors (such as roads and trails) intersect areas at risk. The CNF abuts areas that have high infestation rates creating urgency for updating and integrating the CNF Weed Control Program.

The use of biological, mechanical and herbicide treatment under existing weed plans (Custer National Forest since 1987) requires ground transportation. Weeds in steep and remote terrain on the Forest, such as the steeper portions of the Beartooth Mountains, are left untreated because aerial spraying is not authorized under existing weed control decisions. Also, the CNF has experienced post-wildfire weed infestations over large portions of the landscape. The larger fires that produced a sudden increase of weed spread include Storm Creek (90,000 acres), Robertson (3,300 acres), Willie (1,300 acres), Red Waffle (5,900 acres), Blank Creek (7,000 acres), Stag (62,000 acres), Tobin (9,300 acres), Brewer (37,000 acres), and Kraft Springs (85,000 acres). In order to treat inaccessible infestations or potential large post-burn infestations, the use of aerial application and the flexibility to appropriately use new registered herbicides and biologic controls is proposed.

There are an estimated 2,000 invasive species. There are approximately 275 exotics known in and around the CNF, each having varying degrees of invasiveness (see Appendix B). Twenty of the 26 legally designated noxious weeds in Montana and South Dakota occur in or near the CNF (see Appendix A). Poisonous plants such as tall larkspur are undesirable to management objectives within permitted grazing allotments. The 1987 Custer Land and Resource Management Plan (Forest Plan or FP), incorporated into this analysis by reference, incorporate laws and policies in regards to actions required to control and/or contain these undesirable plant species on the Custer National Forest (FP, pp. 3, 24, and 156).

Mapped weed infestations are delineated with varying densities on about 14,000 gross or managed acres equating to one/tenth percent of 1.2 million acres the CNF. It is estimated that there are about 1,500 net acres that consist of the actual undesirable species that receive treatment. The amount of net weed acres inventoried on the CNF has about doubled over the last 10-15 years with a relatively static budget going towards weed control (USDA, FS 2003). The Table 1-1 displays the change in inventoried weed infested acreage.

TABLE 1 - 1. CHANGE IN INVENTORY ON THE CUSTER NF

District	Species	Scientific Name	1985 Inventoried Net Acres[1]	2006 Inventoried Net Acres
Beartooth	Leafy Spurge	*Euphorbia esula*	3	14
	Spotted Knapweed	*Centaurea maculosa*	114	128
	Dalamtian toadflax	*Linaria dalmatica*	12	5
	Canada Thistle	*Cirsium arvense*	6	143
	Sulfur cinquefoil	*Potentilla recta*		9
	Yellow toadflax	*Linaria vulgare*		4
	Oxeye Daisy	*Chrysanthemum leucanthemum*		4
	Common Tansy	*Tanacetum vulgare*		3
	Houndstongue	*Cynoglossum officinale*		58
	Field Bindweed	*Convolvulus arvense*		0
	Tall Larkspur	*Delphinium occidentale*	Present	57
Subtotal			135	368 + larkspur (57)
Sioux	Leafy Spurge	*Euphorbia esula*	150	24
	Spotted Knapweed	*Centaurea maculosa*	40	14
	Canada Thistle	*Cirsium arvense*	10	749
	Houndstongue	*Cynoglossum officinale*		24
	Other			21
Subtotal			200	831
Ashland[2]	Leafy Spurge	*Euphorbia esula*	32	10
	Spotted Knapweed	*Centaurea maculosa*	454	192
	Russian Knapweed	*Centaurea repens*	21	20
	Canada Thistle	*Cirsium arvense*	14	
	St. Johnswort	*Hypericum perforatum*	1	
	Houndstongue	*Cynoglossum officinale*		2
Subtotal			522	224
CNF Total			857	1422

This increase in inventory is due to spread, large scale wildfires, and better inventory. The total cost of control is greater than the Forest is budgeted to accomplish on an annual basis. In addition to annual appropriations, various grants and partnerships have been successful in adding resources to annual control measures. Priority criteria are used because resources are generally not sufficient to treat all infestations (see Appendix E).

Detailed locations of weeds by Ranger District are located in the project record. They are also displayed in the map section and in Chapter 3, Tables 3 - 1, 3 - 2, and 3 - 3.

Appendix A displays the Custer National Forest's current list of undesirable weeds of specific concern (53 species). Each species is identified by category by state, county, or Greater Yellowstone Coordinating Weed Committee lists.

