



United States
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Agriculture

Forest
Service

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Record of Decision

for the

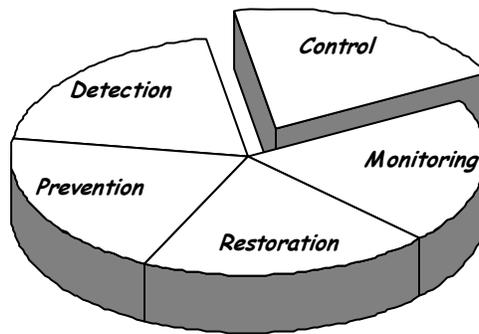
Custer National Forest

Weed Management Final Environmental Impact Statement

Carbon, Stillwater, Sweet Grass, Park, Powder River, Rosebud, and Carter Counties of
Montana and Harding County of South Dakota



Spotted Knapweed



Leafy Spurge

United States
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Agriculture

Forest Service
Northern Region

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INTRODUCTION

This Record of Decision for the Custer National Forest Weed Management Final Environmental Impact Statement (FEIS) provides my decision rationale regarding weed management. Weed management is under the overall umbrella of an Integrated Pest Management (IPM) strategy to control or reduce the presence of noxious and other undesirable weeds on the Custer National Forest (CNF). Forest Plan and Agency objectives for biodiversity, responsibility to health and human safety, responsibility to neighboring lands, and consistency with Federal and State laws dictate an aggressive and effective weed control program. Weed infestations can cause substantial habitat loss as well as negatively affect diversity of plant communities and habitat function. There is strong public support for taking action on the invasive weed problem. The formal and informal comments of support indicate that the people who live near and recreate on the Forest expect aggressive action to control weeds.

BRIEF DESCRIPTION OF MY DECISION

This Record of Decision explains my decision and rationale for selecting Alternative 1 from the Custer Forest Weed Management Final Environmental Impact Statement (FEIS). The impacts of the selected Alternative are described in the FEIS. The selected alternative provides for the use of the most effective tools for controlling weeds while having minimal impact on the environment. Under this decision, weed treatment will occur annually within the approximately 1.2 million acres of the Custer National Forest.

I have decided to select Alternative 1 to address more aggressively the issue of weeds on the Custer National Forest. I am deciding to permit the use of additional types of herbicides; treat more acres of noxious weeds, treat areas of other undesirable vegetation (i.e., poisonous plants); adopt an adaptive management approach to weed management, and broaden noxious weed herbicide control methods to include the use of aerial herbicide applications outside of the Absaroka-Beartooth (A-B) Wilderness Area and provide for herbicide ground applications within the A-B Wilderness Area.

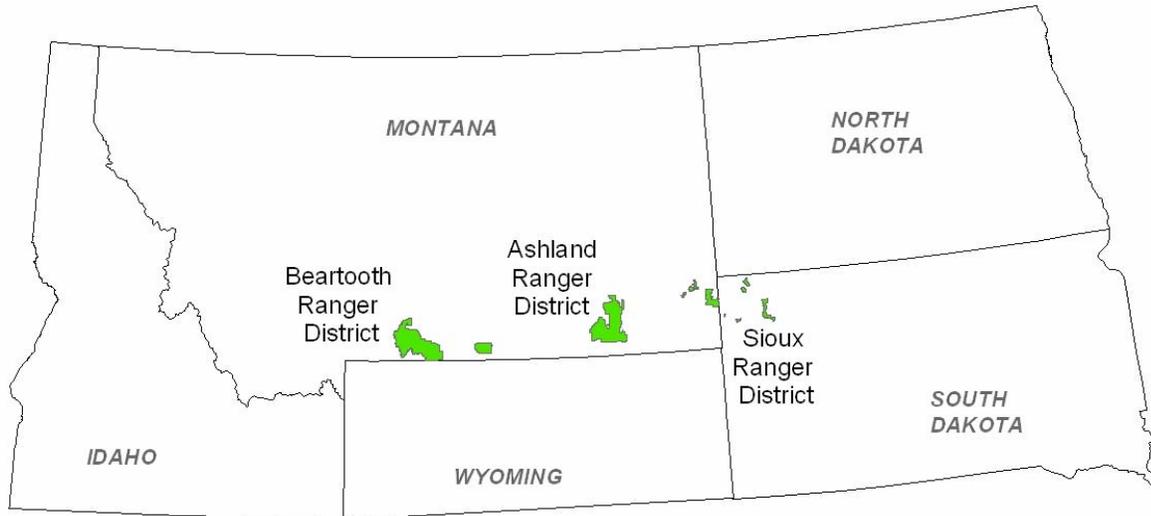
My decision authorizes weed treatment of approximately 14,000 gross acres (approximately 1,500 net acres) of noxious weed infestations with a combination of herbicides (both aerial and ground applications), biological control agents, cultural, and mechanical treatments. Not all of these areas would be treated with herbicides every year. These acres represent actual areas mapped as being infested with weeds. Where infestations are light (i.e., weeds are scattered) and the weeds are spot-sprayed, actual treated acres would be less.

In addition, my decision allows for adaptive management including treatment of new weed species; new weed infestations; and new control methods (including the use of new herbicides, biological control agents, mechanical and cultural techniques), provided that the environmental impacts are within the scope of those disclosed for Alternative 1 as outlined in the accompanying FEIS.

Decision Area

Implementation of the selected Alternative 1 would be applied on Custer National Forest lands in Carbon, Stillwater, Sweet Grass, Park, Powder River, Rosebud, and Carter counties of Montana and Harding County of South Dakota. The CNF 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 National Forest, the Crow and Northern Cheyenne Indian Reservations, and numerous state and private lands.

Vicinity Map



PROJECT BACKGROUND

References to weeds include species found on the State and County noxious weed lists, and other undesirable vegetation (i.e. poisonous plants). Total infested acres are less than 1% of the 1.2 million acres of the Custer National Forest. This equates to an estimated 1,500 net infested acres (within the mapped gross area of 14,000 acres) on the Custer National Forest. Invasive plants are damaging biological diversity and ecosystem integrity within and outside the National Forest. Invasive plant infestations lead to many adverse environmental effects, including: displacement of native plants, reduction in habitat and forage for wildlife and livestock; loss of threatened, endangered, and sensitive species; increased soil erosion and reduce water quality; and reduced soil productivity. Invasive plants can spread to adjacent lands, affecting all land ownerships.

Current management direction for noxious weeds comes from 1986 Records of Decision for Noxious Weed Control on the Custer National Forest and the 1992 Decision Notice for the West Fork of Rock Creek. These documents specified and limited the tools available for the treatment of competing and unwanted vegetation, but did not provide administrative mechanisms for adapting their requirements and adopting new technologies. For example, the four herbicides approved for use by the Forest Service in the previous decisions were developed before 1980. Since that time new herbicides have been developed and registered for use. The new herbicides have advantages for invasive plant control, such as greater selectivity, less harm to desired vegetation, reduced application rates, and lower toxicity to animals and people. Collectively, these earlier NEPA decisions, as they are currently written, do not provide sufficient direction or adequate tools for effectively responding to the invasive plant threat. Also, these earlier documents did not address the use of herbicides in the Absaroka-Beartooth (A-B) Wilderness Area and they did not address the use of aerial application of herbicide outside of the A-B Wilderness Area.

Based on this, I identified the need for management direction that will reduce the extent and rate of spread of invasive plants and help prevent new infestations; the ability to utilize new practices, technologies, and formulations of herbicides that are available for use in invasive plant management; and the ability to update the list of herbicides available for use by the Custer National Forest.

The Final EIS considered two action alternative to meet these needs: Alternative 1 - Proposed Action and Alternative 2 - No Herbicide. The Proposed Action met these needs by minimizing risks to non-target organisms and the public and increasing management flexibility. Alternative 2 increased the emphasis on use of non-herbicide methods of treatment.

I am selecting the Proposed Action from the FEIS, without any modifications. The Proposed Action was identified as the Preferred Alternative in the EIS and remains the basis for my Selected Alternative.

PURPOSE 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 manage weeds aggressively across the Forest. The purpose of the project is to minimize the loss of native plant communities resulting from invasive weeds and allow for management of other undesirable weeds. For a more detailed description of the purpose and need for action, refer to Chapter 1 of the FEIS.

DECISION

Scope of the Decision

As Forest Supervisor, I am the Responsible Official for the decision outlined in this Record of Decision. Based upon the effects of the alternatives, I decided to authorize expanded integrated pest management efforts to control invasive weed infestations and other undesirable plants across the Custer National Forest. This includes an expansion of ground and/or aerial-based application of herbicides. The decision describes when and under what terms and conditions this would occur, and what design criteria (protection measures) would be needed to meet Forest Plan goals and standards. The FEIS documented the environmental analysis and public comment that allowed me to make an informed decision.

Decision

I am adopting the Proposed Action, Alternative 1, as outlined in the FEIS. In making this decision, I considered each alternative as a whole, as well as each alternative's component parts (including protection measures and monitoring).

Forest Plan and Agency objectives for biodiversity, responsibility to health and human safety, responsibility to neighboring lands, and consistency with Federal and State laws dictate an aggressive and effective weed control program. Weed infestations can cause substantial habitat loss as well as negatively affect diversity of plant communities and habitat function.

There is strong public support for taking action on our invasive weed problem. The formal and informal comments of support indicate that the people who live near and recreate on the Forest expect me to take aggressive action to control weeds. I feel any course of action other than Alternative 1 would not be responsive to the public and would not fulfill my responsibility as steward of the Custer National Forest.

The purpose of the new management direction is to facilitate subsequent actions to reduce or control invasive plants or other undesirable plants so that: (1) desired conditions on National Forest System lands can be attained; (2) federal land managers' ability to provide goods and services from the National Forest System lands is maintained; and (3) the Forest Service's ability to cooperate with similar efforts across other ownerships is improved.

This decision approves site-specific projects. Site-specific treatments will be based on location, biology, size of the target invasive plant species, site conditions, integrated resource objectives, and adaptive management concepts. Over time, this decision may be modified in accordance with laws, policies and regulations.

Rationale for My Decision

Noxious weeds and other invasive species are increasing and expanding their range. This knowledge is uncontested. The pattern of expansion is expected to continue through transportation of seeds from increasing commercial and recreational travel across the Custer National Forest and through continued disturbance on all lands in and adjacent to the National Forest (agricultural, residential, recreational and commercial developments). The spread of weeds from other lands in and adjacent to the Custer National Forest will also contribute to increased weed infestation. The number of invader species and their distribution will increase if we do not treat weeds.

I have reviewed all discussions on the current environmental conditions particular to this project, and the direct, indirect and cumulative effects analyses for all actions proposed in each of the alternatives. I have met with various interdisciplinary team members on the status of various analyses and information pertinent to this project. I have also considered comments received from the public and other agencies.

Discussions regarding the management activities to be implemented in Alternative 1 and my rationale for choosing them are presented in the following sections. The criteria I used in comparing the alternatives were:

- The degree to which each alternative met the purpose and need for action;
- The degree to which each alternative resolves significant issues; and,
- The degree to which the alternative is responsive to concerns raised by the public and other agencies.

Relationship to the Purpose and Need

The primary purpose for this project is to minimize the loss of native plant communities resulting from invasive weeds and to allow for effective treatment of other undesirable plants.

Alternative 1: Alternative 1 best meets the purpose and need because it allows for a wide variety of control methods, including treatment in remote areas with the use of aerial application techniques, a variety of herbicides and biological agents, along with the use of cultural and mechanical techniques. This variety of treatment options will allow for better weed control with less impact on other resources. For example, using aquatically approved herbicides within riparian areas will allow for weed control along streams while having a minimal impact on aquatic species.

Alternative 1 also provides for use of the most aggressive techniques over the entire Custer National Forest, including the A-B Wilderness Area. Although aerial application is not authorized as a treatment method within the A-B Wilderness Area, it would be authorized outside the Wilderness Area. Weed spread is fast and aerial application allows us to attack weeds that are creeping into remote areas and in larger areas where post-fire conditions create a seedbed for invasive plants.

The nationwide emphasis on noxious weeds has resulted in the development of better, more effective chemicals. Alternative 1 provides the flexibility to use new herbicides and biological agents tested and registered by the Environmental Protection Agency. It also provides districts with the ability to treat new sites and new invaders in a timely fashion under this Decision.

Alternative 1 provides for the use of adaptive management principles for new weeds, new weed locations, new herbicides, new biological agents, and other new techniques for more aggressive and efficient weed management. Also, since noxious weeds increase and funding does not, Alternative 1 provides priority criteria as outlined in FEIS, Chapter 2.

Alternative 2: I did not select Alternative 2 because it does not meet the purpose and need in an aggressive, efficient, or timely fashion. Alternative 2 relies heavily on the use of biological control agents that have not been proven to be very effective at reducing plant density overall. Only a limited number of weed species have approved biological control agents that provide an adequate level of control slowly over time. As stated in the EIS, biological control is a long-term process. The cost of labor for hand pulling

makes extensive use of this technique not practical. Clearly, this alternative will not aggressively reduce infestations of many of the existing invasive weeds.

Alternative 3: I did not select Alternative 3 because it does not meet the purpose and need in an efficient manner. Most of the weed species would not be controlled in the most effective and efficient manner under Alternative 3. Also, Alternative 3 allows for only the use of four herbicides; picloram, dicamba, glyphosate, and 2, 4-D. The variety of herbicides that would be available under Alternative 1 will prevent the development of herbicide resistance in weed species, will allow for the use of more selective herbicides that cause less impact to non-target plant species, will allow for the use of less toxic herbicides for workers, and will allow for the use of aquatically approved herbicides within riparian areas. Alternative 3 does not allow for herbicide use within the A-B Wilderness Area where there is a need for aggressive weed management methods. Alternative 1 allows for ground applied herbicide treatment within the A-B Wilderness. Alternative 3 does not allow for aerial application of herbicides. Alternative 1 allows for aerially applied herbicide treatment in areas outside of the A-B Wilderness.

Ability to Resolve Significant Issues

An important issue that I considered in my decision is the risk of using herbicides on human health. Alternatives 1 and 3 would use herbicides to control invasive weeds. The final EIS tiers to the risk assessments completed by Syracuse Environmental Research Associated (SERA) under a Forest Service contract (<http://www.fs.fed.us/foresthealth/pesticide/risk.shtml>), the Forest Service, and the EPA. The SERA risk assessment used the best available literature (including peer-reviewed articles from the open scientific literature and current EPA documents including Confidential Business Information) to assess the toxicity of the herbicides and level of exposure for the general public and the workers. The public will not be exposed to herbicide concentrations that exceed safe levels. The workers may be exposed to concentration levels that slightly exceed safe levels if they fail to wear protective equipment, if they use contaminated gloves, or if they are involved in an accidental exposure. All workers will be required to wear clean personal protective equipment and will be trained in safe handling of herbicides, along with emergency response to accidental exposure.

The impact of herbicides on non-target species, such as plants, animals and aquatic resources, was also analyzed in the EIS. Design criteria (protection measures outlined in FEIS, Appendix C) were developed to reduce the risk of herbicides impacting these resource areas and were incorporated into all alternatives that used herbicides. Alternatives 1 and 3 have a low risk of impacting these resource areas because the protection measures were designed to reduce the impact of herbicides on other resources.

The EIS also addressed the concern that aerial spraying might increase the risk of herbicide exposure to people, wildlife, aquatic resources and non-target plants. Alternative 1 has an extensive list of protection measures that are specific to aerial spraying and drift reduction (FEIS, Appendices C and N). These protection measures have been successfully implemented on the Lolo National Forest, and on the Beaverhead-Deerlodge National Forest. Monitoring results have shown that drift is minimal, and no measurable impacts to other resources were detected. I believe that aerial spraying, along with the protection measures outlined in FEIS can be used safely and with minimal impact to other resources.

To ensure that the public is not exposed to herbicides, Alternative 1 would temporarily close areas that are being aerially treated with herbicides. In addition, when ground applications of herbicides are used in developed recreation sites, the sites will be posted stating that the area has been treated and stating when the area is safe to enter (usually within a few hours of treatment). While this may pose a short-term inconvenience to the public, these protection measures will reduce the risk of exposure.

Consideration of Public Comments

In reviewing the comments received on the Draft EIS, I believe that Alternative 1 addresses the concerns raised by the public. Most people were in support of some type of weed control program but expressed concern about chemical toxicity, about the level of monitoring, and that prevention needs serious consideration as a tool to control weeds. These concerns are addressed in more detail in the final EIS, Chapter 6.

Chemical Toxicity: All of the herbicides proposed for use in Alternative 1 have been approved by the EPA and by the Montana Department of Agriculture and South Dakota Department of Environment and Natural Resources, which require a review of scientific information (using both independent peer-reviewed and industry funded research) regarding chemical toxicity. While all herbicides have a low to moderate level of toxicity, no adverse health effects are anticipated because the public will not be exposed to herbicides at levels considered to be toxic. Public areas will be posted or temporarily closed. Most treatment sites are in remote locations. Herbicides are very dilute when applied to vegetation and after an application dries it is difficult to transfer to people or animals. Also, most sites are treated with a spot application, which limits the amounts of herbicides present in any one location. The potential for workers to be exposed to herbicides can be mitigated with the use of personal protective equipment as listed in Appendix M and herbicide labels.

Nevertheless, there are many reports in scientific literature and sections of the EIS that document associations between herbicide exposure and potential human health risks. Moreover, there is a body of literature on herbicide effects that raises concerns about: the additive and synergistic effects of exposure to more than one herbicide; unstudied or unknown consequences of low-level chronic exposures; toxicity of inert ingredients; by-products or contaminants of herbicides; and, uncertainties about the health effects to people who may be sensitive to various chemicals.

I share a concern with many about the human health impacts of these treatments. While we have conducted an in depth analysis of the human health impacts and potential effects of aerial or ground spraying, I also recognize that there will always be data gaps and some degree of uncertainty with any course of action I select. I do not take this responsibility lightly. I directed the planning team to include protection measures that ensure the highest possible level of caution based not only on literature, models and research, but also on carefully reviewed actual on the ground projects. While some degree of uncertainty will always exist, I feel that by being careful, following herbicide product labels, and using the protection measures I have included in my decision, there will be no significant effect to public health from the use of herbicides in this project. I am more certain of the risks and damage caused from invasive weeds than I am uncertain of the risks posed by herbicides.

Level of Monitoring: This project includes a monitoring plan that documents existing weed populations, the treatments, and the effectiveness of the treatments. The monitoring plan also documents how to measure drift from aerial application, and how to measure water samples whenever there is reason to suspect herbicide contamination. I believe these will be more than adequate for the purpose of measuring the effectiveness of this project and measuring unintended impacts.

Weed Prevention: Prevention measures and best management practices currently exist. A comprehensive guide applicable to all alternatives is outlined in FEIS, Appendix C. As stated earlier, the scope of my decision is limited to the treatment of weed infestations.

PUBLIC INVOLVEMENT PROCESS AND ISSUES

Public Involvement

Public participation helps the Forest Service identify concerns with possible effects of its proposals. It is also a means of disclosing to the public the nature and probable consequences of actions on National Forest land. A public involvement strategy for this project was developed to ensure that potentially interested members of the public and other government agencies received timely information about the proposal in order to be able to fully participate in the planning process. Throughout its duration, the project was also listed in each Custer National Forest (CNF) quarterly Notice of the Schedule for NEPA projects which is mailed to about 200 individuals.

In order to help identify specific areas of concern, a scoping document was sent to 360 individuals, government agencies, tribal interests, news media, businesses, and organizations that had shown interest in similar projects on the CNF. This document provided information on the purpose and need for the project, described the proposed action, and asked for comments.

All respondents were in agreement that invasive weeds and other undesirable plants are of urgent concern on the Custer National Forest and that steps should be taken to reduce or eliminate their presence. Of these, all but one supported the use of herbicides as part of the proposal, although some had questions or comments concerning the effects of the herbicides. The remaining one commenter either questioned the need for using herbicides or was concerned about the environmental effects of using herbicides. The interdisciplinary team and I considered all public comments and they are documented in the project file.

On August 18, 2006, the Notice of Availability was published in the Federal Register. This officially started the 45-day comment period for the Draft EIS. A legal notice was published in Billings Gazette and Rapid City Journal on August 21, 2006 and August 22, 2006, respectively. On August 22, 2006 a news release was mailed to 14 newspapers¹. Copies of the Draft EIS were mailed to 11 agencies and 23 individuals². Five comments were received. Chapter 6 outlines the comments and Forest Service responses.

Based on these comments, a few minor changes were made between the Draft EIS and Final EIS as follows: the water quality monitoring section in Chapter 2 was expanded to include water quality monitoring results from the West Fork of Rock Creek; a reference to an available water quality monitoring technique was included in Chapter 5, Reference Section; minor typographical corrections were made; minor tabular corrections in tables were made; a few scientific names were updated; some grammar errors were corrected; some sentences were restructured for clarification; gravel pit weed prevention guidelines were clarified in Appendix D; updates on some biological agents were incorporated; Appendix C biological control section was expanded to allow for consideration of maintaining successful bio-control sites as a distribution sources for bio-agents; a more thorough discussion of weed spread vectors was incorporated into Appendix D; and a statement was added to page 3-49 which requires surface water to be free from substances that create concentrations which are toxic or harmful to aquatic life per Montana Water Quality Standards.

Key Issues

Public involvement resulted in the identification of the following issues, which define the scope of the analysis and development of the Alternatives. They are:

Effects on Vegetation, Biological Diversity, Production, and Structure: There is a concern with potential impacts on vegetation, biological diversity, production, and structure from not aggressively treating weeds through an integrated pest management strategy. More specifically the respondents were concerned about further spread of infestations and new starts of new invasive species. They were also concerned about loss of biological diversity, productiveness of the land, and changes in functional plant groups and structure of the vegetation (i.e., native grasslands converting to knapweed).

Effects of Herbicides on Human Health: There is a concern with potential impacts on human health from the use of herbicides to control weed infestation. More specifically they were concerned about the acute and chronic toxicity effects of low-level exposure. Some were concerned about the amounts and combination of herbicides and the synergistic effects of herbicide combinations. Respondents also wanted to know how people who are sensitive to herbicides would be protected. Some were concerned about drift from either ground or aerial applications.

Potential effects on human health from herbicides use have been addressed and considered by the EPA (Environmental Protection Agency), as well as the Forest Service. The analysis of risk to human health is contained in the Human Health section of Chapter 4.

Effects of Herbicide on Soils, Water, and Aquatic Resources: Respondents expressed concern about effects of herbicides used for weed control on water quality and aquatic organisms (fisheries, insects and

¹ News Releases sent to Stillwater Co. News, Carbon Co. News, Lovell Chronicle, Billings Gazette, The Outlook, The Outpost, Yellowstone Co. News, Miles City Star, Powder River Examiner, Nation News, Bowman Co. Pioneer, Rapid City Journal, Independent Press, The Ekalaka Eagle Newspapers

² The DEIS mailing list was based upon responses from a March 24, 2006 notice to the mailing list for project scoping. This March mailing asked for response from those interested in staying on the project mailing list and what kind of format they wanted to receive (hard copy, compact disk, executive summary, and/or access via weblink).

amphibians). Some respondents expressed concern about herbicide drifting from treatment areas into riparian areas, streams, and other lands with unintended consequences. The specific concern was that aerial applied herbicides could not be effectively controlled.

Effects of Herbicide on Threatened, Endangered, or Sensitive Species and Habitats: There is concern about effects of herbicides used for weed control on threatened, endangered, or sensitive species and their habitats.

Effects of Herbicide on Wildlife: There is concern about the effects of herbicides on wildlife, and the risk of bio-accumulation of herbicides within the environment.

Other Issues: In addition to the key issues identified earlier, other concerns were expressed and protection measures (see Appendix C in the EIS) were developed that reduces their significance. These concerns, analyzed in Chapter 4, include the following:

- Effects of weed management on wilderness, recommended wilderness, inventoried roadless areas, wild and scenic rivers, and research natural areas;
- Effects of weed management on recreation users;
- Effects of weed management on heritage resources; and
- Effects of weed management on social and economic considerations, including effects on Partnerships/Cooperators.

No additional alternatives were presented throughout the public involvement process. All comments were analyzed and incorporated in the Final EIS. Many encouraged use of new herbicides registered by the EPA and urged aggressive treatment of weeds.

Some respondents supported weed control but expressed concern about chemical toxicity, adequate buffers for herbicide use near open water, potential for leaching, and control of vectors of weed spread. The analysis included design criteria to provide protection measures for fish, wildlife, and non-target plants from harmful effects.

Some question the adequacy of testing and registration of herbicides and weed spread from off highway vehicle use. None of the comments argued with the need for weed control. Alternative 1 addresses chemical related concerns and contains protection measures for potentially negative effects.

ALTERNATIVES CONSIDERED BUT NOT STUDIED IN DETAIL

As a result of comments made during the initial scoping period and on the Draft EIS, the following alternatives were considered but dismissed from detailed analysis because they are beyond the scope of the analysis or are not substantially different from other alternatives being considered (EIS, page 2-4).

Prohibit all activities that spread weeds. An alternative that alters or eliminates activities that provides vectors for weed infestation and spread, was identified by the public during scoping for consideration as an alternative to be analyzed in the EIS. The intent of the alternative is to address and take action on human activities that promote the spread of weeds, specifically, close roads, modify authorized livestock grazing permits, and alter or eliminate existing timber, mining and recreational OHV activities. These human uses and activities are authorized through previous decisions made in the Record of Decision for the Custer National Forest Plan, which incorporates requirements of several public land laws and regulations authorizing multiple uses on National Forest Systems lands. Taking action on activities, authorized under existing public laws, regulations, permits, and the Custer Forest Plan, which may contribute to the spread of weeds, is beyond the scope of this EIS and was not considered further.

Prevention measures (FEIS, Appendix D) that minimize establishment and spread of noxious weeds are already a part of Forest Service policy and recent decisions, and therefore were not 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.

No Weed Treatment. An alternative that discontinues the current weed management program was considered but eliminated from detailed analysis because it does not meet any of the project purposes, does not comply with the Forest Service's Integrated Pest Management program, is inconsistent with Forest Service policy that noxious weeds and their adverse effects be managed on National Forests, and violates federal and state laws and executive orders. It also would be irresponsible of the Forest Service to ignore weeds on the Custer National Forest when their presence may impact weed control on adjacent private and public lands.

Use Herbicide Only After Other Treatment Methods Failed. Other alternatives also eliminated from detailed analysis included mechanical, vegetative, biological, and combinations of treatments followed by herbicides application if these treatments are unsuccessful. This alternative was eliminated because there is concern that if the non-herbicide treatments fails and some time passes before this failure is determined, the subsequent weed infestation may have expanded substantially beyond the original acreage, thus further impacting forest resources. The need for increased follow-up herbicide treatments would then have greater potential impacts than the original action. Such an occurrence would not be consistent with meeting project purpose and need.

BRIEF DESCRIPTION OF ALTERNATIVES STUDIED IN DETAIL

Three alternatives were developed and analyzed in the EIS. As described in Chapter 2, the decision to be made is not *whether* to treat weeds, but *how*. The alternatives were developed to address objectives in all areas of the Custer National Forest.

Alternative 1 includes all integrated pest management (IPM) methods used for existing weed control, use of additional herbicides registered by the EPA (2, 4-D, aminopyralid, chlorsulfuron, clopyralid, dicamba, diuron, glyphosate, hexazinone, imazapic, imazapyr, metsulfuron methyl, picloram, sulfometuron methyl, and triclopyr.), herbicide use within the Absaroka- Beartooth Wilderness Area, and aerial application of herbicides outside of the A-B Wilderness Area.

Alternative 2 is to use all integrated pest management methods, but without the use of herbicides. This alternative addresses concerns about chemical contamination of public lands.

Alternative 3 takes no action to change the current integrated pest management including ground based herbicide treatment with only four herbicide choices authorized in 1987 (2, 4-D, dicamba, glyphosate, and picloram), no herbicide use within the A-B Wilderness Area, and no aerial application is authorized.

Alternative 1 was selected because it best protects native species and habitat diversity with protection measures adequate to protect resources.

The following table displays weed treatment by alternative.

TABLE 1. TREATMENT ACRES (NET AREA) BY ALTERNATIVE³

Alt. ⁴	Biological Control	Cultural/Mechanical*	Aerial Herbicide	Ground Herbicide	Ground Herbicide inside Wilderness	Tall Larkspur Herbicide	Infra-structure Herbicide	Weed Acres Not Treated by Herbicide
1	155	5	85 ⁵	1415	45	60	5	0
2	155	5	0	0	0	0	0	1340
3	155	5	0	1415	0	0	0	45

³ Some acres are counted more than once because more than one species is present on the same site and each species may have unique treatment strategy.

⁴ For all alternatives except Alternative 2, herbicides will be used in conjunction with biological, cultural, and mechanical control methods.

⁵ Aerial estimated acreages are mapped where infestations are currently spotty, but are anticipated to grow rapidly due to the difficulty in treating weeds in rough and inaccessible terrain.

Summary of Potential Impacts between Alternatives

With each alternative, there is a trade-off between beneficial and adverse impacts. This section focuses on issues described earlier and in Chapter 2 of the EIS. Key components of these issues are impacts to human health, non-target plants, animals, fish, soils, and water. Impacts are based upon the application of appropriate protection measures outlined in EIS. These tradeoffs are analyzed in Chapter 4 of the EIS and summarized in the following Tables (FEIS, Appendix C).

TABLE 2. SUMMARY OF POTENTIAL IMPACTS BETWEEN ALTERNATIVES

Issue or Concern	Potential Impacts		
	Alt. 1- Proposed Action	Alt. 2 – No Herbicides	Alt. 3- No Action; Current Management
Impacts of weed spread: <ul style="list-style-type: none"> • Loss of native plant community; wildlife and fisheries habitats • Loss of sensitive plant populations; • Human Health (e.g. allergies, asthma) • Social/Economics 	<ul style="list-style-type: none"> - Maximizes native species emphasis -Low risk, effective protection measures - Decrease weed impact -Moderate economic improvement; containment and control of weed infestations 	<ul style="list-style-type: none"> - High loss of natives from weeds -High risk (weeds out compete rare plants) - Increased allergies -Spread of weeds would continue and impact wildlife and aquatic habitats, biological integrity, forage bases, fire regimes, partnership and cooperator relationships, and continued animal death from poisonous weeds. Social lifestyles associated with Wilderness experience will be diminished. 	<ul style="list-style-type: none"> - Moderate loss of natives from weeds -High risk (weeds out compete rare plants) - Decrease weed impact -Moderate economic improvement; containment and control of weed infestations. Continued animal death from poisonous weeds. Social lifestyles associated with Wilderness experience will be diminished.
Impacts of using herbicides: <ul style="list-style-type: none"> • Human health; • Fish and animals; • Non-target plants; • Water quality • Heritage Resources 	<ul style="list-style-type: none"> -Low risk of worker exposure to herbicides due to area treated and IPM methods, effective protection measures; -Low risk, effective protection measures; short-term habitat impact; insignificant Forestwide. -Low risk, effective protection measures; short-term habitat impact; insignificant Forestwide. -Low risk, effective protection measures. -Low risk, effective protection measures. 	<ul style="list-style-type: none"> - No potential for worker exposure to herbicides; some risk involved with mechanical methods such as tilling. - No risk - No risk - No risk - No risk 	<ul style="list-style-type: none"> -Low risk, effective protection measures -Low risk, effective protection measures; short-term habitat impact; insignificant Forestwide. -Low risk, effective protection measures; short-term habitat impact; insignificant Forestwide. -Low risk, effective protection measures -Low risk, effective protection measures.
Additional risks of aerial spraying: <ul style="list-style-type: none"> • Human health; • Fish and animals; • Non-target plants. 	<ul style="list-style-type: none"> -Low risk, effective protection measures -Low risk, effective protection measures -Low risk, effective protection measures. 	<p>N/A –no aerial herbicide application</p>	<p>N/A – no aerial herbicide application</p>
Impacts of Non-herbicide treatments (Mechanical and Cultural) <ul style="list-style-type: none"> • Air Quality 	<ul style="list-style-type: none"> -Moderate short-term emissions; air quality standards will not be exceeded. 	<ul style="list-style-type: none"> -Moderate short-term emissions; air quality standards will not be exceeded 	<ul style="list-style-type: none"> -Moderate short-term emissions; air quality standards will not be exceeded.

Issue or Concern	Potential Impacts		
	Alt. 1- Proposed Action	Alt. 2 – No Herbicides	Alt. 3- No Action; Current Management
<ul style="list-style-type: none"> Water Quality / Fisheries Soils Vegetation Heritage Resources 	<p>-Insignificant effects to water quality; effective protection measures.</p> <p>-Low potential for short-term insignificant soil impacts or surface erosion from mechanical treatment methods.</p> <p>-Best weed control; minimum impact to non-target vegetation from biological treatment.</p> <p>-Low probability of site damage from mechanical methods.</p>	<p>-Insignificant effects to water quality.</p> <p>-Moderate to low potential for short-term insignificant soil impacts or surface erosion from mechanical treatment methods.</p> <p>-Poor weed control by mechanical methods with minimum impact to non-target vegetation from biological treatment.</p> <p>-Some probability of site damage from mechanical methods.</p>	<p>-Insignificant effects to water quality; effective protection measures.</p> <p>-Low potential for short-term insignificant soil impacts or surface erosion from mechanical treatment methods.</p> <p>-Good weed control with minimum impact to non-target vegetation from biological treatment.</p> <p>-Low probability of site damage from mechanical methods.</p>
<p>Wilderness Character</p> <ul style="list-style-type: none"> Natural Integrity Solitude and Remoteness Regional Forester Authority 	<p>-Maximizes natural integrity</p> <p>-Minor short-term effects when recreational users encounter weed control crews.</p> <p>Pesticide Use Proposal needs approval from Regional Forester</p>	<p>-Natural integrity erodes the most with increasing weed infestations. Higher probability for recreation setting to be disturbed by stickers and weed latex.</p> <p>-Short-term effects, crews spend more time treating weeds, chance for encounters increase.</p> <p>N/A</p>	<p>- Natural integrity erodes some with increasing weed infestations.</p> <p>-Minor short-term effects when recreational users encounter weed crews.</p> <p>Pesticide Use Proposal needs approval from Regional Forester (FSM 2150)</p>
<p>Visual / Recreation Setting / Wild and Scenic Rivers</p>	<p>Little to no visual disturbance from biological methods; some short/long-term reoccurring visual disturbance from tilling/burning; little effect on recreation setting. Good improvement at recreation sites with treated infestations. Temporary closure during treatment.</p>	<p>Little to no visual disturbance from biological methods; some short/long-term reoccurring visual disturbance from tilling/burning; little effect on recreation setting. More likely to encounter plant annoyances such as stickers, burs, and weed latex. No additional constraints required.</p>	<p>Little to no visual disturbance from biological methods; some short/long-term reoccurring visual disturbance from tilling/burning; little effect on recreation setting. Good improvement at recreation sites with treated infestations. Temporary closure during treatment</p>
<p>Social and Economic Considerations</p>	<p>Some loss of forage and habitat for livestock and wildlife.</p> <p>The impact of weed infestations spreading on the private land and being an additional hardship is less likely.</p> <p>Partnerships continue.</p>	<p>Higher loss of forage and habitat for livestock and wildlife.</p> <p>The impact of weed infestations spreading on the private land and being an additional hardship is much more likely.</p> <p>Partnerships are not likely.</p>	<p>Some loss of forage and habitat for livestock and wildlife.</p> <p>The impact of weed infestations spreading on the private land and being an additional hardship is less likely</p> <p>Partnerships continue.</p>
<p>Effectiveness of control actions</p> <ul style="list-style-type: none"> Limit spread, or eliminate existing infestations Percent area treated based on current budget. 	<p>Very Effective</p> <p>80-95 % plus adaptive management options for new infestations.</p>	<p>Not Very Effective</p> <p>10 %</p>	<p>Effective on limited area; no herbicide use in A-B Wilderness; no adaptive management and fewer protection measures than Alternative 1.</p> <p>70-80 %</p>