PURPOSE OF AND NEED FOR ACTION

Invasive weeds are threatening or dominating areas of the Forest with negative impacts on native plant communities, wildlife habitat, soil and watershed resources, recreation, and aesthetic values. A shift from native vegetation to invasive weeds decreases wildlife forage, reduces species diversity, and increases soil erosion due to a decrease in surface cover. For these reasons it is imperative to aggressively manage weeds across the Forest.

The purpose and need of the project is to prevent and reduce loss of native plant communities associated with the spread of weeds. Specifically, the purposes of this project are to treat weeds within the Custer

[1] The 1985 inventory was taken from the 1986 Custer Forest Plan.
[2] The 2006 inventory for the Ashland Ranger District is generally less than what was reflected in the 1985 inventory. This is due to successful broadcast treatment of spotted knapweed and continued treatment of spurge.

National Forest, and to reduce the impact of weeds on other resources. The specific purposes of this proposal are described below, together with discussions of the ecological and management needs:

Purpose 1: This EIS provides the opportunity to update and integrate the 1987 weed control decisions with use of new herbicides and biological control, utilize herbicides as a tool in the A-B Wilderness Area, and aerially treat specific areas outside of the Wilderness. The 1987 environmental analyses are incorporated into this analysis by reference.

Need: There is a need to review the Custer National Forest's current management strategies and tactics to evaluate a reasonable course of action given new problems, options and opportunities. Existing decisions do not allow the CNF to keep up with weeds introduced at a faster rate than anticipated in the previous analysis. The speed of introduction or spread is increasing because:

- Large infestations are appearing on lands adjacent to National Forest as a rapid increase of users from weed-infested areas travel to National Forests.
- New weed species are invading areas not considered in previous decisions.
- Changes in types of use, Off-highway vehicles for example, increase the opportunity for and the rate of infestations.
- Controls do not match the rate of infestation in remote inaccessible areas, because weeds go untreated. Aerial herbicide application is not authorized under existing weed programs, which limits potential treatment options in these more inaccessible areas. As a result, control efforts only slow the spread of weeds on the Forest rather than contain or eradicate infestations.
- Large area wildfires have created massive seedbeds for invasion by weeds.

In order to update and refine current Forest weed control program the following developments were considered.

- Seed spread by the increase of all types of recreational and commercial use on the Forest.
- Changes in sites, modes and rates of weed spread and the impact on Forest use.
- Introduction of new weed species.
- Identification of other undesirable weeds such as poisonous plants (i.e., tall larkspur) and weeds interfering with infrastructure investments (i.e., creating cracks along paved road shoulders).
- Improved tools such as recently registered herbicides and use of aerial application methods.

INTEGRATED WEED MANAGEMENT

Integrated weed management is an ecologically based process for selecting strategies to regulate weeds to achieve resource management objectives. It is the planned and systematic use of detection, evaluation, and monitoring techniques; and all appropriate silvicultural, biological, chemical, genetic, and mechanical tactics needed to prevent or reduce weed-caused damage and losses to levels that are economically, environmentally, and aesthetically acceptable. The integrated weed management approach developed for this project does not center on treatment methods but rather on a multi-faceted strategy that includes education, inventory, ecological impact and risk assessment, prioritizing treatment areas, choosing management techniques, evaluating the program through monitoring and adapting as the program evolves. The overall goal of integrated weed management is to maintain or restore healthy plant communities that are relatively weed resistant, while meeting other land-use objectives such as forage production, wildlife habitat development, or recreational land maintenance.

Key components of integrated weed management program include:

- Preventing encroachment into non-infested sites;
- Detecting and eradicating new introductions;
- Eradicating small populations within or adjacent to high valued areas (such as wilderness, sensitive plants, and key wildlife habitat);
- Containing large weed populations;
- Re-vegetating when necessary; and
- Properly managing competitive vegetation

A successful program consists of a sustained effort, constant evaluation, and adoption of improved strategies as they arise.

The goals of implementing the various elements of integrated weed management are to:

- Increase public awareness regarding impacts of noxious weeds to resource values;
- Limit weed seed dispersal from roads and trails:
- Contain neighboring weed infestations; and
- Minimize soil disturbance.

Forest management practices already utilize measures such as the washing of machinery to prevent further spread of noxious or invasive weeds. Prevention efforts also include a Special Order that requires certified weed seed-free feed to be used on all National Forest and Bureau of Land Management Lands in the States of Montana and South Dakota. Educational efforts include distribution of posters or other informational visual materials, as well as other available opportunities. Efforts need to continue in these areas to increase awareness of the weed problem in this area and personal commitments to minimizing the spread of these weeds.

Mechanical and cultural control of noxious weeds has not been very effective at containing or reducing widespread existing infestations. For example, roadside mowing has not prevented spotted knapweed from flowering and going to seed. Hand pulling, the principal method of mechanical control used on the CNF, has been effective on individual plants or very small, isolated weed populations. However, attempts to hand-pull large infestations of weeds have provided only temporary control because seeds remain viable in the soil for many years and the act of pulling up the weed often creates an ideal site for seeds to sprout in. This method is completely ineffective on deep-rooted weeds such as leafy spurge, and weeds that reproduce through runners or shoots, such as St. Johnswort, yellow toadflax, and Canada thistle. Tilling and burning infestations have had limited effectiveness and usually needs herbicide treatment as well (see Appendix F).

Herbicide applications have been used on the CNF with good success. However, these have been utilized up to this point only in areas authorized by the 1987 Noxious Weed Management Projects decisions or subsequent tiered decisions. New herbicides are now available and were not addressed in the 1987 Custer NF Noxious Weed EIS.

Biological control agents are chosen for their host specificity (i.e., they are designed to target only a particular weed species). In this sense they are useful in native plant communities because they avoid other non-target vegetation. Biological control agents can include the use of insects or pathogens to consume or kill select portions of individual weeds, reducing growth or reproduction of the weed. Seven biological control flea beetle releases (*Aphthona nigriscutis)* on leafy spurge have been done on the Sioux and Ashland Ranger Districts at various times between 1993 and 2002. Some effectiveness of these releases has been observed.

Preventing introduction and spread of weeds is one objective of the integrated weed management program on the Forest. Best management practices are outlined in Forest Service policy (Northern Region 2001 2080 directives supplement) and the comprehensive Guide to Noxious Weed Prevention Practices (USDA FS 2001) (see Appendix D). These guides are for use in planning resource management activities and operations. The guides assists manger and cooperators in identifying weed prevention practices that mitigate identified risks of weed introduction and spread for projects and programs. Factors critical in a prevention program include:

- Limiting weed seed dispersal occurring from vehicles and equipment traveling forest roads, and people and livestock traveling forest trails;
- Containing neighboring weed infestations;
- Minimizing soil disturbance;
- Detecting and eradicating newly established weeds;
- Establishing competitive desirable vegetation; and
- Managing forage, including re-vegetation and shade management.

In addition, the Forest depends on public education and weed prevention programs to deter establishment of new weed species. Weed education programs have helped raise public awareness about invasive weeds and what steps can be taken to help reduce the spread of existing weeds and establishment of new invaders.

Prevention measures that minimize establishment and spread of noxious weeds are already a part of Forest Service policy and recent decisions, and therefore will not be repeated in this analysis. The CNF fully utilizes prevention, education, and non-chemical activities to combat weeds on the forest. Herbicide, mechanical, and biological methods as addressed in this analysis would be used in conjunction with these other activities where necessary or appropriate.

COMPARISON OF WEED MANAGEMENT METHODS

Table 1 - 2 compares the relative limitations, management effectiveness, and approximate costs of the weed management methods used in the analysis.

TABLE 1 - 2. LIMITATIONS, EFFECTIVENESS AND COSTS BY METHOD [3]

Methods	Limitations	Management Effectiveness[1]	Approximate Implementation Cost/Acre
CULTURAL			
Seeding	Environmental limitations; cannot be conducted on steep, remote, rocky sites; causes ground disturbance which may increase likelihood of re-invasion; most effective after weed populations have been reduced by other control actions.	Not able to estimate	$100 to $300 Average $250
Grazing	Treatment must occur during proper phenological stage; herding required; sometimes nonselective; can reduce forage available for big game; predator predation problems; disease transfer to bighorn sheep	Low cost/low effectiveness	$50
MECHANICAL			
Hand pulling/ Grubbing	Labor intensive; not effective on deep-rooted or rhizomatous perennial; causes ground disturbance which may increase susceptibility of site; effective on single plants or small low-density infestations.	High cost/ low effectiveness	$400
Mowing	Limited to smooth gentle slope; treatment timing critical; impact on non-target vegetation	Low cost / low effectiveness	$200
Tilling	Limited to smooth gentle slopes, impact on non-target vegetation.	Low cost / low effectiveness	$200
Prescribed Burning	Climate limitations; may increase likelihood of re-invasion unless combined with other treatment methods.	Low cost / low effectiveness	$40
BIOLOGICAL			
Parasites, Predators and Pathogens	Does not achieve eradication; effective only on one species, only a few weeds with available agent; most agents not effective by themselves need multiple agents	Moderate cost/ moderate effectiveness	$150
HERBICIDES			
Ground Application	Not cost effective on slopes greater than 40 percent; must have accessible sites; potential impacts to non-target vegetation; application timing limited based on plant phenology and weather conditions.	Low cost/ moderate to high effectiveness	$30 –Vehicle, $125 –Backpack, $50 – ATV, $300 – Horse Average $100
Aerial Applications	Potential impacts to non-target resources; application timing limited based on plant phenology and weather conditions.	Low cost/ moderate to high effectiveness	$40
WEED PREVENTION			
All Methods	Not effective on existing infestations; ineffective if not enforced	Not measurable	