DETAILED DESCRIPTION OF THE SELECTED ALTERNATIVE 1

The Proposed Action, Alternative 1 will provide annual weed control on about 1,500 net infested acres (approximately 14,000 managed gross acres) of noxious weeds, 60 net acres tall larkspur, and 5 net acres for infrastructure maintenance (i.e., paved road shoulder maintenance). Methods will employ integrated pest management treatments and strategies. Actual treatment would provide for adaptive management practices while addressing current infestations as follows:

- About 1415 net infested acres of ground herbicide application (includes 45 acres in the A-B Wilderness Area);
- About 85 net infested acres aerial treatment application is proposed. Currently, there are about 5 net acres of infestation in the Dry Creek area and about 80 net acres of infestation in the Stillwater area of the Beartooth Ranger District. These areas have potential for aerial treatment needs in the near future due to their remote and steep characteristics. These characteristics reduce the ability for effective ground treatment and have a potential to spread to about 7,300 acres of remote and inaccessible areas.
- About 155 acres of biological control is proposed. Herbicide treatment will be used along the perimeter and small patches to contain the weeds. Current targeted areas include 80 acres - Stillwater, 5 acres - Dry Creek, 28 acres - Rock Cr, 20 acres - Ski Run Rd, 2 acres - Pryor Mountain (Beartooth Ranger District), 10 acres - Powder River Breaks (Ashland Ranger District), 10 acres - Long Pines (Sioux Ranger District).
- Less than 5 acres is proposed to be treated by hand-pulling (herbicides may be used to reduce plant density to low levels, then isolated plants will be pulled);
- Less than 5 acres of cultural treatment of seeding is proposed. Herbicides or grazing may be used to reduce plant density, then more desirable and competing vegetation will be seeded; tilling or burning will most likely apply if future populations are more sizable as to make the treatment more cost effective.
- About 60 acres of tall larkspur control of ground herbicide application is proposed.
- Less than 5 acres for infrastructure maintenance or construction. This includes periodic treatment along paved road shoulders. This will help maintain paved road investment by reducing undesirable plant growth from creating hairline cracks in and along shoulders of paved roads. Undesirable plants may increase maintenance costs of the infrastructure, can be a safety problem, or cause injury.

Prevention policy, project risk assessment protocol, and Best Management Practices (BMPs) for weed prevention and weed management will continue to be implemented in conjunction with implementation of Alternative 1 (FEIS, Appendix D).

The Administration Travel Policy will be enforced. The policy conforms to the letter written by the Regional Forester in Appendix D of the *Off-Highway Vehicle FEIS for Montana, North Dakota, and Portions of South Dakota* (USDI BLM – USDA FS, 2001) regarding administrative off-road travel. Motorized, wheeled cross-country travel for all Northern Region employees is limited to necessary administrative and emergency business. Some examples of necessary administrative use include prescribed fire, noxious weed control, and revegetation.

Implementation would occur within a 15 year period. Not all acres would be treated every year. Acres treated will depend on available funding and on a priority rating system described in Appendix E, Table E - 1. Historical funding has allowed for treatment of between 600 and 1,200 acres annually. Most areas would need repeated treatment for 5 to 8 years to ensure effective control. Monitoring would be used to determine effectiveness and to identify areas that would need re-treatment or if treatment areas could be reduced based on effectiveness of previous treatments.

The following table (FEIS, Appendix A) contains a current list of 53 invasive and poisonous plants that occur on the Custer Forest or occur nearby. The list will be updated as new plants are recognized as a threat to the ecosystem or agricultural economics.

TABLE 3. WEED SPECIES OF CONCERN⁶ (Those species in **bold** type occur on the Custer National Forest)

Common Name	Scientific Name	MT & County Lists ⁷ & Category	SD List ⁸	WY List ⁹	GYCC Category ¹⁰	Occurs on Beartooth RD	Occurs on Ashland RD	Occurs on Sioux RD
State Listed Wide Spread Invaders								
Canada Thistle	<i>Cirsium arvense</i>	S-1	S	S	1	X	X	X
Common Tansy	<i>Tanacetum vulgare</i>	S-1	L		1			
Dalmatian Toadflax	<i>Linaria dalmatica</i>	S-1	L	S	2	X		
Diffuse Knapweed (White Knapweed)	<i>Centaurea diffusa</i>	S-1	L	S	3			
Field Bindweed	<i>Convolvulus arvensis</i>	S-1	S	S	2	X		
Houndstongue (Gypsy Flower)	<i>Cynoglossum officinale</i>	S-1	L	S	1	X	X	
Leafy Spurge	<i>Euphorbia esula</i>	S-1	S	S	2	X	X	X
Ox-eye Daisy	<i>Chrysanthemum leucanthemum</i>	S-1		S	1	X		
Perennial Sowthistle (Field Sowthistle)	<i>Sonchus arvensis</i>	L-Carbon	S	S	2			
Russian Knapweed (Hardheads)	<i>Acroptilon repens</i> (<i>Centaurea repens</i>)	S-1	S	S	3			X
Spotted Knapweed	<i>Centaurea maculosa</i>	S-1	S, L	S	1	X	X	X
Common St. Johnswort	<i>Hypericum perforatum</i>	S-1	L		1			
Sulfur Cinquefoil	<i>Potentilla recta</i>	S-1			1	X		
Whitetop	<i>Lepidium draba</i>	S-1	S	S	2			
Yellow Toadflax (Butter and Eggs)	<i>Linaria vulgaris</i>	S-1	L	S	1	X		
State Listed Rapidly Spreading Invaders								
Dyer's Woad	<i>Isatis tinctoria</i>	S-2		S	3			
Meadow Hawkweed	<i>Hieracium pratense</i>	S-2			2	X		
Orange Hawkweed	<i>Hieracium aurantiacum</i>	S-2			1	X		
Perennial Pepperweed (Broadleaved Pepperweed)	<i>Lepidium latifolium</i>	S-2		S	3			
Purple Loosestripe	<i>Lythrum salicaria</i>	S-2	S	S	3			
Salt Cedar (Tamarisk)	<i>Tamarix spp.</i>	S-2		S			X	
Tall Buttercup	<i>Ranunculus acris</i>	S-2			2			

⁶ Species of Concern are currently identified state and county listed noxious weeds, and other undesirable weed species.

⁷ From Montana Dept. of Ag, 6/27/2003 State Weed List and Montana Dept. of Ag, 2003 (<http://agr.state.mt.us/weedpest/noxiousweedslist2.asp>), Carbon, Stillwater, Sweet Grass, and Rosebud County lists (<http://www.umt.edu/mnps/countyweedlist.pdf>)

Montana Noxious Weed List Categories (South Dakota Weed List is not categorized like Montana Weed List, but are grouped in the above Table under a related category):

- 1 = Category 1 noxious weeds are weeds that are currently established and generally widespread in many counties of the state. Management criteria include awareness and education, containment, and suppression of existing infestations and prevention of new infestations. These weeds are capable of rapid spread and render land unfit or greatly limit beneficial uses.
- 2 = Category 2 noxious weeds have recently been introduced into the state or are rapidly spreading from their current infestation sites. These weeds are capable of rapid spread and invasion of lands, rendering lands unfit for beneficial uses. Management criteria include awareness and education, monitoring and containment of known infestations and eradication where possible.
- 3 = Category 3 noxious weeds have not been detected in the state or may be found only in small, scattered, localized infestations. Management criteria include awareness and education, early detection and immediate action to eradicate infestations. These weeds are known pests in nearby states and are capable of rapid spread and render land unfit for beneficial uses.
- S = State listed species
- L = Locally listed species by County.

⁸ South Dakota Dept. of Ag, 2004. (<http://www.state.sd.us/doa/das/noxious.htm#weed>)

⁹ Rice, 2003.

¹⁰ USDA, 2002.

GYCC Priority key by Category: Categories developed for the Greater Yellowstone Area by the Greater Yellowstone Coordinating Committee

1 = 3rd Priority; Widespread Invaders; goal is containment within infested areas and reduction of plant populations;

2 = 2nd Priority; New Invaders; goal is containment within already infested areas and strong emphasis on reduction of populations;

3 = 1st Priority; Potential Invaders; Currently absent from Custer NF; goal is prevention; however, if these species are found on the Custer NF, they would be considered for treatment with herbicides with the goal of eradication.

Common Name	Scientific Name	MT & County Lists ⁷ & Category	SD List ⁸	WY List ⁹	GYCC Category ¹⁰	Occurs on Beartooth RD	Occurs on Ashland RD	Occurs on Sioux RD
Tansy Ragwort (Stinking Willie)	<i>Senecio jacobaea</i>	S-2			2			
State Listed New Invaders								
Common Crupina	<i>Crupina vulgaris</i>	S-3			3			
Eurasian Common Milfoil (Spike Watermilfoil)	<i>Myriophyllum spicatum</i>	S-3			2			
Russian Skeletonweed (Hogbite)	<i>Chondrilla juncea</i>	S-3			3			
Yellow-Starthistle	<i>Centaurea solstitialis</i>	S-3			3			
Yellow Flag Iris (Pale Yellow Iris)	<i>Iris pseudacorus</i>	S-3						
County Listed Invaders								
Bull Thistle	<i>Cirsium vulgare</i>	L-Sweet Grass	L			X		
Common Burdock (Lesser Burrdock)	<i>Arctium minus</i>	L-Stillwater & Sweet Grass	L	S	1			
Common Cocklebur (Rough Cockleburr)	<i>Xanthium strumarium</i>	L-Sweet Grass						
Common or Absinth Wormwood (Absinthium)	<i>Artemisia absinthium</i>	L-Carbon	L		1			
Common Mullein	<i>Verbascum thapsus</i>	L-Stillwater	L		1	X		X
Flowering Rush	<i>Butomus umbellatus</i>	L-Carbon						
Milk Thistle (Blessed Milk Thistle)	<i>Silybum marianum</i>	L-Carbon						
Spiney Plumeless Thistle	<i>Carduus acanthoides</i>		L	S				
Poison Hemlock	<i>Conium maculatum</i>	L-Rosebud			3		X	
Puncture Vine	<i>Tribulus terrestris</i>		L					
Scotch Thistle (Scotch Cottonthistle)	<i>Onopordum acanthium</i>	L-Carbon, Rosebud, Sweet Grass	L	S				
White Bryony	<i>Bryonia alba</i>	L-Carbon			3			
Other Invaders (also see Appendix B)								
Blueweed (Common Vipersbugloss)	<i>Echium vulgare</i>				3			
Goatsbeard / Meadow Salsify (Jack-Go-To-Bed-At-Noon)	<i>Tragopogon pratensis</i>				3			
Creeping Bellflower (Rampion Bellflower)	<i>Campanula rapunculoides</i>				2			
Hairy Whitetop	<i>Cardaria pubescens</i>			S				
King-Devil Hawkweed Tall Hawkweed)	<i>Hieracium piloselloides</i>				2			
Kochia (Mexican Fireweed)	<i>Kochia scoparia</i>				3			
Purple Mustard (Cross Flower)	<i>Chorispora tenella</i>				3			
Quackgrass	<i>Agropyron repens</i>			S				
Reed Canarygrass	<i>Phalaris arundinacea</i>				1			
Scentless Chamomile (False Mayweed)	<i>Matricaria maritima</i>				3			
Sheep Sorrel (Common Sheep Sorrel)	<i>Rumex acetosella</i>				1			
Yellow-Devil Hawkweed	<i>Hieracium floribundum</i>				2			
Poisonous Weeds								
Tall Larkspur (Duncecap Larkspur)	<i>Delphinium occidentale</i>	L-Custer NF				X		

One feature of the selected Alternative 1 is the flexibility to use updated agents as they are registered and approved by the EPA (FEIS, Appendix E). All herbicides will be applied according to label specification; or when additional protection measures are required by Forest Service policy as described in the FEIS and FEIS, Appendix C. Impacts on soil and water will be mitigated to meet public land water laws, state pesticide application requirements, Northern Region Soil and Water Standards, and Custer Forest Plan Standards. The following table (FEIS, Appendix G) lists the herbicides addressed in this analysis.

TABLE 4. EPA REGISTERED HERBICIDES AVAILABLE FOR CONTROL¹¹

Common Name	Partial List of Trade Names	Target Weed Species (general)
2,4-D*	Hi-Dep®, Weedar 64®, Weed RHAP®, Amine 4®, Aqua-Kleen (Amines)	Foliage applied. Selective. Some broadleaf, woody and aquatic plants susceptible. Thistles, sulfur cinquefoil, dyers woad, knapweeds, purple loosestrife, tall buttercup, whitetop
Aminopyralid	Milestone	Foliage applied. Selective. Many broadleaf weeds. Tolerated by most grasses. Perennial and biennial thistles, knapweeds, sulfur cinquefoil
Chlorsulfuron	Telar®	Foliage applied. Selective. Some broadleaf plants and grasses susceptible. Dyer's woad, thistles, common tansy, houndstongue, whitetop, tall buttercup, toadflax
Clopyralid	Stringer®, Curtail®, Transline®, Redeem®	Foliage applied. Selective. Many broadleaf and woody species susceptible. Thistles, yellow starthistle, hawkweeds, knapweeds, rush skeletonweed, oxeye daisy
Dicamba	Banvel®, Clarity®, others	Foliage applied. Selective. Some broadleaf plants, brush and vines susceptible. Houndstongue, yellow starthistle, common crupina, hawkweed, oxeye daisy, tall buttercup, blueweed, leafy spurge, tansy ragwort, knapweeds
Diuron	Diuron 4L	Applied pre- or post-emergence. Broad spectrum. Most annual and perennial broadleaf plants, grasses and some woody vegetation. Annual weeds and broadleaves for infrastructure maintenance needs such as right-of-ways
Glyphosate	Roundup®, Rodeo®, Accord®, Glyphomate®	Foliage applied. Nonselective. Most plants are susceptible. Broad spectrum for broadleaf plants and grasses. Purple loosestrife, field bindweed, yellow starthistle, thistles, cheatgrass, common crupina, toadflax
Hexazinone	Velpar®, Pronone 10G®	Broad spectrum control with some selectivity for conifers. Cheatgrass, oxeye daisy, yellow starthistle, thistles
Imazapic	Plateau®	Foliage applied. Selective. Some broadleaf plants and grasses susceptible. Cheatgrass, leafy spurge, toadflax
Imazapyr	Arsenal®, Chopper®	Applied pre- or post-emergence. Broad spectrum. Most annual and perennial broadleaf plants, grasses and woody vegetation. Dyers woad, field bindweed
Methsulfuron methyl	Escort, Ally	Applied pre- or post-emergence. Selective. Some broadleaf weeds and annual grasses. Houndstongue, thistle, sulfur cinquefoil, common crupina, dyers woad, purple loosestrife, common tansy, whitetop, blueweed
Picloram	Tordon®, Grazon®, Pathway®	Foliage applied. Selective. Most annual and perennial broadleaf and woody plants are susceptible. Grasses are tolerant. Thistles, yellow starthistle, common crupina, hawkweeds, knapweeds, rush skeleton weed, common tansy, toadflax, leafy spurge
Sulfometuron methyl	Oust®	Applied pre- or post-emergence. Broad spectrum. Many annual and perennial grasses and broadleaf plants. Woody vegetation tolerant. Cheatgrass, whitetop, oxeye daisy, tansy ragwort, musk thistle
Triclopyr	Garlon®, Redeem®, Remedy®	Foliage applied. Selective. Woody plants, some broadleaf plants, and root-sprouting species are susceptible. Grasses are tolerant. Hawkweed, sulfur cinquefoil, purple loosestrife, knapweed, oxeye daisy, thistle

Herbicide selection would be based on environmental conditions (such as groundwater vulnerability, proximity to water, and non-target vegetation) to meet management objectives. FEIS Appendix F displays herbicide effectiveness by species. FEIS Appendix I outlines weed species specific integrated pest management (IPM) treatment guidelines, including recommended application rates. The following table briefly displays some IPM treatment methods by species.

¹¹ EPA Registered Herbicides Available for Control under Proposed Action - Alternative 1. Ammonium sulfate, an adjuvant, can also be effective as an herbicide on tall larkspur.