Notes: [1]Percent of target species killed in a treatment area: High = 75 to 100 percent; Moderate = 46 to 75 percent; Low = 25 to 45 percent; Very Low = 0 to 24 percent.
Not measurable – means the cost/effectiveness is not measurable or quantifiable.

[3] USDA, FS, 2005

Purpose 2: Maintain forest, non-forest, and riparian ecosystem integrity and health by using an Integrated Pest Management approach by:

- limiting the spread of "widespread invader" species on the CNF or onto adjacent lands, and reducing invader populations where possible;
- containing "new invader" species that already occur on the CNF, with strong emphasis on reducing their populations;
- containing or eradicating any "potential invader" species that may appear on the CNF; and
- continuing monitoring for undesirable plant populations.

Need: Additional control measures and emphasis are needed to limit the further presence and impacts of these weed species on ecosystem integrity.

Weed infestations can cause substantial habitat loss as well as negatively affect diversity of plant communities and habitat function. Our current inability to treat some infestations leads to a continual and compounding annual loss of desired habitat to weeds and creates the potential to infest adjacent lands or defeat existing control efforts by neighboring landowners. This is inconsistent with Forest Plan and Northern Region goals for sustaining native plant diversity and desired community function. There is also a need to protect sensitive and unique habitats (including A-B Wilderness Area, Research Natural Areas, wetlands, sensitive plant populations, and big game winter range).

The Northern Region Overview identified weeds as the greatest risk to grass and shrub lands on National Forest. New, safer target-specific herbicides and biological controls are now available that were not considered in previous decisions. These new controls can be more effective while reducing impacts to humans and non-target species. Aerial application and authorization of new herbicides and biocontrols can increase the effectiveness of the CNF weed control program.

Current weed management activities on the CNF already combine prevention and education with biological, mechanical, and cultural control applications, with very limited use of herbicide applications, in an overall IPM strategy. However, these combined efforts, with minimal use of herbicides, have not been sufficient to contain, control, or reduce existing or new populations of noxious and invasive weeds.

Populations of "widespread invader" (Category 1) weeds continue to rapidly expand on the CNF. Leafy spurge, spotted knapweed, houndstongue, and Canada thistle are examples of these weeds and are present on all three ranger districts of the CNF. Since initial establishment on the CNF (in many cases, decades ago), weeds in this category have steadily, and in some cases rapidly, increased along Forest roads and in other disturbed areas such as trailheads, campgrounds, gravel pits, and power lines.

Salt cedar and purple loosestrife are examples of "new invaders" (Category 2) species that have only recently become established on or near the CNF. These species are only known from a few localities. Some were first seen on CNF lands as recently as the 1990's, while others have been around longer, yet have only recently been discovered on CNF lands. Most of the other new invaders are currently very restricted in their distribution.

Common crupina is an example of a "potential invader" (Category 3) species. These types of species have not yet been documented in the states or may be found only in small, scattered, localized infestations. Based on the extent of infestations in nearby states, these weeds have the potential to become widespread and cause severe economic and environmental effects. Common crupina has been noted on the South Dakota portion of the Sioux Ranger District.

It has also become apparent that damage to forest resources from noxious weeds is increasing due to their expanding populations. Because they are non-native in origin, noxious weeds may often out-compete native plants due to a lack of naturally adapted competitors or biological control agents. Noxious weeds may crowd out native plants and diminish the productivity and ecosystem integrity, biodiversity, and appearance of National Forest lands.

ECOLOGICAL IMPACTS OF INVASIVE PLANTS

Invasive plants can alter the structure, organization and function of ecological systems including soil, plants, and animal relationships (USDA FS, 2005). Spotted knapweed dominance on many open timber and grassland communities on the Forest 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 impact wildlife species that depend on open timber and grassland for forage, and breeding and nesting habitat. Spotted knapweed is prevalent throughout the Forest and extensive research on this species has revealed numerous ecological impacts associated with its presence. A resent study has proven that spotted knapweed releases a phytotoxic chemical that inhibits the growth of Idaho fescue thus giving a competitive advantage to spotted knapweed (Goodwin and Sheley, 2003). Other noxious weed species are expected to result in similar impacts to ecosystem processes. Examples of ecological impacts from spotted knapweed will dominate the discussion in this section, but this does not preclude the impacts caused by the presence other species.

Soil: Invasive plants can affect the structure of ecosystems by altering soil properties. Soil in areas dominated by invasive plants may have lower amounts of organic matter and available nitrogen than areas supporting native grasslands. 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. Biologically active organic matter occurs within the top one to four inches of soil and may be more prone to loss even during minor run-off events. A study conducted by Montana State University found that runoff and sediment yield increase 56 percent and 192 percent, respectively, on spotted knapweed sites compared to sites dominated by native bunchgrass (Tu et al., 2001).

Soil nutrient levels may be affected by the presence of invasive species. For example, potassium, nitrogen, and phosphorous levels were 44 percent, 62 percent and 88 percent lower on soil from a spotted knapweed-infested site than from adjacent soil with a grass overstory in a study conducted by Harvey and Nowierski (Tu et al., 2001). Plants that reduce soil nutrient availability to very low levels have a competitive advantage over neighboring plants (Tu et al., 2001).

Soil microorganisms can either benefit or be impacted 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. Conversely, these secondary compounds may limit activity and growth of aerobic soil microbial populations, resulting in thick liter layers and slower nutrient cycling (Tu et al., 2001).

Soil moisture can also be altered by the presence of tap-rooted weedy species. Tap-rooted forbs may reduce infiltration because they do not have dense, fine root systems of grasses, which contribute organic matter and enhance soil structure. 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 (Tu et al., 2001). Water has a high capacity to store heat. By reducing soil water content in surface soil, greater evaporation enhances rapid heating and cooling of near-surface layers. This will increase runoff by lowering infiltration, again reducing thermal conductivity and capacity of the soil to store heat resulting in greater temperature extremes at the soil surface (Tu et al., 2001).

Native Plant Communities: Invasive plants have a variety of mechanisms giving them a competitive advantage over native species. For example: invasive plants can be alleopathic (contain compounds that suppress other plants); produce abundant seed; establish and spread in a wide range of habitats; grow rapidly; initiate growth earlier in the season and later in the season; exploit water and nutrients better; have no native enemies; and are not palatable to 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 prevalent throughout the Custer National Forest. It occurs primarily on roadsides, on grasslands and open forest community types. Invasion of knapweed into disturbed and undisturbed native bunchgrass communities is well documented (Stannard, 1993;

DiTomaso, 1999; Tu et al., 2001). As spotted knapweed and other invasive plants increase, cover of more desirable but less competitive grasses and forbs is significantly reduced, sometimes as much as 60 to 90 percent (Maxwell et al., 1992; Beck, 1994). 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 et al., 1998).

Rare plants are particularly vulnerable to invasive plants (DiTomaso, 1999). Beartooth goldenweed is endemic to the Bighorn Basin and is listed as sensitive on the Beartooth Ranger District by the Forest Service. It is an example on the CNF where a population is at risk because of encroachment of habitat by spotted knapweed.

Cryptogramic ground crust may also be impacted by invasive weeds. 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 (Parks et al., 2004). Tyser (Tyser et al., 1998) compared a native fescue grassland site to one invaded by spotted knapweed in Glacier National Park. Study results indicated that the cryptogramic ground cover within spotted knapweed infested sites was 96 percent less than native fescue grassland site.

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 (DiTomaso; 1999). Exotic plants on the Custer Forest have started to invade important big game winter ranges, reducing forage available for over-wintering animals. On the Lolo National Forest, forage availability was identified as the most limiting factor for over-wintering elk and deer populations. Forage that is low in nutrients also hinders elk and deer because they metabolize fat at an accelerated rate to stay warm in colder temperatures.

Unlike elk and deer, bighorn sheep are relatively non-migratory. They spend most of the year on low elevation big game winter ranges, which are often associated with talus slopes. Additional demands are placed on the forage base because they are non-migratory and forage yearlong on some ranges. Bighorn sheep yearlong foraging makes them more dependent on high quality forage on low elevation big game winter ranges than elk and deer.