TABLE 5. QUICK GUIDE FOR TREATMENT METHODS BY SPECIES^{12 13} (See FEIS, Appendix I for Detailed Information)

Noxious Weed (Known)	Treatment Method				
	Biological	Herbicide ¹⁴	Grazing	Mechanical ¹⁵	Fire
Leafy Spurge	Flea beetles (<i>Apthona nigriscutis</i> , <i>A. lacertosa</i> , <i>A. czwalinae</i> , <i>A. adominalis</i> , <i>A. cyparissiae</i> , <i>A. flava</i>) long-horned beetle (<i>Oberea erythrocephala</i>), gall midge (<i>Spurgia esulae</i>), Leafy spurge hawkmoth (<i>Hyles euphorbiae</i>)	picloram+ dichlorophenoxyacetic (2, 4-D), imazapic, dicamba, glyphosate, 2,4-D, sulfometuron methyl.	Sheep or goat grazing	Hand pulling	In combination with other treatments
Spotted knapweed	Root weevil (<i>Cyphocleonus achates</i>), knapweed root moth (<i>Agapeta zoegana</i>), knapweed flower weevils (<i>Larinus minutus</i> and <i>Larinus obtusus</i>), etc.	aminopyralid, triclopyr, clopyralid, picloram, clopyralid +2, 4-D		Hand Pulling	
Russian knapweed		aminopyralid, triclopyr, clopyralid, imazapic Metsulfuron methyl, clopyralid +2, 4-D		Hand Pulling	
Canada thistle	Thistle stem weevil (<i>Ceutorynchus litura</i>) thistle stem gall fly (<i>Urophora cardui</i>)	aminopyralid, clopyralid +2, 4-D, picloram, picloram+2, 4-D, triclopyr, 2,4-D clopyralid, imazapic		Mowing	In combination with other treatments
Saltcedar	<i>Diorhabda elongata</i> (leaf beetle)	imazapyr, imazapyr+ glyphosate, triclopyr		Cutting	In combination with other treatments
Absinth wormwood		picloram, clopyralid +2, 4-D, triclopyr, clopyralid, dicamba, 2,4-D, glyphosate		Mowing	
Musk thistle	Thistle crown weevil (<i>Trichosirocalus horridus</i>)	aminopyralid, picloram, clopyralid, triclopyr, metsulfuron methyl, dicamba+2,4-D			
Whitetop		imazapic, metsulfuron methyl, 2,4-D			
Houndstongue		picloram, 2, 4-D, imazapic, metsulfuron methyl		Hand Pulling	
Black henbane		picloram, glyphosate			
Plumeless thistle	Thistle crown weevil (<i>Trichosirocalus horridus</i>)	aminopyralid, picloram, clopyralid, metsulfuron methyl, triclopyr, dicamba+2,4-D		Mowing	
Bull thistle	Thistle crown weevil (<i>Trichosirocalus horridus</i>)	aminopyralid, picloram, clopyralid, metsulfuron methyl, triclopyr, dicamba+2,4-D		Mowing	
Perennial sow-thistle		2,4-D, dicamba, picloram		Mowing	
Field bindweed		2,4-D, dicamba, picloram, clopyralid, dicamba+2,4-D,		Hand Pulling	
Common Burdock		2,4-D, dicamba, imazapic, clopyralid, triclopyr, clopyralid +2, 4-D,		Hand Pulling	
Purple loosestrife	Leaf feeding beetle (<i>Galerucella pusilla</i> , <i>G. californiensis</i>), Root mining weevil (<i>Hyllobius transversovittatus</i>)	triclopyr, glyphosate, imazapyr, 2, 4-D (water soluble), glyphosate, imazapyr		Hand Pulling	
E. watermilfoil		triclopyr, 2, 4-D (water soluble)			
Dalmatian toadflax	Biocontrol agents for this species can be effective in some locations	picloram+2, 4-D, imazapic, chlorsulfuron			
Yellow toadflax		picloram+2, 4-D,			
St. Johnswort		picloram, picloram +2, 4-D			
Yellow starthistle	Biocontrol agents for this species can be somewhat effective in some locations	picloram, triclopyr, clopyralid, imazapyr, clopyralid +2, 4-D		Hand Pulling	
Diffuse knapweed	Biocontrol agents for this species are effective	aminopyralid, clopyralid, triclopyr, picloram, imazapic, dicamba, clopyralid +2, 4-D		Hand Pulling	
Paved Road Maintenance		diuron, diuron + sulfometuron methyl			

¹² Prevention and Education are not identified in the table; however, they are an ongoing part of the control of all noxious weeds.

¹³ Revegetation would likely be used in any situation where control of a noxious weed has resulted in the creation of bare ground patches greater than a quarter of an acre.

¹⁴ Herbicide selection would be based on environmental conditions such as groundwater depth, soil type, non-target vegetation, and management objectives. Herbicide selection considers the following criteria: Herbicide label considerations; Herbicide effectiveness on target species; Proximity to water and other sensitive resources; Soil characteristics; Potential unintended impacts to non-target species such as woody species or shrubs; Application method (aerial, ground, or wick applicator); Other weed species present at the site, and effectiveness of herbicides on those species (for example leafy spurge infestations with inclusions of Canada thistle); Timing of treatments (spring/fall); and Priority weed – new invaders vs. existing.

¹⁵ Hand pulling is a treatment that would generally be applied for small numbers of plants.

Treatment Priority Criteria

Another component of Alternative 1 includes treatment priority criteria (FEIS, Appendix E). This is especially important when funding resources are scarce. Priority is generally given to those new populations of aggressive invader species where long-term management can be successful. An example would be a new site consisting of five plants of salt cedar. On larger, well established infestations, such as 200 acres of leafy spurge, where long term effectiveness is questionable, containment strategies play a much more important role. Even then, control emphasis is provided along the spread vector areas such as trailheads, roadways, campgrounds, and parking areas.

TABLE 6. TREATMENT PRIORITY CRITERIA

Priority	Description	Treatment – choice based on site-specific conditions
Highest Priority for Treatment	<ul style="list-style-type: none"> Eradication¹⁶ of new species (focus on aggressive species with potential for significant ecological impact including but not limited to State listed high priority species – Category 3¹⁷) New infestations (e.g. populations in areas not yet infested; “spot fires”; any State, County, and Forest-listed highest priority species – Category 2¹⁸). Areas of concern such as: Areas of high traffic spread vectors and sources of infestation (e.g. parking lots, trailheads, roadsides, horse camps, gravel pits) Areas of special concerns: (e.g. wilderness, research natural areas, big game winter ranges, adjacent boundaries/access with National Parks) Riparian corridors or Sensitive plant populations where there is a high threat to species of concern. Areas where partnership / cooperator agreements are in place. 	<ul style="list-style-type: none"> Cultural/mechanical - isolated plants or small populations. Herbicide treatment if manual/mechanical is known to be ineffective or population too large. Remove seed heads. This is an interim measure if cost/staff is an issue.
Second Priority of Treatment	<ul style="list-style-type: none"> Containment¹⁹ of existing large infestations (e.g. focus on State, County, and Forest-listed highest priority species – Category 1²⁰) – focus on boundaries of infestation. Roadsides, Trails, and Trailheads – focus first on access points leading to areas of concern. 	<ul style="list-style-type: none"> Cultural /mechanical - isolated plants or small populations in spread zones. Herbicide treatment for larger populations along perimeter.
Third Priority of Treatment	<ul style="list-style-type: none"> Control²¹ of existing large infestations (e.g. State-listed and Forest second priority species) 	<ul style="list-style-type: none"> Biocontrol on large infestations Livestock grazing Mechanical
Fourth Priority of Treatment	<ul style="list-style-type: none"> Suppression²² of existing large infestations when eradication/control or containment is not possible. 	<ul style="list-style-type: none"> Biocontrol on large infestations Livestock grazing Mechanical

¹⁶ **Eradication:** Attempt to totally eliminate an invasive plant species from a Forest Service unit, recognizing that this may not actually be achieved in the short term since re-establishment/re-invasion may take place initially.

¹⁷ **Category 3 Species** - These invaders are the highest priority for control. The discovery of any new populations would prompt immediate eradication action using the most efficient IPM approach. No populations of Category 3 invaders would be allowed to persist.

¹⁸ **Category 2 Species** - Some infestations of Category 2 species are relatively large, yet they are still geographically limited to only a portion of the CNF. For this reason containment is the primary goal. If contained, many of these Category 2 species can be eradicated if acted upon immediately thus preventing these new invaders from affecting native plant communities. If eradication is not possible, then control and containment is the goal to at least limit the impacts these species would have on the native ecosystem. Category 2 invaders should therefore be prevented from infesting new areas, and should be eliminated in some existing populations, while the remainder would be contained.

¹⁹ **Contain:** Prevent the spread of the weed beyond the perimeter of patches or infestation areas mapped from current inventories.

²⁰ **Category 1 Species** - Because most of these species exist in extensive, widespread infestations, a great deal of resources would be required to reduce or eradicate populations. For especially hardy species with extensive root systems, eradication of large infestations could prove to be impossible since we do not have the tools or technology to effectively kill all plant parts and prevent regrowth. Therefore, the key management approach with these species is to control and contain existing populations (keep them from spreading into uninfested areas) and to eradicate new populations in uninfested areas. The IPM approach is to prevent Category 1 species from spreading beyond current infestations. Therefore, Category 1 invaders would not necessarily be eliminated, but infestation spread into uninfested native plant communities would be reduced.

²¹ **Control:** Reduce the infestation over time; some level of infestation may be acceptable.

²² **Suppress:** Prevent seed production throughout the target patch and reduce the area coverage. Prevent the invasive species from dominating the vegetation of the area; low levels may be acceptable.

Adaptive Management Approach

Under the selected alternative, adaptive management principles are included. New weed infestations could be treated provided that the steps identified in the Adaptive Management section (FEIS, Appendix E) are followed. They include criteria to help determine the appropriate treatment for new weed sites. All infestations will use the priority decision process outlined in Figure 1 (from FEIS, Appendix E Table E – 1) to determine the type of treatment on each weed infestation. If the weeds are in the A-B Wilderness, then Wilderness Minimum Tool Guidelines will be used as outlined in Figure 2 (FEIS, Appendix E Table E – 3). The adaptive management approach is made up of two principle components:

Principle 1: To quickly and effectively treat newly discovered weed infestations, a decision tree based on site characteristics, weed species, and location would be used to select treatment methods (FEIS, Appendix E Table E-2). Using an adaptive management approach allows treatment of new sites or new species without a lengthy delay, while still addressing other resource concerns. Although treatments of weeds are expected to be effective in reducing existing weed infestations, all infestations cannot be treated immediately due to budgetary and logistical constraints. Existing infestations will expand before they can be treated, and new areas will be identified. Since every acre of the Custer National Forest has not been inventoried for weeds many existing sites have yet to be identified. Also, new invasive weed species may be added to the invasive weed list and they will be incorporated into this analysis. The strategy includes:

- The decision (if and how) to treat newly discovered infestations would be driven by the Decision Tree for New Weed Locations as shown in EIS Appendix E, Table E - 2;
- New invaders, as identified by local and State agencies, should be given high priority for eradication, if feasible;
- New infestations may be treated with herbicide as long as the areas treated remain within the limits described in EIS Appendix E, Table E – 1 and adhere to all protection measures listed in EIS Appendix C; and
- Appropriate methods and environmental protection measures described in Appendices C and E would be used.

Principle 2: To improve effectiveness and reduce impacts, new technologies, biological controls, adjuvants, or herbicides would be evaluated for use. New technology, biological controls, herbicide formulations, and supplemental labels are likely to be developed within the next 15 years. These new treatments would be considered when there are indications that they would be more weed-specific than methods analyzed here, less toxic to non-target vegetation, or less persistent and less mobile in the soil. New herbicides may be used when they become available if they are permitted by the EPA, have a human health and environmental risk assessment completed per direction of Forest Service Handbook 2109.14, Chapter 10, and are registered for use by the states of Montana or South Dakota. The Adaptive Management Strategy would allow incorporation of these new treatment methods:

- New herbicides or formulations registered and approved by the US Environmental Protection Agency would be applied according to label specifications;
- Application methods and environmental protection measures described above would be used;
- The decision by the line officer to use a new treatment method would be driven by an interdisciplinary review (FSH 1909.15, 18.4) to confirm that the new treatment is within the scope of the analysis in this EIS, and a site characteristic evaluation (EIS Appendix E, Table E - 2);
- A risk assessment must be completed per Forest Service Handbook 2109.14, Chapter 10 for the herbicide. These assessments could be completed by the Forest Service, the Natural Resources Conservation Service, USDA Agriculture Research Station, Environmental Protection Agency, or other authorized agency.
- New biological control agents that are approved and certified by the Animal Plant Health Inspection Service and the applicable State (Montana or South Dakota) prior to their introduction. Biological agents should be virtually harmless to native or desirable non-native plants, and;
- Cost effect mechanical methods of treatments are developed. These methods would be reviewed before use to determine if other resource quality standards can be maintained

FIGURE 1. DECISION TREE FOR NEW WEED LOCATIONS

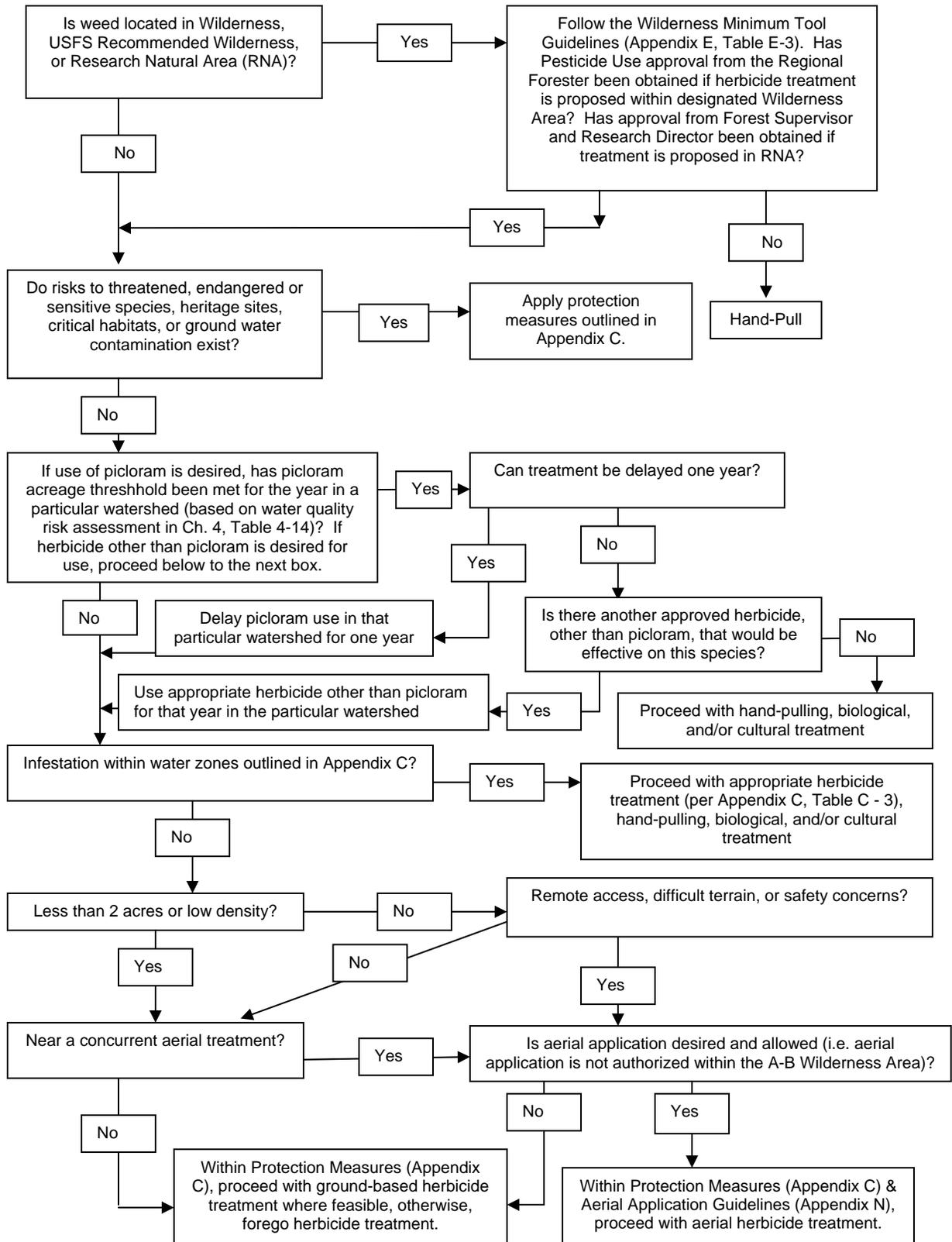
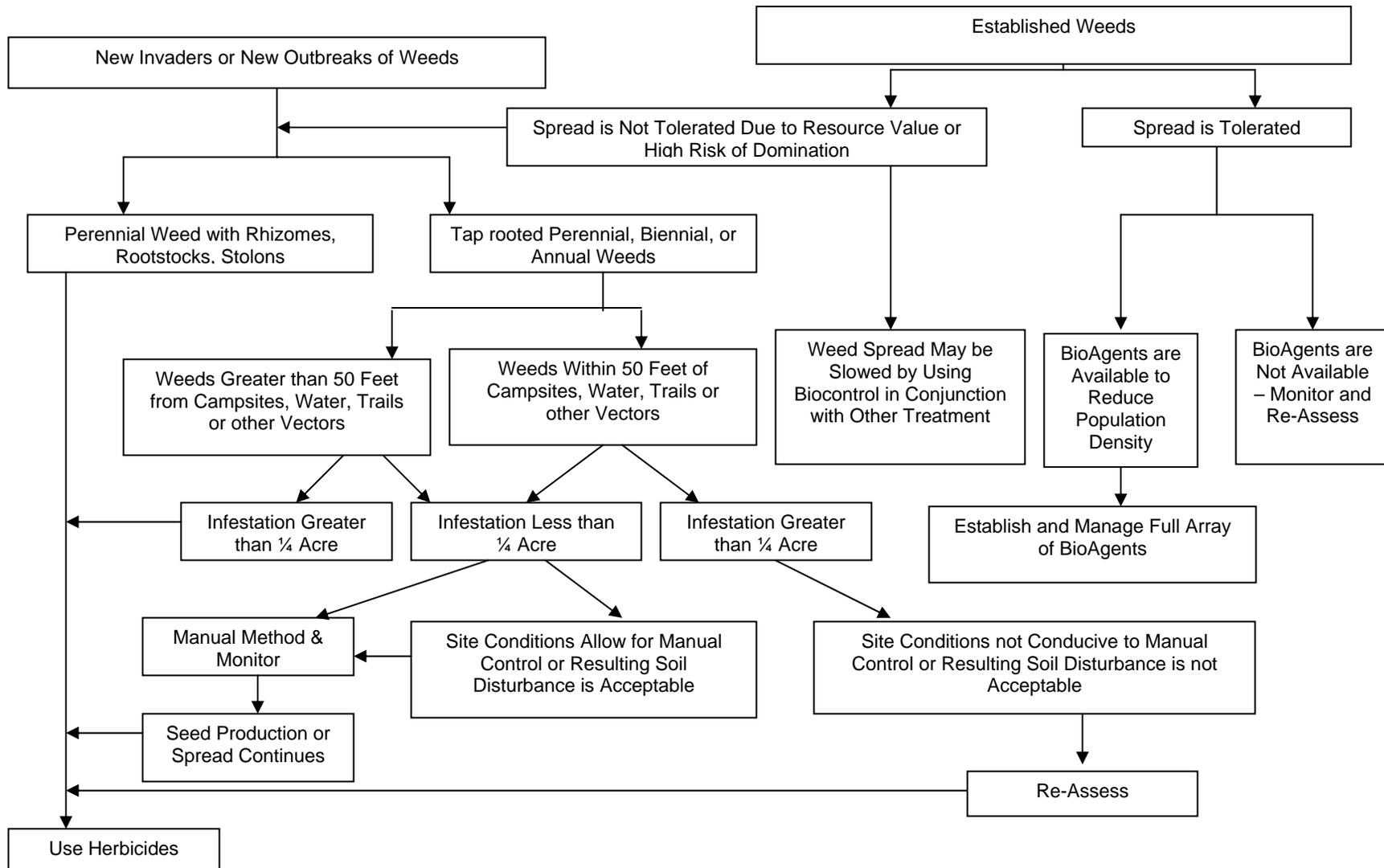