A 1996 study conducted by Thompson (Laugenberg et al., 2005) 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 (Laugenberg et al., 2005) 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 (Laugenberg et al., 2005). 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. 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. Although spotted knapweed infestations are considered more detrimental to elk than deer, the plant was not detected in mule deer diet even though it was common on winter ranges (USDA, FS, 2005).

Spotted knapweed is not considered food forage, even though the plants can contain high amounts of crude protein. The bitter-tasting compounds primarily found in the leaves reduce palatability. Even though animals may ingest spotted knapweed, the secondary compounds in the forage may affect rumen microbial activity thereby reducing forage intake, or may cause general malaise resulting in aversive post-ingestive feedback (USDA, FS, 2005).

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 reactions

(USDA, FS, 2005). 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 adrenalin kits and take weekly allergy shots (USDA, FS, 2005).

Purpose 3: Comply with the 1987 Custer Forest Plan, which incorporates Federal and State laws regulating management of noxious weeds.

Need: The CNF needs to comply with Federal and State direction and regulations by expanding the weed management plan.

The Forest is directed by law, regulation, and agency policy to treat weeds. The following laws give broad authority for control of weeds on National Forest System land, and several laws and regulations specifically provide for control of such weeds.

Custer National Forest Plan. The 1987 Custer National Forest Plan (FP) directs control of noxious weeds as a priority item (FP Page II-3) where the goal is to implement an "integrated pest management program aimed at controlling new starts, priority areas of minor infestations. Holding actions will be implemented on areas of existing large infestations." The Forest Plan also directs that noxious weed control program be developed for the Absaroka-Beartooth Wilderness Area in order to maintain wilderness values (FP Appendix II, p. 156).

Existing Weed Control Plans. 1987 Records of Decision and the 1987 Decision Notice for the West Fork of Rock Creek (Beartooth District) are in place for the control of weeds on each district of the CNF. Additional decisions that tier to these documents have also been made for specific projects such as road and trail construction, oil and gas leasing, timber sales, grazing management and special uses.

Executive Order (03 February 1999) directs Federal Agencies to prevent and control invasive species.

Executive Order 13112, signed by the President of the United States in February 1999, directs federal agencies to conduct activities that will reduce noxious weed populations.

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.

The South Dakota CL 38.22 provides for designation of noxious weeds in the State, direction of control efforts, registration of pesticides and licensing of applicators, and enforcement of statutes. The law delegates enforcement to County Commissioners.

The Montana Noxious Weed Law 1948, amended in 1991 provides for designation of noxious weeds in the State, direction of control efforts, registration of pesticides and licensing of applicators, and enforcement of statutes. The law delegates enforcement to County Commissioners.

The Montana County Noxious Weed Management Act defines a noxious weed as "any exotic plant species established, or that may be introduced in the state, which may render land unsuitable for agriculture, forestry, livestock, wildlife, or other beneficial uses and is further designated as either a state-wide or county-wide noxious weed" (7-22-2101 MCA). In addition, this act states that it is unlawful for any individual to allow noxious weeds to propagate or go to seed on their land unless they are complying with an approved weed management plan.

Carlson-Foley Act of 1968 (PL 90-583) directs Federal Agencies to permit control of noxious weeds on Federal lands, by State and local governments on a re-imbursement basis.

36 CFR 222.8 directs the Forest Service to cooperate with local weed control Districts to analyze and develop noxious weed control programs.

Federal Noxious Weed Act of 1974 (sec 9) authorized the Secretary to cooperate with other Federal and State agencies or political subdivisions thereof, and individuals in carrying out measures to eradicate, suppress, control or prevent the spread of noxious weeds.

Forest Service Manual 2259.03 directs Forest officers to control noxious weeds on National Forest System lands, and cooperate fully with State, County and Federal officials in implementing 36 CFR 222.8 and the Carlson-Foley Act.

The Federal Land Policy Management Act of 1976 (PL 94-579) authorizes control of weeds on rangeland.

The National Forest Management Act of 1976 (PL-94-588) authorizes removal of deleterious plant growth.

The Wilderness Act of 1964; Amended October, 1978: The Absaroka-Beartooth Wilderness Area was established in 1978. The goal of Wilderness Areas is to retain its primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural conditions.

Purpose 4: Cooperate with other agencies and private individuals concerned with the management of noxious weeds.

Need: Without an adequate plan for weed control on lands managed by the CNF, efforts on other lands and the management plan for the individual counties are greatly hampered.