FIGURE 2. MINIMUM TOOL GUIDELINES - FOR WILDERNESS AREAS, HIKING AREAS, OR OTHER REMOTE AREAS WITH DIFFICULT ACCESS



Environmental Protection Measures

Concerns about use of herbicides and impacts to humans and other components of our ecosystem, especially aquatic species, are shared. Protection measures for herbicide use (see tables below) involves restrictions and special measures to protect open water, riparian zones and incorporates Best Management Practices for herbicide use and type of chemicals used to prevent negative impacts.

The tables below outline the environmental design criteria that would be implemented under the selected Alternative1 and are identified as protection measures. They are grouped as general treatment, aerial treatment, and water/woodland protection measures. FEIS Appendix N also provides additional aerial spray guidelines. As part of the proposed action design, the protection measures outlined in Table C - 3 are intended to minimize contamination of water resources and to minimize injury to non-target desired plants from herbicide use in environmentally sensitive sites. All protection measures apply to Alternative 1, the selected Alternative. These management requirements and constraints apply to personnel, contractors, or other partners treating weeds on the Custer National Forest. It outlines the issue area, objective, and effectiveness for each protection measure. Prevention measures and Best Management Practices (BMPs) outlined in EIS Appendix D are additional protection measures that would continue to be implemented.

TABLE 7. GENERAL PROTECTION MEASURES

General Protection Measures	Issue Area & Effectiveness ²³
<p>Prevention. Follow Appendix D Best Management Practices for Prevention. Ensure all Forest Service employees are aware of and knowledgeable about Noxious Weeds (FSM 2081.2 11). All employees will inspect, remove and properly dispose of weed seed and plant parts found on their clothing and equipment including Forest Service vehicles and all terrain vehicles (FSM 2081.2 11). Implement prevention and protection measures as outlines in FSM 2080.</p>	<p>Effectiveness of Treatment</p> <p>Minimize seed spread; High effectiveness; Logical</p>
<p>Proper Training and Safety Instruction: Herbicides would be used in accordance with US Environmental Protection Agency label instructions and restrictions. Label restrictions on herbicides are developed to mitigate, reduce, or eliminate potential risks to humans and the environment. Label information and requirements include: Personal Protective Equipment; User Safety; First Aid; Environmental Hazards; Directions for Use; Storage and Disposal; General Information; Mixing and Application Methods; Approved Uses; Weeds Controlled; and Application Rates.</p> <p>All guidelines and protection measures presented in the Forest Service Manual 2150, Pesticide Use Management and Coordination, and in the Forest Service Handbook 2109.14, Pesticide Use Management and Coordination Handbook, will be adhered to. Applicators or operators must wear all protective gear required on the label of the herbicide they are using (FSH 6709.11). Application would be done or supervised by licensed applicators, as required by law. Operators should calibrate spray equipment at regular intervals to ensure proper rates of herbicide applications (see Appendix K). Maintain personnel hygiene when spraying is complete (see Appendix M).</p> <p>Records of herbicide use will be recorded daily in a herbicide use log, including: temperature, wind speed, and direction; herbicide and formulation uses; quantity of herbicide and dilutents applied; location and method of application; acreage; and persons applying herbicides.</p> <p>Herbicide applicators will be advised of the potential for herbicides to run off into streams and will not initiate spraying when heavy rains are forecast that could cause offsite herbicide transport into sensitive resources such as streams. Herbicide effectiveness can also be compromised if spraying occurs too close to heavy rainfall occurrence (see Appendix J and label for Rainfastness information).</p>	<p>Human Health</p> <p>Water Quality & Aquatics</p> <p>Ensure responsible application of herbicide; High effectiveness; Professional experience</p>
<p>Weather Monitoring: Weather conditions would be monitored on-site (temperature, humidity, wind speed. Direction), and spot forecasts would be reviewed for adverse weather conditions.</p>	<p>Drift Reduction and Herbicide Effectiveness</p> <p>Ensure responsible application of herbicide; High effectiveness; Professional experience</p>

²³ The effectiveness column used the following definitions for rating purposes.

High: Protection measures are very effective (estimated to be 90 percent effective). Documentation of effectiveness is available in literature; professional judgment based on previous experience, or applied logic.

Moderate: Protection measures are reasonably effect (estimated between 40 to 89 percent effective). Documentation of effectiveness is available in literature; professional judgment based on previous experience, or applied logic.

Low: Protection measures are somewhat effective (estimated at less than 40 percent). Documentation of the effectiveness is unavailable or professional judgment indicates success is uncertain. Implementation of the protection measure needs to be monitored and the measure may need to be modified if necessary to achieve the objective.

Unknown: Effectiveness is unknowns or unverified; there is little or no documentation, or applied logic is uncertain. The protection measure needs both effectiveness and validation monitoring to determine success in meeting objective.

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General Protection Measures	Issue Area & Effectiveness ²³
<p>Travel Plan Adherence: Treatment activities in designated Wilderness and Research Natural Areas will follow local motorized travel management plan or applicable public land laws, rules, regulations, and orders. Variances to motorized travel plans may be allowed for administrative motorized access to conduct weed treatment activities in areas outside of Wilderness and RNAs.</p>	<p>Travel Plan; Special Areas</p> <p>Avoid conflict with other resources; High effectiveness; Logical</p>
<p>Mixing, Loading, Disposal: Procedures for mixing, loading, and disposal of pesticides and a spill plan would be followed (Label and FSH 2109.14, 43). All herbicide storage, mixing, and post-application equipment cleaning is completed in such a manner as to prevent the potential contamination of any perennial or intermittent waterway, unprotected ephemeral waterway or wetland. These procedures are outlined in Appendices L and M. Herbicide applicators shall carry spill containment equipment, be familiar with and carry an Herbicide Emergency Spill Plan (see Appendix M).</p>	<p>Human Health</p> <p>Water Quality & Aquatics</p> <p>Ensure responsible application of herbicide; High effectiveness; Professional experience</p>
<p>Dyes: Water-soluble colorants, such as Hi-Light® blue dye, would be used in some situations to enable applicators and inspectors to better see where herbicide has been applied.</p>	<p>Herbicide Use and Safety – Dye</p> <p>Safe handling of herbicide; Moderate effectiveness; Logical, Appendix J</p>
<p>Ester Formulations Prohibited: Due to toxicity to fish, ester formulations of herbicides (i.e. 2, 4-D ester, triclopyr ester (Garlon 4)) are prohibited from use in streamside or wetland zones where fisheries occur.</p>	<p>Aquatics</p> <p>Protect fish resources; Moderate efficiency; EIS Ch. 4, Table 4 - 13</p>
<p>Posting in Public Use Areas: In public recreation areas (such as developed campgrounds, trailheads, other areas of concentrated use) post treated area until the area is safe to re-enter (as defined by the product label, usually 24 to 48 hours).</p>	<p>Herbicide Use and Safety – Recreation Areas</p> <p>Inform public; Moderate effectiveness; Logical</p>
<p>Herbicide Use Near Potable (Drinking) Water: See Table C - 3 for detailed protection measures in and near surface and ground water.</p> <p>Emphasize non-herbicide alternatives, where feasible.</p> <p>Follow herbicide label restrictions regarding use near functioning potable water sources. Herbicides can have varying setback restrictions near functioning/active potable water intakes. For example, very specific restrictions apply to labels of glyphosate products registered for aquatic weed control state: <i>“Do not apply this product in flowing water within 0.5 mile up-stream of active potable water intake”</i>.</p> <p>Unless otherwise directed by label, ground herbicide terrestrial application within a 50 foot radius of functioning potable water sources / wellheads should use only glyphosate or 2, 4-D formulations approved for use in or near water.</p>	<p>Human Health</p> <p>Protect human health; Moderate efficiency; Logical</p>
<p>Herbicide Use Near Water: See Table C - 3 for detailed protection measures in and near surface and ground water. Emphasize non-herbicide alternatives, where feasible. In watersheds where picloram delivery modeling indicates possible concerns within a watershed (see Ch. 4, Table 4 - 14) use one or more of the following strategies:</p> <ul style="list-style-type: none"> • Treat some infestations with another appropriate herbicide (see Appendices G & I), • Postpone treatment with picloram for at least a year; and /or • Use biological or mechanical control, where feasible. 	<p>Aquatics</p> <p>Protect aquatic resources and ground water; Moderate efficiency; EIS Ch. 4-Table 4 - 13</p>
<p>Surfactants Near Water: Only surfactants labeled for use in and around water would be used within 50 feet of water, or the edge of subirrigated land, whichever distance is greater, or on high run-off areas. Some surfactants are labeled for use in and around water including: Activate Plus®, LI-700®, Preference®, R-11®, Widespread® and X-77®. Follow product label.</p>	<p>Herbicide Use and Safety & Aquatics – Surfactants</p> <p>Protect Aquatic Resources; High effectiveness; EIS, Appendix J</p>
<p>Risk to Groundwater: See Table C - 3 for detailed protection measures in and near surface and ground water.</p> <p>In areas at high or unacceptable risk to groundwater contamination (see Map section – RAVE Model), use hand applications (spot treat, wick, etc.), or for broadcast application use an alternate herbicide with a lower leachability than clopyralid, dicamba, hexazinone or picloram (see Ch.3, Table 3 -13 for herbicide leachability). Refer to Table C – 3 for herbicide specific applications in these areas.</p>	<p>Herbicide Use and Safety</p> <p>Ensure responsible application of herbicide; High effectiveness; Logical, Label advisories.</p>

General Protection Measures	Issue Area & Effectiveness ²³
<p>Storage Prohibited in Riparian Areas: Storage of fuels and other toxicants within riparian areas and refueling within these areas is prohibited unless there is no other alternative.</p>	<p>Aquatics</p> <p>Protect aquatic resources; Moderate efficiency; EIS page 4-23 (INFISH standard FA-4)</p>
<p>Prescribed Burning: All burning would be conducted in accordance with Custer National Forest fire management policy which requires the site specific preparation of a prescribed burn plan before every burn. The prescribed burn plan addresses the objectives of the burn, physical characteristics of the burn area, type of fuels, weather conditions under which the plan will be carried out, expected fire behavior, air and water quality restrictions, ignition pattern and sequence, emergency fire control workforce requirements, public contacts, and safety.</p>	<p>Burn Treatments</p> <p>Ensure restoration to a diverse plant community; Moderate effectiveness; Professional experience.</p>
<p>Biological Agents: Biological agents would not be released until screened for host specificity and approved by the USDA Animal Plant Health Inspection Service.</p> <p>Protected biocontrol sites can also function as collection points for redistribution of established biocontrols to other sites. Depending upon management objectives, consideration should be given for possible protection of successful biocontrol sites from other management actions that could negatively influence the biocontrol agent (such as burning or application of herbicides).</p>	<p>Biological Agents</p> <p>Minimize injury to non-target species; High effectiveness; Logical</p>
<p>Seeding with Native Seed: Seeding with native seed would only occur if desirable competitive plants do not re-emerge and dominate the vegetation community after the weed species is treated. Seed must be certified weed seed free.</p>	<p>Cultural Treatments</p> <p>Ensure restoration to a diverse plant community; High effectiveness; Herbicide label</p>
<p>Timing of Mechanical Treatment. To limit the potential for equipment to spread weed seeds, treatments should be completed before seed becomes viable.</p>	<p>Effectiveness of Treatment</p> <p>Minimize seed spread.; High effectiveness; Logical</p>
<p>Mechanical Treatment - Sensitive Plant Populations: Mechanical treatment methods that have potential to adversely affect the viability of known sensitive plant species populations will be avoided or mitigated.</p>	<p>TES Species</p> <p>Protect sensitive plant resources High effectiveness; Logical</p>
<p>Mechanical Treatment - Heritage Resources: Mechanical or burning treatment methods that have potential to adversely affect heritage resources will follow applicable public land laws (36 CFR 800) and State Historic Preservation Office agreements. Significant sites that could be damaged by a mechanical or burning treatment will be mapped and provided to weed treatment coordinators in order to avoid any damages.</p>	<p>Heritage</p> <p>Protect Heritage Resource sites; High effectiveness; Logical</p>
<p>Disposal of Manually Removed Weeds. Disposal of weeds that are grubbed or manually removed will be as follows: If no flowers or seeds are present, pull the weed and place it off the ground, if possible, to dry out. If flowers or seeds are present, pull and place weeds in a plastic bag or a container to retain seeds. Dispose of weeds by burning them or taking them in closed garbage bags to a sanitary landfill.</p>	<p>Effectiveness of Treatment</p> <p>Minimize seed spread.; High effectiveness; Logical</p>
<p>Consultation - Tribal: Where traditional cultural plant gathering areas have been identified, following protection measures outlined in this Appendix for sensitive plant populations. Tribal consultation may be done to address any additional mitigation measures needed to minimize effects to various aspects of the activity. These could include, but are not limited to adjusting the timing of the treatment, adjusting the type of treatment, adjusting the priority of the treatment.</p>	<p>Heritage</p> <p>Protect Heritage Resource areas; High effectiveness; Logical</p>
<p>Concurrence Required in RNAs: If any treatment with herbicide is planned within RNA boundaries, concurrence must be obtained through the Research Station Director and Forest Supervisor.</p>	<p>Special Areas</p> <p>Ensure policy is followed.; High effectiveness; FSM 4060.</p>
<p>Cooperation: In cooperation with federal, state, and county agencies, Custer National Forest System lands within ¼ mile to other ownership would be selectively treated to coincide with active weed management projects on those adjacent lands. Decisions regarding treatment methods and buffer width on land adjacent to privately owned land or land managed by other agencies would be negotiated between the Forest Service and the other owner/agency.</p>	<p>Adjacent Land</p> <p>Prevent weeds from spreading onto FS land; Moderate effectiveness; Professional experience</p>

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General Protection Measures	Issue Area & Effectiveness ²³
<p>Coordination - Grazing Restrictions: Coordinate with District Rangeland Management personnel regarding locations of permitted livestock when anticipating using a herbicide that may have grazing restrictions. When applicable, the timing of herbicide treatment will avoid conflict with permitted livestock grazing as required by the herbicide label. See label and Appendix H.</p>	<p>Social / Economic</p> <p>Minimize conflicts with permitted livestock High effectiveness Professional experience; Herbicide label</p>
<p>Coordination - Biologists: District/Forest wildlife biologists would review and coordinate weed management projects with the District/Forest weed coordinators to identify current raptor nesting areas, grizzly bear core habitat, wolf territories, or other critical wildlife areas that may be affected by weed control activities, to ensure the protection measures described in this Appendix are implemented properly.</p>	<p>TES Species</p> <p>Protect wildlife species from weed control; Moderate Effectiveness; Professional experience</p>
<p>Sensitive Plant Populations: Infested sites would be evaluated for Forest Service regionally listed sensitive plants before treatment. If sensitive plants occur in or near infestations, a weed control plan will be developed to help protect the sensitive plant. Provide weed crews or contractors with maps of all known sensitive plant populations so that these sites can be identified and protected. Provide training for weed crews to identify sensitive plants so that new sites can be identified and protected. Consult with botanist or designated resource specialist prior to treating in sensitive plant habitat with known locations.</p> <p>Use the control method with the least impact on the rare plants (for example, pull non-rhizomatous weeds if the roots of the rare plant will not be detrimentally affected by the soil disturbance).</p> <p>Broadcast (boom) applications of chlorsulfuron or sulfometuron methyl are prohibited within 1500 feet of sensitive plant populations²⁴. Selective hand spot or wick treatment with this herbicide is allowed within this setback.</p> <p>Diuron, chlorsulfuron, imazapyr, sulfometuron methyl (broad-spectrum herbicides) are prohibited within the 50-foot buffer zone. Remaining herbicides may be spot applied following label instructions. The broad-spectrum herbicide, glyphosate, may be applied within the 50 buffer, only if the sensitive plant species is dormant.</p> <p>When applying herbicides within 50 feet of sensitive plants, spot treat via hand held wands, backpack sprayers, wick, etc. using herbicide that does not persist in the soil (i.e. picloram, imazapic, diuron are more persistent in soils) (see Table 3 - 13, Ch. 3) and protect sensitive plants from herbicide drift (for example cover plant with plastic when spraying herbicide or use a wick applicator).</p> <p>Ensure that the herbicide used does not target the family of the specific sensitive plant species For example; herbicides targeted for the composite/aster family should not be used near Beartooth Goldenrod populations (i.e. Aminopyralid, Clopyralid). Monocots (species of grass, sedge, and lily families) are tolerant to Clopyralid, 2, 4-D, and triclopyr (i.e. pregnant sedge, yellow lady's slipper). Dicamba and picloram are also considered safe around monocots at lower formulations.</p> <p>If a sensitive plant species is located within a streamside, wetland, groundwater vulnerable, wellhead protection, or woodland zone, that zone's protection measures, if more restrictive, would also apply.</p>	<p>TES Species</p> <p>Avoid impact to sensitive plants; Moderate effectiveness; Professional experience and EIS pages 4-57 through 61.</p>
<p>Western Toads and Leopard Frogs: When ground application of herbicide is necessary within 50 feet of a water body, surveys of the treatment area will be required. If adult northern leopard frogs or western toads are identified, the extent of distribution within the proposed treatment area will be marked on the ground and reported to the district amphibian specialist (fisheries or wildlife biologist) and weed coordinator. If treatment is not possible without directly spraying individuals then hand pulling or wick application could be applied. If tadpoles or metamorphs of either species are identified, the location will be reported to the local amphibian specialist (fisheries or wildlife biologist) and weed coordinator, and application of herbicides will be delayed until metamorphs disperse.</p>	<p>TES Species, Aquatics</p> <p>Protect aquatic resources and ground water; Moderate efficiency; EIS page 4-54</p>
<p>Bald Eagles: No human activities associated with weed control would be allowed within Zone I (<400 meters [¼ mile]) of an active bald eagle nest from February 1-August 15, except within 20 feet of roads that are open for public motorized use.</p>	<p>TES Species</p> <p>Protect eagle; Moderate effectiveness; Conservation Strategy</p>

²⁴ USDI, BLM, 2005.

General Protection Measures	Issue Area & Effectiveness ²³
<p>Wolves and Grizzly Bears: If sheep or goat grazing is prescribed, a herder and guard dogs would be present to monitor sheep and goats used for weed control purposes. The herder must notify the local District Ranger within 24 hours of any loss of sheep or goats. Sheep and goats would be removed from the project area within 24 hours of any grizzly bear or wolf depredations. The herder would be required to comply with the Custer National Forest food storage in order to minimize attractants to bears. The carcasses of sheep or goats that die within a project area must be removed within 24 hours to avoid habituation of grizzly bears or wolves to livestock as carrion. Sheep and goats would be contained each night within the perimeter of an electric fence. Herders would be required to receive training from the U.S. Fish & Wildlife Service or other authorized organization in the use of hazing techniques to prevent depredations by wolves. Herders are required to implement these techniques when wolves are known to be in proximity to the project area.</p>	<p>TES Species</p> <p>Protect sheep from predation; Moderate effectiveness; Conservation Strategy, EIS page 4-74.</p>
<p>Wolves: No ground-based spraying would occur within ½ mile of a known wolf den site from April 1 thru June 30 (J. Trapp, MT Fish, Wildlife, and Parks, personal communication on 04/29/05).</p>	<p>TES Species</p> <p>Reduce impact to wolves; Moderate effectiveness; EIS page 4-74.</p>
<p>Bighorn Sheep: Proposals for goat or sheep grazing for weed control purposes would be coordinated with the appropriate state wildlife biologist to determine if bighorn sheep may occur in the area. At least nine miles of separation would be maintained between bighorn sheep and domestic sheep or goats being used for weed control purposes.</p>	<p>Key Wildlife Species</p> <p>Prevent disease spread; Moderate Effectiveness; Professional experience</p>
<p>Avoid Tree Habitat Mortality: See Table C - 3 for detailed protection measures in and near wooded areas. Herbicides would only be applied at concentrations that would avoid tree mortality to protect potential habitat for bald eagles, lynx, and other key species.</p>	<p>TES Species</p> <p>Protect wildlife habitat; Moderate Effectiveness; Logical</p>
<p>Diuron: When using diuron or diuron and sulfometuron methyl mix along paved roads, treat a foot from the shoulders' edge or on other hairline fractures in pavement. Pre-treatment with glyphosate is helpful to reduce existing vegetation.</p>	<p>Reduce potential for erosion.</p> <p>Moderate effectiveness Logical, Local Experience</p>

TABLE 8. AERIAL PROTECTION MEASURES (SEE APPENDIX N)

Aerial Protection Measures	Issues Area & Effectiveness
<p>Aviation Activities. All aviation activities will be in accordance with FSM 5700 (Aviation Management), FSM 2150 (Pesticide Use Management and Coordination), FSH 5709.16 (Flight Operations Handbook), FSH 2109.14, 50 (Quality Control Monitoring and Post-Treatment Evaluation). A project Aviation Safety Plan will be developed prior to aerial spray applications.</p>	<p>Human Health & Safety</p> <p>Ensure responsible application of herbicide; High effectiveness; Professional experience</p>
<p>Herbicide Restrictions. Diuron is projected to have limited use since it would typically be used for small amount of infrastructure maintenance (less than 5 acres annually). Aerial application of diuron is not needed and is therefore prohibited.</p>	<p>Non-target Species</p> <p>Prohibit aerial use of broad selection herbicide to prevent reaching non-target species; High effectiveness; Logical</p>
<p>Watershed Assessment During Contract Preparation. During contract preparation for aerial application, reassess surface water quality risk with site-specific information. Once the exact treatment areas are delineated in preparation for the contract, determine treatment acres for 6th hydrologic unit code (HUC) watersheds potentially affected by aerial application if picloram is used. Incorporate these acres into the risk assessment to estimate probable herbicide concentrations and allowable treatment acres. If concentrations of picloram exceed the recommended safe threshold (see Chapter 4, Table 4-14 Surface Water Risk Analysis), reduce treatment acres to the allowable amount or use herbicides approved for use near surface water.</p>	<p>Water Quality & Aquatics</p> <p>Prevent high concentration in surface water; High effectiveness; EIS pages 4-51,52.</p>
<p>Water Setback. On each side of aquatic, streamside or wetlands zones with, a 300-foot buffer would be established where aerial applications would not be allowed.</p>	<p>Water Quality & Aquatics</p> <p>Prevent high concentration of drift from reaching streams & wetlands; High effectiveness; EIS Appendix N Drift Model and USFS Fisheries and Herbicides Work Group Final Findings and Recommendations (March 8, 2004).</p>

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Aerial Protection Measures	Issues Area & Effectiveness
Sensitive Plant Setback. Aerial application of chlorsulfuron or sulfometuron methyl will have a setback of 1500 feet from sensitive plant populations. For all other herbicides, a 300-foot buffer would be established where aerial applications would not be allowed adjacent to sensitive plant populations.	Non-target Species Minimize effects to sensitive plants; High effectiveness; USDI BLM 2005, ENSR Recommendations
Ground Treatment Within the 300 Foot Aerial Setback. Within 300-foot aerial spray buffers, ground-application of herbicides may occur within protection measures outlined in this Appendix. Herbicide selection would be based on product label restriction, site characteristic evaluation, and protection measures outlined in Tables C – 1 and Table C – 3.	Water Quality & Aquatics Treat weeds in buffer area while mitigating resources; High effectiveness; USDA 2001b, page 1-8
Minimize Drift. Spray drift is largely a function of droplet particle size, release height, and wind speed. Try to stay within wind speeds up to 6 mph or per label instruction. Incorporate these factors into project design to reduce the risk of drift.	Drift Reduction Prevent high concentration of drift from reaching wetlands or other non-target area; High effectiveness; Lolo NF Aerial Guidelines.
Pre-Treatment Mapping. Aerial spray units would be field-validated, flagged, and/or marked using GPS prior to spraying to ensure only appropriate portions of the unit are aerially treated. A GPS system would be used in spray helicopters and each treatment unit mapped before the flight to ensure that only areas marked for treatment are treated.	General Ensure accurate location of treatment; High effectiveness; Kulla 2003, page 11-13
Bald Eagles. No aerial spraying would be allowed within Zone I and II (within 1/2 mile) of an active bald eagle nest from February 1 – August 15.	TES Species Reduce impact to eagles; Moderate effectiveness; EIS page 4-75.
Goshawks. No aerial spraying would be allowed within ¼ mile of an active goshawk nest from April 1- August 15.	TES Species Reduce impact to goshawk; Moderate effectiveness; EIS page 4-78.
Peregrine Falcons. No aerial spraying within one mile of an active peregrine falcon nest from April 1 to August 15.	TES Species Reduce impact to peregrine; Moderate effectiveness; EIS page 4-78.
Grizzly Bears. Only 8 hours of aerial spraying would be allowed in grizzly bear core habitat within a given Bear Management Subunit each year.	TES Species Reduce impact to grizzly bears; Moderate effectiveness; EIS page 4-71.
Wolves. No aerial spraying would occur within ½ mile of a known wolf den site from April 1 thru June 30 (J. Trapp, MT Fish, Wildlife, and Parks, personal communication on 04/29/05).	TES Species Reduce impact to wolves; Moderate effectiveness; EIS page 4-74.
Designated Wilderness and RNAs. Aerial applications would be excluded from designated Wilderness and Research Natural Areas.	Special Areas Avoid conflict with Wilderness Experience or RNA integrity; High effectiveness; Logical

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Aerial Protection Measures	Issues Area & Effectiveness
<p>Campgrounds, Residential, Private Land Areas. Provide a minimum buffer of 300 feet for aerial application of herbicides from developed campgrounds, recreation residences and private residential areas (unless otherwise authorized by adjacent private landowners). Treat outside of high use periods where feasible. Temporary closures of campgrounds may be considered to ensure public safety during spray operations.</p>	<p>Human Health and Non-target Vegetation</p> <p>Reduce Drift in areas where People Recreate or Reside and to non-target vegetation; Moderate effectiveness; Logical</p>
<p>Posting. Signing and on site layout would be performed one to two weeks prior to actual aerial treatment.</p>	<p>Human Health</p> <p>Provide public notification; Low effectiveness; Logical</p>
<p>Temporary Closures. Temporary area and road/trail closures would be used to ensure public safety during aerial spray operations.</p>	<p>Human Health</p> <p>Ensure public safety; High effectiveness; Logical</p>
<p>Communications. Constant communications would be maintained between the helicopter and project leader during spraying operations. Ground observers would have communication with the project leader. Observers would be located at various locations adjacent to the treatment area to monitor wind direction and speed as well as to visually monitor drift and deposition of herbicide.</p>	<p>General</p> <p>Ensure safety and implementation of protection measures; High effectiveness; Logical</p>
<p>Monitoring. To reduce risk of effects on aquatic species, aerial spray operations would be closely monitored. Field inspectors will provide on-site monitoring for drift and label compliance. They will be trained and wearing personal protective equipment.</p>	<p>Water Quality & Aquatics</p> <p>Ensure implementation of protection measures; High effectiveness; Logical</p>
<p>Monitoring Cards. A field inspector will be present during all aerial application to monitor drift using spray detection cards placed in buffer areas along any stream or lake comprising a sport fishery, or waters important for Threatened, Endangered or Sensitive (TES) aquatic species. Cards will be placed prior to herbicide application and will be sufficient in number and distribution to adequately determine when drift of herbicide into the buffer area exceeds acceptable levels.</p> <p>Spray cards would be placed out to 350 feet from and perpendicular to nearby water bodies, wetlands, or other sensitive areas to monitor herbicide presence. Non-toxic dye would be added to make herbicide visible on spray cards. Dye would allow observers to see herbicide as it is sprayed and to visually monitor drift or vortices from boom and rotor tips.</p>	<p>Water Quality & Aquatics</p> <p>Document herbicide disposition; High effectiveness; Logical and Lolo NF Aerial Guidelines.</p>
<p>Equipment & Drift Reduction. Drift reduction agents, nozzles that create large droplets, and special boom and nozzle placement, would be used to reduce drift during aerial spraying.</p>	<p>Drift Reduction</p> <p>Control drift; Moderate effectiveness; EIS Appendix J.</p>
<p>Products & Volatility Reduction. Drift control agents may be used in aerial spraying during low humidity to reduce drift into non-target areas. Products that reduce volatility, have been shown to keep droplet sizes larger, and are appropriate adjuvant for the herbicide (as specified by labeling of both the herbicide and the drift agent, in consultation with the herbicide manufacturer) would be used.</p>	<p>Drift Reduction</p> <p>Control drift; Moderate effectiveness; EIS Appendix J</p>
<p>Discontinue Treatment. Aerial spraying will be discontinued if herbicide is drifting within the set-back zone and/or wind speed exceeds those recommended on the product's label.</p>	<p>Drift Reduction</p> <p>Protect sensitive area; Moderate Effectiveness; Logical</p>
<p>Weather. Weather conditions would be monitored on-site (temperature, humidity, wind speed and direction), and spot forecasts would be reviewed for adverse weather conditions.</p>	<p>Drift Reduction</p> <p>Control drift; Moderate effectiveness; Logical</p>

Water and Woodlands

Herbicides that are approved for rangeland use are generally benign to soil and soil microorganisms in most soil types. Nevertheless, the specific properties of the herbicides considered do require special attention, particularly when used near surface waters, shallow groundwater, domestic water supply, and woodlands. As part of the proposed action design, the protection measures outlined in the following table (FEIS, Appendix C Table C-3) are intended to minimize contamination of water resources and to minimize injury to non-target desired woody plants from herbicide use in environmentally sensitive sites (FEIS, Appendix C Table C – 1 addresses protection measures pertaining to sensitive plant habitat). These environmentally sensitive sites include

- Aquatic Zone (AZ): The area where aquatic plants (algae, floating plants, submersed plants and emergent plants, i.e. purple loosestrife and water milfoil), grows in ponds, lakes, reservoirs, marshes, drainage ditches, and streams that are still or slow moving.
- Streamside Zone (SZ): Moving water systems (lotic) containing and adjacent to stream channels and floodplains having the presence of obligate &/or facultative riparian vegetation.
- Wetland Zone (WZ) Saturated wetland systems (lentic) that have saturated or seasonally saturated soils and support mostly obligate &/or facultative wetland vegetation &/or aquatic life); includes swamps, bogs, potholes, lakes, ponds, manmade reservoirs & stock ponds.
- Groundwater Vulnerable Zone (GVZ): Shallow groundwater areas underlying permeable soils that is especially vulnerable to contamination from some herbicides. These areas are shown as high or unacceptable vulnerability areas on the RAVE Model Map found in the Map Section – are most often riparian areas.
- Wellhead Protection Areas (WPA): A 50 foot radius around an underground developed and functioning source of drinking water.
- Woodland Zone (WDZ): Hardwood draws, stands of conifers, stands of juniper, aspen groves, and riparian forest stands. Salt Cedar areas are not considered woodlands for use of the following Table.

The following table describes the protection measures for each of the above environmental zones along with prohibitions or limitations on the use of each herbicide within each zone. Based on the properties and behavior of the herbicides assessed, the herbicides are grouped into three classes for each zone: (i) those that are expressly prohibited, (ii) those that are limited in some defined way, and (iii) those that are generally permitted with no or minor restrictions. Adherence to label directions applies to all herbicides in all zones. See the table above (FEIS, Appendix C Table C – 2) for aerial application protection measures.

TABLE 9. PROPOSED ACTION HERBICIDE-SPECIFIC PROTECTION MEASURES (see bulleted items; adherence to label directions applies to all herbicides in all zones).