The CNF manages land in Carbon, Stillwater, Sweet Grass, Park, Powder River, Carter, and Harding Counties, and to varying degrees, non-Forest Service lands in these counties are often adjacent to or intermingled with CNF-managed lands. The general public continues to demand increased noxious weed control efforts on local, state, and federal lands in those counties, including lands managed by the CNF. Many agencies in these counties have implemented Memorandums of Understanding with county weed districts. The Custer National Forest is also pursuing coordinated Weed Management Area efforts with various counties. However, due to existing noxious weeds, along with the threat of new and potential invader plants, local efforts must continue to expand.

The Greater Yellowstone Coordinating Committee identified management of noxious weeds as one of the highest priority needs in the Greater Yellowstone Area. The Absaroka–Beartooth Wilderness tri-Forest committee has also identified the management of noxious weeds as one of the highest priority needs in the A-B Wilderness Area.

Vehicle traffic, livestock, wildlife, wind, and contaminated gravel, straw, and hay readily move noxious weeds between the CNF and other lands. Many adjacent landowners control noxious weeds on their property. A partnership approach is vital to a successful control program.

PROPOSED ACTION

The Forest is proposing to broaden the 1987 Environmental Analysis for control of weeds to:

- Permit the use of different types of EPA registered herbicides;
- Allow use of herbicides within the Absaroka-Beartooth Wilderness Area.
- Treat approximately 1,500 net acres (within approximately 14,000 managed gross acres) with a combination of treatment methods such as ground-based and aerial application of herbicides, biological control agents, grazing, mechanical and cultural (the actual amount of annual treatment will depend on available funding and monitoring results);
- Treat additional new infestations through adaptive management tools for assessing new treatments and new sites;
- Broaden control methods to include the use of aerial application; and
- Broaden protection measures for ground and aerial applications.

The Proposed Action (Alternative 1) is further described in Chapter 2 regarding specific treatment sites, size of treatment, targeted species, and treatment methods.

SCOPE OF THE ANALYSIS

The scope of this analysis is limited to the effects of weeds, and weed control treatments (as proposed in Alternative 1) on different resources within the Custer National Forest boundary.

Impacts

Regulations contained in 40 CFR 1508.25(c) require analysis of direct, indirect, and cumulative impacts. Direct effects are caused by the action and occur at the same time and place as the Proposed Action. Indirect effects are caused by the action and occur later in time or farther removed in distance, but are still reasonably foreseeable. Cumulative impacts are those impacts on the environment that result from incremental impact of the action where added to other past, present, and reasonably foreseeable future action.

Alternatives

In determining the scope of analysis, the agency must consider three types of alternatives (40 CFR 1508.25[b]): no action alternative, other reasonable courses of action, and protection measures. Chapter 2 presents a range of alternatives for site-specific treatment of invasive weeds. Alternatives that have a reasonable likelihood of partial success are discussed in detail. Protection measures for each alternative have been developed by the Forest and outlined Chapter 2 and Appendix C. Impacts of the no-action alternative, which would maintain the current program projects on the forest, are also considered.

Connected, Cumulative and Similar Actions

Regulations in Code of Federal Regulations (CFR) Title 40 1508.25 address the scope of analysis and elements to be considered in a proposed action. The regulations recognize that separate activities can combine and interact to create impacts that may be significantly beyond the effects of individual actions. These actions are considered cumulative, and their additive effects are addressed in Chapter 4.

Federal regulations also require a combined analysis of connected actions. Connected actions are those that are closely related and 1) automatically trigger other actions, 2) could not or would not proceed unless other actions are taken previously or simultaneously, and 3) are interdependent parts of a larger action and depend on the larger action for their justification. The effects of connected actions are analyzed together. Similar actions are those that share a common timing or geography and therefore can be evaluated together.

SCOPE OF THE PROPOSED ACTION

This environmental assessment is the documentation of site-specific effects of the proposed action and the no-action alternative. It is not a general management plan or a programmatic environmental analysis. No further decisions would be made under the National Environmental Policy Act prior to implementation of the selected alternative.

The proposed action would not supercede either the 1987 Noxious Weed Management Record of Decisions (RODs) or the 1987 West Fork of Rock Creek Decision Notice. Rather, this proposal would be a "companion" analysis and decision that would enable the CNF to use new herbicides and to implement treatment of additional weed infestations not analyzed by those projects.