<p>Management Zone²⁵ / General Protection Measures</p>	<p>Aquatic Zone (AZ) - still or slow waters with aquatic plants (i.e. purple loosestrife and water milfoil).²⁶</p> <ul style="list-style-type: none"> Only those formulations of 2, 4-D, glyphosate, imazapyr, or triclopyr that have been approved for use in or near water are permitted²⁷. All other formulations are prohibited. Only surfactants labeled for use in & around water would be permitted. 	<p>Streamside Zone (SZ)²⁸ – perennial and intermittent stream riparian areas.</p> <ul style="list-style-type: none"> Ground based boom application is allowed up to 50 feet from water's edge. Application within 50 feet must be done with hand application (hand-held wand, backpack sprayer, wicking, etc.). Wicking applications up to the water's edge is allowed, including use of the otherwise "prohibited" or "limited" herbicides.²⁹ Only surfactants labeled for use in and around water would be permitted. Due to toxicity to fish, ester formulations of herbicides are prohibited where fisheries occur. 	<p>Wetland Zone (WZ) – seasonal and permanent wetlands.</p> <ul style="list-style-type: none"> Same Protection Measures as SZs. 	<p>Groundwater Vulnerable Zone (GVZ)³⁰ - shallow groundwater beneath permeable soils; most often are riparian areas.³¹</p> <ul style="list-style-type: none"> Use hand application, or for broadcast application use an alternate herbicide with a lower leachability than clopyralid, dicamba, hexazinone or picloram (see Ch.3, Table 3 -13). The same prohibitions, limitations, and uses listed under the SZs and WZs apply to GVZs with exceptions listed below. 	<p>Wellhead Protection Zone (WPZ)³² - a 50 foot radius around a functioning well for drinking water.</p> <ul style="list-style-type: none"> Unless otherwise directed by label, ground herbicide application within a 50 foot radius of functioning potable water intakes / wellheads should use only glyphosate or 2, 4-D formulations approved for use in or near water. 	<p>Woodland Zone (WZ) - hardwood draws and conifers (woody weeds, such as salt cedar, are excluded from this category).</p>
<p>2, 4-D³³</p> <p>Thistles, sulfur cinquefoil, dyers woad, knapweeds, purple loosestrife, Eurasian water milfoil, tall buttercup, whitetop, Some broadleaf, woody and aquatic plants susceptible.</p> <p>Amine is labeled for terrestrial and aquatic use. Hi-Dep IVM is labeled for terrestrial applications, and non-irrigation ditchbanks.</p>	<p>Use Permitted</p> <ul style="list-style-type: none"> Aquatic formulations only Consult with Fisheries Specialist. <p>Use Prohibited</p> <p>Non-aquatic formulations</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Use only formulations approved for use in or near water. In the amine form or aquatic labeled formulations it can be applied up to the water's edge (without direct contact to the water). <p>Use Prohibited</p> <p>Non-aquatic formulations</p>	<p>Same as SZ for 2, 4-D except:</p> <ul style="list-style-type: none"> Allowed up to 25 feet from water's edge if there is a vegetative buffer³⁴ with slopes <6% 	<p>Use Permitted</p> <ul style="list-style-type: none"> Aquatic or non-aquatic 2, 4-D may be applied. 	<p>Limited Use</p> <ul style="list-style-type: none"> Same as SZ and GVZ for 2, 4-D. 	<p>Limited Use</p> <ul style="list-style-type: none"> Spot treatment only within 50 feet of woodlands. Under canopy of desired woody plants, spot apply to foliage of target plants and avoid direct or indirect application to non-target plants or soil.

²⁵ Follow label direction as it pertains to use in irrigation ditches. Aminopyralid, chlorsulfuron, clopyralid, hexazinone, imazapic, imazapyr, metsulfuron methyl, picloram, and sulfometuron methyl are not permitted within an irrigation ditch even if the ditch is dry per label instruction. Diuron is allowed within a dry irrigation ditch, only per label instruction.

²⁶ **AZs.** For ponds with heavy weed infestation, partial treatments may be necessary to prevent oxygen depletion & possible fish suffocation associated with decaying vegetation.

²⁷ **AZs.** These formulations labeled for aquatic use target broadleaf plants (dicots) such as Eurasian water milfoil and purple loosestrife. Most Native aquatic plants are monocots and not susceptible to these chemicals.

²⁸ **SZs.** Aminopyralid, and formulations of 2, 4-D amine, glyphosate (i.e., Glypro and Rodeo), and triclopyr (i.e. Renovate 3) approved for use in or near water are compatible for use in SZs and can be applied to the water's edge. Glyphosate is injurious to some desired riparian plants, so it must be applied by spot treatments to target plants within a riparian area. Where 5 foot setbacks from water's edge are in place, alternative treatments may include use of permitted herbicides, wick applications, biocontrols, mechanical options, and/or herbivory by goats or sheep.

²⁹ Although applications by other means are prohibited or limited within 5- feet of water in SZs, wicking application of prohibited herbicides is allowed up to the water's edge due to direct foliage treatment with no drifting or direct application to soil.

³⁰ Most herbicide groundwater contamination results from "point sources." Point source contaminations include spills or leaks at storage and handling facilities, improperly discarding containers, and rinsing equipment in loading and handling areas, often times into adjacent drainage ditches. Point sources are characterized by discrete, unidentifiable locations discharging relatively high local concentrations. These contaminations can be avoided through proper calibration, mixing, and cleaning of equipment. Non-point source groundwater contaminations of herbicides are relatively uncommon. They can occur, however, when a mobile herbicide is applied in areas with a shallow water table. In this situation, the choice of an appropriate herbicide or alternative control strategy can prevent contamination of the water source. Water tables can shift seasonally and annually; therefore, the depth to water table can be monitored prior to application of a prohibited or limited herbicide within a GVZ. For example, areas that customarily have high water tables early in the growing season may be suitable for herbicide treatment by the fall if preceding precipitation is low. Glyphosate, and amine formulations of 2, 4-D and triclopyr are currently labeled for aquatic use and would be the materials used within designated buffer zones along streams and bodies of water. Imazapic, imazapyr, and triclopyr could be used in buffer zones as long as they would not be directly applied to water.

³¹ Most of the GVZs on the Custer NF (about 600 acres) are found along SZs and WZs. Use the same chemical prohibitions, limitations, and uses listed under the SZs and WZs apply to GVZs with the listed exceptions by herbicide.

³² **WPZs.** Biological controls, herbivory, or mechanical options will be emphasized where feasible and effective.

³³ The more restrictive setback distance in WZs than SZs reflects the persistence of 2,4-D and chlorsulfuron in anaerobic conditions, which are more likely to exist in lentic water systems (wetlands) and wetland soils than in lotic (riverine) environments. **GWZs.** 2, 4-D and glyphosate (formulations approved in and near water) will be the only herbicides approved for use within a WPZ. These chemicals have low to intermediate leaching potential.

³⁴ Vegetative buffer is an area with good vegetative ground cover. Badlands or other low cover areas with bare ground would not be considered as a vegetative buffer.

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<p>Management Zone²⁵ / General Protection Measures</p>	<p>Aquatic Zone (AZ) - still or slow waters with aquatic plants (i.e. purple loosestrife and water milfoil).²⁶</p> <ul style="list-style-type: none"> Only those formulations of 2, 4-D, glyphosate, imazapyr, or triclopyr that have been approved for use in or near water are permitted²⁷. All other formulations are prohibited. Only surfactants labeled for use in & around water would be permitted. 	<p>Streamside Zone (SZ)²⁸ – perennial and intermittent stream riparian areas.</p> <ul style="list-style-type: none"> Ground based boom application is allowed up to 50 feet from water's edge. Application within 50 feet must be done with hand application (hand-held wand, backpack sprayer, wicking, etc.). Wicking applications up to the water's edge is allowed, including use of the otherwise "prohibited" or "limited" herbicides.²⁹ Only surfactants labeled for use in and around water would be permitted. Due to toxicity to fish, ester formulations of herbicides are prohibited where fisheries occur. 	<p>Wetland Zone (WZ) – seasonal and permanent wetlands.</p> <ul style="list-style-type: none"> Same Protection Measures as SZs. 	<p>Groundwater Vulnerable Zone (GVZ)³⁰ - shallow groundwater beneath permeable soils; most often are riparian areas.³¹</p> <ul style="list-style-type: none"> Use hand application, or for broadcast application use an alternate herbicide with a lower leachability than clopyralid, dicamba, hexazinone or picloram (see Ch.3, Table 3 -13). The same prohibitions, limitations, and uses listed under the SZs and WZs apply to GVZs with exceptions listed below. 	<p>Wellhead Protection Zone (WPZ)³² - a 50 foot radius around a functioning well for drinking water.</p> <ul style="list-style-type: none"> Unless otherwise directed by label, ground herbicide application within a 50 foot radius of functioning potable water intakes / wellheads should use only glyphosate or 2, 4-D formulations approved for use in or near water. 	<p>Woodland Zone (WZ) - hardwood draws and conifers (woody weeds, such as salt cedar, are excluded from this category).</p>
<p>Aminopyralid³⁵</p> <p>Perennial and biennial thistles, knapweeds, sulfur cinquefoil. Tolerated by most grasses.</p> <p>Milestone is labeled for terrestrial applications. Do not apply in surface water</p>	<p>Use Prohibited</p>	<p>Permitted Use</p> <ul style="list-style-type: none"> It can be applied up to the water's edge (without direct contact to the water). Per label instruction, not to be used in areas of standing water. 	<p>Use Permitted</p> <ul style="list-style-type: none"> Per label instruction, not to be used in areas of standing water. 	<p>Use Permitted</p>	<p>Use Prohibited</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Spot treatment only within 50 feet of non-targeted woodlands or under canopy of desired woody plants. Do not apply over canopy in non-targeted areas. Avoid direct or indirect application to non-target plants or soil.
<p>Chlorsulfuron³⁶</p> <ul style="list-style-type: none"> Spot treatment only with hand application methods. <p>Dyer's woad, thistles, common tansy, whitetop, houndstongue, tall buttercup. Some broadleaf plants and grasses susceptible.</p> <p>Telar is labeled for terrestrial use only.</p>	<p>Use Prohibited</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Do not use in flooded areas or on saturated soils. Spot treatment allowed up to 5 feet from water's edge. Use only once per growing season on alkaline soils. 	<p>Same as SZ except:</p> <ul style="list-style-type: none"> Spot treatment allowed up to 25 feet from water's edge if there is a vegetative buffer with slopes <6%. 	<p>Use Permitted</p>	<p>Use Prohibited</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Spot treatment only within 50 feet of non-targeted woodlands or under canopy of desired woody plants. Do not apply over canopy in non-targeted areas. Avoid direct or indirect application to non-target plants or soil.

³⁵ SZs. **Limited Herbicides.** Limitations are imposed based on persistence, transportation pathways, application rates, modes of chemical degradation, and environmental properties of various formulations. The use of aminopyralid is effective on a narrow spectrum of plants (especially knapweeds and thistles) and can generally be used in SZs where standing water does not occur.

³⁶ SZs. **Limited Herbicides.** Limitations are imposed based on persistence, transportation pathways, application rates, modes of chemical degradation, and environmental properties of various formulations. Use of chlorsulfuron must avoid flooded areas and anaerobic conditions, which commonly occur in saturated soils. Also, chlorsulfuron generally targets those plants that prefer upland sites and are not in SZs. The risk of flooding along some perennial streams is seasonal; therefore, use of chlorsulfuron may be restricted temporally during periods when there is a high probability of flooding. The more restrictive setback distance in WZs than SZs reflects the persistence of 2,4-D and chlorsulfuron in anaerobic conditions, which are more likely to exist in lentic water systems (wetlands) and wetland soils than in lotic (riverine) environments.

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<p>Management Zone²⁵ / General Protection Measures</p>	<p>Aquatic Zone (AZ) - still or slow waters with aquatic plants (i.e. purple loosestrife and water milfoil) .²⁶</p> <ul style="list-style-type: none"> Only those formulations of 2, 4-D, glyphosate, imazapyr, or triclopyr that have been approved for use in or near water are permitted²⁷. All other formulations are prohibited. Only surfactants labeled for use in & around water would be permitted. 	<p>Streamside Zone (SZ)²⁸ – perennial and intermittent stream riparian areas.</p> <ul style="list-style-type: none"> Ground based boom application is allowed up to 50 feet from water's edge. Application within 50 feet must be done with hand application (hand-held wand, backpack sprayer, wicking, etc.). Wicking applications up to the water's edge is allowed, including use of the otherwise "prohibited" or "limited" herbicides.²⁹ Only surfactants labeled for use in and around water would be permitted. Due to toxicity to fish, ester formulations of herbicides are prohibited where fisheries occur. 	<p>Wetland Zone (WZ) – seasonal and permanent wetlands.</p> <ul style="list-style-type: none"> Same Protection Measures as SZs. 	<p>Groundwater Vulnerable Zone (GVZ)³⁰ - shallow groundwater beneath permeable soils; most often are riparian areas.³¹</p> <ul style="list-style-type: none"> Use hand application, or for broadcast application use an alternate herbicide with a lower leachability than clopyralid, dicamba, hexazinone or picloram (see Ch.3, Table 3 -13). The same prohibitions, limitations, and uses listed under the SZs and WZs apply to GVZs with exceptions listed below. 	<p>Wellhead Protection Zone (WPZ)³² - a 50 foot radius around a functioning well for drinking water.</p> <ul style="list-style-type: none"> Unless otherwise directed by label, ground herbicide application within a 50 foot radius of functioning potable water intakes / wellheads should use only glyphosate or 2, 4-D formulations approved for use in or near water. 	<p>Woodland Zone (WZ) - hardwood draws and conifers (woody weeds, such as salt cedar, are excluded from this category).</p>
<p>Clopyralid³⁷</p> <p>Thistles, yellow starthistle, hawkweeds, knapweeds, rush skeletonweed, oxeye daisy. Many broadleaf and woody species susceptible.</p> <p>Transline, Stinger, and Reclaim are labeled for terrestrial applications. Do not apply in or near surface water. Do not contaminate water used for irrigation or domestic purposes.</p>	<p>Use Prohibited</p>	<p>Use Prohibited</p> <ul style="list-style-type: none"> Within 50 feet of water's edge. Exception: Wicking applications may occur within 50 feet. 	<p>Same as SZ for Clopyralid</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Hand application only. Broadcast application prohibited. 	<p>Use Prohibited</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Spot treatment only within 50 feet of non-targeted woodlands. Under canopy of desired woody plants, spot apply to foliage of target plants and avoid direct or indirect application to non-target plants or soil
<p>Dicamba³⁸</p> <p>Houndstongue, knapweeds, oxeye daisy, tall buttercup, leafy spurge, tansy ragwort, common crupina, blueweed, yellow starthistle. Some broadleaf, brush, vines susceptible</p> <p>Vanquish and Banvel are labeled for upland sites and non-irrigation ditchbanks</p>	<p>Use Prohibited</p>	<p>Use Prohibited</p> <ul style="list-style-type: none"> Within 50 feet of water's edge. Exception: Wicking applications may occur within 50 feet. 	<p>Same as SZ for Dicamba</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Hand application only. Broadcast application prohibited. 	<p>Use Prohibited</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Spot treatment only within 50 feet of non-targeted woodlands. Do not use within 3 times the dripline of trees and shrubs (conifers especially sensitive). Avoid direct or indirect application to non-target plants or soil.

³⁷ **SZs: Prohibited Herbicides.** Herbicides that are prohibited within 50 feet of water are very mobile with generally moderate persistence. Triclopyr targets many of the same noxious weeds as clopyralid and has been formulated for use near water. Consequently triclopyr is a more acceptable alternative than clopyralid or metsulfuron methyl in a SZ.

³⁸ **SZs: Prohibited Herbicides.** Herbicides that are prohibited within 50 feet of water are very mobile with generally moderate persistence. Even though dicamba has low persistence, it is very mobile, easily leached, and breaks down slowly in water or in water-saturated soil. The weeds, which dicamba targets, generally do not occur in wetland or riparian settings. Therefore, the prohibition of dicamba has little bearing on management options. **WZs.** Dicamba can injure woody plants by being exuded through weed roots and being uptaken by trees and shrubs within three times their drip lines.

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<p>Management Zone²⁵ / General Protection Measures</p>	<p>Aquatic Zone (AZ) - still or slow waters with aquatic plants (i.e. purple loosestrife and water milfoil).²⁶</p> <ul style="list-style-type: none"> Only those formulations of 2, 4-D, glyphosate, imazapyr, or triclopyr that have been approved for use in or near water are permitted²⁷. All other formulations are prohibited. Only surfactants labeled for use in & around water would be permitted. 	<p>Streamside Zone (SZ)²⁸ – perennial and intermittent stream riparian areas.</p> <ul style="list-style-type: none"> Ground based boom application is allowed up to 50 feet from water's edge. Application within 50 feet must be done with hand application (hand-held wand, backpack sprayer, wicking, etc.). Wicking applications up to the water's edge is allowed, including use of the otherwise "prohibited" or "limited" herbicides.²⁹ Only surfactants labeled for use in and around water would be permitted. Due to toxicity to fish, ester formulations of herbicides are prohibited where fisheries occur. 	<p>Wetland Zone (WZ) – seasonal and permanent wetlands.</p> <ul style="list-style-type: none"> Same Protection Measures as SZs. 	<p>Groundwater Vulnerable Zone (GVZ)³⁰ - shallow groundwater beneath permeable soils; most often are riparian areas.³¹</p> <ul style="list-style-type: none"> Use hand application, or for broadcast application use an alternate herbicide with a lower leachability than clopyralid, dicamba, hexazinone or picloram (see Ch.3, Table 3 -13). The same prohibitions, limitations, and uses listed under the SZs and WZs apply to GVZs with exceptions listed below. 	<p>Wellhead Protection Zone (WPZ)³² - a 50 foot radius around a functioning well for drinking water.</p> <ul style="list-style-type: none"> Unless otherwise directed by label, ground herbicide application within a 50 foot radius of functioning potable water intakes / wellheads should use only glyphosate or 2, 4-D formulations approved for use in or near water. 	<p>Woodland Zone (WZ) - hardwood draws and conifers (woody weeds, such as salt cedar, are excluded from this category).</p>
<p>Diuron</p> <ul style="list-style-type: none"> No aerial spraying <p>Annual weeds and broadleaves for infrastructure maintenance needs such as right-of-ways. Broad spectrum.</p> <p>Diuron 4L Diuron 80 (DF, WDG) Direx 4L Karmex DF (80 DF) is labeled for Uplands, and ditches when water is not present. Irrigation ditches can only be treated in the non-crop season.</p>	<p><i>Use Prohibited</i></p>	<p>Use Prohibited</p> <ul style="list-style-type: none"> Within 50 feet of water's edge. Exception: Wicking applications may occur within 50 feet. 	<p><i>Use Prohibited</i></p>	<p>Use Permitted</p>	<p><i>Use Prohibited</i></p>	<p>Limited Use</p> <ul style="list-style-type: none"> Spot treatment only within 50 feet of non-targeted woodlands or under canopy of desired woody plants. Do not apply over canopy in non-targeted areas. Avoid direct or indirect application to non-target plants or soil.
<p>Glyphosate³⁹</p> <p>Purple loosestrife, field bindweed, yellow starthistle, thistles, cheatgrass, common crupina, toadflax. Glyphosate does not work on underwater plants such as Eurasian watermilfoil. Broad spectrum.</p> <p>Accord, Glypro, and Rodeo are labeled for certain aquatic weed control applications. The other products are for terrestrial applications, including ditch banks, and dry ditch or canal bottoms.</p>	<p>Use Permitted</p> <ul style="list-style-type: none"> Aquatic formulations only Consult with Fisheries Specialist. <p>Use Prohibited</p> <p>Non-aquatic formulations</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Use only formulations approved for use in or near water (i.e. Glypro, Rodeo). Spot treat target plants only within riparian area to avoid injury to non-target riparian plants. <p>Use Prohibited</p> <p>Non-aquatic formulations</p>	<p>Same as SZ for Glyphosate</p>	<p>Use Permitted</p>	<p>Use Permitted</p> <ul style="list-style-type: none"> Use only formulations approved for use in or near water 	<p>Limited Use</p> <ul style="list-style-type: none"> Spot treatment only within 50 feet of non-targeted woodlands or under canopy of desired woody plants. Avoid direct or indirect application to non-target plants or soil.