Geographic Scope. The geographic scope of this analysis is confined to the treatment areas that would occur within the Custer National Forest boundary. The scope of the proposed action is limited to the management activities as described in Chapter 2. Activities could occur in all management areas described in the CNF Forest Plan. Descriptions of the goals and objectives of these management areas

are described in Chapter III of the Forest Plan. The proposal includes undesirable weed treatments only on lands managed by the CNF, including Wilderness and roadless areas.

For each resource issue 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 same as the project area.

Temporal Scope. The timeframe for project implementation is estimated for up to 15 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 included in the analysis. In some cases, longer-term effects are also discussed.

DECISION TO BE MADE

The Forest Supervisor of the Custer National Forest is the Responsible Official for making the decision concerning this proposal. Given the purpose and need, the deciding official reviews the proposed action, the other alternatives, and the environmental consequences in order to make the following decisions:

- Whether to expand current efforts to control weeds
- What treatment methods would be used;
- What herbicides would be used;
- What protection measures and monitoring measures would be required; and whether to include an adaptive approach to address future spread of invasive weeds. If authorized, the decision would describe adaptive management options under specific settings and conditions.

The EIS is a project level analysis. The scope of the project is confined to issues and potential environmental consequences relevant to the decision. This analysis does not attempt to re-evaluate or alter decisions made at higher levels. The decision is subjected to and would implement direction from higher levels.

National, regional, policies, and Forest Plan rules direction require consideration of effects of all projects on weed spread and prescribe protection measures where practical to limit those effects. Reconsideration of other existing project level decisions or programmatically prescribing protection measures or standards for future Forest management activities (such as travel management, timber harvest, and grazing management) are beyond the scope of this document. Cumulative effects of the Project are addressed where appropriate in Chapter 4, combined with effects of other Forest activities.

Even with careful consideration, unforeseen events can occur that will require additional analyses. Unanticipated events can result in new information that could have a bearing on a decision. Forest Service procedures for addressing these new information, documents, and decisions are thoroughly explained in FSH 1909.15, Section 18.

DECISIONS THAT WILL NOT BE MADE

Decisions that will not be made based on this analysis are briefly discussed below:

- Changes in land use and Forest management objectives.
- Changes in the level of wildland fire suppression, strategies and tactics, and decisions on whether or not to control wildfire.
- Changes in travel, road use and access
- Roads analysis or road management decisions will not be addressed in this analysis, but will be addressed at a later date per FSM 7710. The Deciding Officials determined that the scope and scale of issues under consideration do not warrant a roads analysis. There are no proposed road

management activities (road construction, reconstruction, and decommissioning) that would result in changes in access, such as changes in current use, traffic patterns, and road standards (FSM 7712.13c).

- Prevention measures that minimize establishment and spread of noxious weeds are already a part of Forest Service policy and recent decisions and therefore will not be repeated in this analysis (see Appendix D). The CNF fully utilizes prevention, education, and non-chemical activities to combat weeds on the forest. Herbicide, mechanical, and biological methods as addressed in this analysis would be used in conjunction with these other activities where necessary or appropriate. The following outline recent prevention and education decisions, policy, and measures for the weed control program occurring within the analysis area:

    - Forest Service Policy (FSM 2080 R1 Supplement 2000-2001-1) provides Best Management Practices (BMPs) for Weed Control (see Appendix D). They specify incorporation of weed prevention and control through project layout, design, and alternative evaluation and project decisions to reduce potential sites for weed establishment.
    - Coordination of weed prevention and control efforts continues at the local, County, State, regional, and national levels.
    - The Weed Seed Free Feed and Straw program is a Forest and Region-wide requirement. This program requires all hay, straw and processed feeds entering the Forest to be certified free of weed seed. The certification program is controlled by the Montana and South Dakota State Departments of Agriculture and relies on a field survey of crops prior to harvest.
    - The Off Highway Vehicle (OHV) amendment for Region One was implemented in January 2001. Off road or trail use by OHVs is restricted and will reduce one vector of weed spread. The first year focused on public education of riders in the field. In 2002 the enforcement phase of the amendment will result in citations instead of warnings.
    - Timber sales and other activities utilizing mechanical equipment commonly include, and will continue to include, the requirement that off-road equipment be washed prior to entering sites on the CNF (see Appendix D).
    - Each Ranger District Office and the Supervisor's Office have a wide array of information available on noxious weed identification, prevention, and control. In addition, the major trailheads into the Wilderness areas on the CNF are posted with informational brochures and the requirement to use only certified noxious weed seed-free feed for livestock.
    - Field employees on the CNF will continue to be trained in identification of noxious weeds.