³⁹ **GWZs.** 2,4-D and glyphosate (see specific formulations) will be the only herbicides approved for use within a WPZ. These chemicals have low to intermediate leaching potential.

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<p>Management Zone²⁵ / General Protection Measures</p>	<p>Aquatic Zone (AZ) - still or slow waters with aquatic plants (i.e. purple loosestrife and water milfoil).²⁶</p> <ul style="list-style-type: none"> Only those formulations of 2, 4-D, glyphosate, imazapyr, or triclopyr that have been approved for use in or near water are permitted²⁷. All other formulations are prohibited. Only surfactants labeled for use in & around water would be permitted. 	<p>Streamside Zone (SZ)²⁸ – perennial and intermittent stream riparian areas.</p> <ul style="list-style-type: none"> Ground based boom application is allowed up to 50 feet from water's edge. Application within 50 feet must be done with hand application (hand-held wand, backpack sprayer, wicking, etc.). Wicking applications up to the water's edge is allowed, including use of the otherwise "prohibited" or "limited" herbicides.²⁹ Only surfactants labeled for use in and around water would be permitted. Due to toxicity to fish, ester formulations of herbicides are prohibited where fisheries occur. 	<p>Wetland Zone (WZ) – seasonal and permanent wetlands.</p> <ul style="list-style-type: none"> Same Protection Measures as SZs. 	<p>Groundwater Vulnerable Zone (GVZ)³⁰ - shallow groundwater beneath permeable soils; most often are riparian areas.³¹</p> <ul style="list-style-type: none"> Use hand application, or for broadcast application use an alternate herbicide with a lower leachability than clopyralid, dicamba, hexazinone or picloram (see Ch.3, Table 3 -13). The same prohibitions, limitations, and uses listed under the SZs and WZs apply to GVZs with exceptions listed below. 	<p>Wellhead Protection Zone (WPZ)³² - a 50 foot radius around a functioning well for drinking water.</p> <ul style="list-style-type: none"> Unless otherwise directed by label, ground herbicide application within a 50 foot radius of functioning potable water intakes / wellheads should use only glyphosate or 2, 4-D formulations approved for use in or near water. 	<p>Woodland Zone (WZ) - hardwood draws and conifers (woody weeds, such as salt cedar, are excluded from this category).</p>
<p>Hexazinone</p> <p>Poison Hemlock, Cheatgrass, oxeye daisy, yellow starthistle, thistles. Broad spectrum control with some selectivity for conifers.</p> <p>Velpar and Pronone are labeled for terrestrial applicaionts.</p>	<p>Use Prohibited</p>	<p>Use Prohibited</p> <ul style="list-style-type: none"> Within 50 feet of water's edge. Exception: Wicking applications may occur within 50 feet. 	<p>Same as SZ for Hexazinone</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Hand application only. Broadcast application prohibited. 	<p>Use Prohibited</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Follow Label direction in and near conifers. Spot treatment only within 50 feet of non-targeted woodlands or under canopy of desired woody plants. Avoid direct or indirect application to non-target plants or soil.
<p>Imazapic⁴⁰</p> <p>Cheatgrass, leafy spurge, toadflax. Some broadleaf plants and grasses susceptible.</p> <p>Plateau is labeled for terrestrial use only. Do not apply near water.</p>	<p>Use Prohibited</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Maximum of 0.188 lb a.e./ac. Allowed up to 5 feet from water's edge if there is a vegetative buffer that has slopes <6% 	<p>Same as SZ for Imazapic</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Maximum of 0.188 lb a.e./ac. Exception: No slope limitations 	<p>Use Prohibited</p>	<p>Limited Use</p> <ul style="list-style-type: none"> When making fall applications, potential injury to tree and brush species from foliar contact may be minimized by making the application after the leaves have begun to senesce (fall color) or after leaf drop. Conifers are generally tolerant to fall applications. Applications in and around tree and brush species should be made at the recommended timing for the target weed species.

⁴⁰ **SZs. Limited Herbicides.** Limitations are imposed based on persistence, transportation pathways, application rates, modes of chemical degradation, and environmental properties of various formulations. The use of imazapic is desirable because it acts on a narrow spectrum of plants and is generally non-injurious to non-target forbs at low application rates and when applied after seed-set has occurred. Furthermore, imazapic is rapidly photodegraded by sunlight in surface waters. Imazapic and imazapyr are limited to reaches where a well vegetated buffer zone exists and grounds slopes are less than 6 percent between the application site and surface water. These requirements are imposed to keep these herbicides from entering surface water via runoff from overland flow. Also, the maximum application rate for imazapic is 0.188 lb acid equivalent/acre, based on studies that demonstrate limited mobility at this and lower application rates (BASF Corporation, 2006, p. 4). The slope restrictions on imazapic and imazapyr do not apply within a GVZ because physical translocation of soil-adsorbed chemicals will not affect the groundwater.

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Management Zone²⁵ / General Protection Measures	Aquatic Zone (AZ) - still or slow waters with aquatic plants (i.e. purple loosestrife and water milfoil). ²⁶ <ul style="list-style-type: none"> Only those formulations of 2, 4-D, glyphosate, imazapyr, or triclopyr that have been approved for use in or near water are permitted²⁷. All other formulations are prohibited. Only surfactants labeled for use in & around water would be permitted. 	Streamside Zone (SZ)²⁸ – perennial and intermittent stream riparian areas. <ul style="list-style-type: none"> Ground based boom application is allowed up to 50 feet from water's edge. Application within 50 feet must be done with hand application (hand-held wand, backpack sprayer, wicking, etc.). Wicking applications up to the water's edge is allowed, including use of the otherwise "prohibited" or "limited" herbicides.²⁹ Only surfactants labeled for use in and around water would be permitted. Due to toxicity to fish, ester formulations of herbicides are prohibited where fisheries occur. 	Wetland Zone (WZ) – seasonal and permanent wetlands. <ul style="list-style-type: none"> Same Protection Measures as SZs. 	Groundwater Vulnerable Zone (GVZ)³⁰ - shallow groundwater beneath permeable soils; most often are riparian areas. ³¹ <ul style="list-style-type: none"> Use hand application, or for broadcast application use an alternate herbicide with a lower leachability than clopyralid, dicamba, hexazinone or picloram (see Ch.3, Table 3 -13). The same prohibitions, limitations, and uses listed under the SZs and WZs apply to GVZs with exceptions listed below. 	Wellhead Protection Zone (WPZ)³² - a 50 foot radius around a functioning well for drinking water. <ul style="list-style-type: none"> Unless otherwise directed by label, ground herbicide application within a 50 foot radius of functioning potable water intakes / wellheads should use only glyphosate or 2, 4-D formulations approved for use in or near water. 	Woodland Zone (WZ) - hardwood draws and conifers (woody weeds, such as salt cedar, are excluded from this category).
Imazapyr⁴¹ Salt Cedar, Purple loosestrife, dyers woad, field bindweed. Imazapyr does not work on underwater plants such as Eurasian watermilfoil. Broad spectrum. Arsenal is labeled for uplands, non-tidal wetlands where surface water is not present, non-irrigation ditchbanks, and ditchbottoms where only isolated puddles of surface water occur.	Use Permitted <ul style="list-style-type: none"> Consult with Fisheries Specialist. 	Limited Use <ul style="list-style-type: none"> Use of Habitat or Arsenal on cut stump or hand spraying salt cedar may come into contact with surface water per label instruction. For all other species, use of imazapyr is allowed up to 5 feet from water's edge if there is a vegetative buffer that has slopes <6%. 	Same as SZ for Imazapyr	Use Permitted <ul style="list-style-type: none"> Exception: No slope limitations 	Use Prohibited	Limited Use <ul style="list-style-type: none"> Spot treatment only within 50 feet of non-targeted woodlands or under canopy of desired woody plants. Avoid direct or indirect application to non-target plants or soil.
Metsulfuron methyl^{42,43} Houndstongue, thistle, sulfur cinquefoil, common crupina, dyers woad, purple loosestrife, common tansy, whitetop, blueweed. Escort is labeled for Terrestrial applications. Escort can be applied to floodplains, terrestrial areas of deltas, and drained areas of low-lying areas where there may be isolated puddles.	Use Prohibited	Use Prohibited <ul style="list-style-type: none"> Within 50 feet of water's edge. Exception: Wicking applications may occur within 50 feet. 	Same as SZ for Metsulfuron methyl	Use Prohibited	Use Prohibited	Limited Use <ul style="list-style-type: none"> Spot treatment only within 50 feet of woodlands or under canopy of desired woody plants. Do not apply over canopy in non-targeted areas. Avoid direct or indirect application to non-target plants or soil.

⁴¹ **SZs. Limited Herbicides.** Limitations are imposed based on persistence, transportation pathways, application rates, modes of chemical degradation, and environmental properties of various formulations. Imazapic and imazapyr are limited to reaches where a well vegetated buffer zone exists and grounds slopes are less than 6 percent between the application site and surface water. These requirements are imposed to keep these herbicides from entering surface water via runoff from overland flow. Imazapyr may be transported on eroded soil particles. Setback and vegetation buffer limitations have been applied to minimize soil transport when imazapyr is applied near water. The slope restrictions on imazapic and imazapyr do not apply within a GVZ because physical translocation of soil-adsorbed chemicals will not affect the groundwater.

⁴² **SZs: Prohibited Herbicides.** Herbicides that are prohibited within 50 feet of water are very mobile with generally moderate persistence. Metsulfuron methyl is slow to break down in surface water, especially alkaline waters. Triclopyr is a more acceptable alternative than clopyralid or metsulfuron methyl in a SZ.

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<p>Management Zone²⁵ / General Protection Measures</p>	<p>Aquatic Zone (AZ) - still or slow waters with aquatic plants (i.e. purple loosestrife and water milfoil).²⁶</p> <ul style="list-style-type: none"> Only those formulations of 2, 4-D, glyphosate, imazapyr, or triclopyr that have been approved for use in or near water are permitted²⁷. All other formulations are prohibited. Only surfactants labeled for use in & around water would be permitted. 	<p>Streamside Zone (SZ)²⁸ – perennial and intermittent stream riparian areas.</p> <ul style="list-style-type: none"> Ground based boom application is allowed up to 50 feet from water's edge. Application within 50 feet must be done with hand application (hand-held wand, backpack sprayer, wicking, etc.). Wicking applications up to the water's edge is allowed, including use of the otherwise "prohibited" or "limited" herbicides.²⁹ Only surfactants labeled for use in and around water would be permitted. Due to toxicity to fish, ester formulations of herbicides are prohibited where fisheries occur. 	<p>Wetland Zone (WZ) – seasonal and permanent wetlands.</p> <ul style="list-style-type: none"> Same Protection Measures as SZs. 	<p>Groundwater Vulnerable Zone (GVZ)³⁰ - shallow groundwater beneath permeable soils; most often are riparian areas.³¹</p> <ul style="list-style-type: none"> Use hand application, or for broadcast application use an alternate herbicide with a lower leachability than clopyralid, dicamba, hexazinone or picloram (see Ch.3, Table 3 -13). The same prohibitions, limitations, and uses listed under the SZs and WZs apply to GVZs with exceptions listed below. 	<p>Wellhead Protection Zone (WPZ)³² - a 50 foot radius around a functioning well for drinking water.</p> <ul style="list-style-type: none"> Unless otherwise directed by label, ground herbicide application within a 50 foot radius of functioning potable water intakes / wellheads should use only glyphosate or 2, 4-D formulations approved for use in or near water. 	<p>Woodland Zone (WZ) - hardwood draws and conifers (woody weeds, such as salt cedar, are excluded from this category).</p>
<p>Picloram⁴⁴</p> <p>Thistles, yellow starthistle, common crupina, hawkweeds, knapweeds, rush skeleton weed, common tansy, toadflax, leafy spurge. Grasses are tolerant.</p> <p>Tordon is labeled for Terrestrial applications. Should not be used where conditions favor off-site movement due to leaching or run-off.</p>	<p>Use Prohibited</p>	<p>Use Prohibited</p> <ul style="list-style-type: none"> Within 50 feet of water's edge. Exception: Wicking applications may occur within 50 feet. 	<p>Same as SZ for picloram</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Hand application only. Broadcast application prohibited. 	<p>Use Prohibited</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Spot treatment only within 50 feet of non-targeted woodlands or under canopy of desired woody plants, especially within 3 times the dripline of trees and shrubs. Avoid direct or indirect application to non-target plants or soil.
<p>Sulfometuron methyl⁴⁵</p> <ul style="list-style-type: none"> Spot treatment only with hand application methods. <p>Cheatgrass, whitetop, oxeye daisy, tansy ragwort, musk thistle. Broad spectrum.</p> <p>Oust: - Do not apply near open water.</p>	<p>Use Prohibited</p> <ul style="list-style-type: none"> Broadcast application prohibited within 100 feet of AZs.⁴⁶ Aerial application prohibited within 1500 feet of AZs.⁴⁷ 	<p>Limited Use</p> <ul style="list-style-type: none"> Allowed up to 25 feet from water's edge if there is a vegetative buffer with slopes <6%. 	<p>Same as SZ for sulfometuron methyl</p>	<p>Use Permitted</p>	<p>Use Prohibited</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Spot treatment only within 50 feet of woodlands or under canopy of desired woody plants. Do not apply over canopy in non-targeted areas. Avoid direct or indirect application to non-target plants or soil.

⁴⁴ **WZs.** Picloram can injure woody plants by being exuded through weed roots and being uptaken by trees and shrubs within three times their drip lines.

⁴⁵ **SZs.** Sulfometuron methyl limitations are designed to prevent transportation to surface water by overland flow.

⁴⁶ USDI BLM, 2005.

⁴⁷ USDI BLM, 2005.

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<p>Management Zone²⁵ / General Protection Measures</p>	<p>Aquatic Zone (AZ) - still or slow waters with aquatic plants (i.e. purple loosestrife and water milfoil) .²⁶</p> <ul style="list-style-type: none"> Only those formulations of 2, 4-D, glyphosate, imazapyr, or triclopyr that have been approved for use in or near water are permitted²⁷. All other formulations are prohibited. Only surfactants labeled for use in & around water would be permitted. 	<p>Streamside Zone (SZ)²⁸ – perennial and intermittent stream riparian areas.</p> <ul style="list-style-type: none"> Ground based boom application is allowed up to 50 feet from water's edge. Application within 50 feet must be done with hand application (hand-held wand, backpack sprayer, wicking, etc.). Wicking applications up to the water's edge is allowed, including use of the otherwise "prohibited" or "limited" herbicides.²⁹ Only surfactants labeled for use in and around water would be permitted. Due to toxicity to fish, ester formulations of herbicides are prohibited where fisheries occur. 	<p>Wetland Zone (WZ) – seasonal and permanent wetlands.</p> <ul style="list-style-type: none"> Same Protection Measures as SZs. 	<p>Groundwater Vulnerable Zone (GVZ)³⁰ - shallow groundwater beneath permeable soils; most often are riparian areas.³¹</p> <ul style="list-style-type: none"> Use hand application, or for broadcast application use an alternate herbicide with a lower leachability than clopyralid, dicamba, hexazinone or picloram (see Ch.3, Table 3 -13). The same prohibitions, limitations, and uses listed under the SZs and WZs apply to GVZs with exceptions listed below. 	<p>Wellhead Protection Zone (WPZ)³² - a 50 foot radius around a functioning well for drinking water.</p> <ul style="list-style-type: none"> Unless otherwise directed by label, ground herbicide application within a 50 foot radius of functioning potable water intakes / wellheads should use only glyphosate or 2, 4-D formulations approved for use in or near water. 	<p>Woodland Zone (WZ) - hardwood draws and conifers (woody weeds, such as salt cedar, are excluded from this category).</p>
<p>Triclopyr⁴⁸</p> <ul style="list-style-type: none"> Do not use high application rates in order to avoid potential hazards to birds and mammals The use of triclopyr is limited to selective application techniques only (e.g., spot spraying, wiping, basal bark, cut stump, injection). No aerial spraying. <p>Purple loosestrife, Eurasian watermilfoil, Hawkweeds, sulfur cinquefoil, knapweed, oxeye daisy, thistle. Woody, some broadleaf, & root-sprouting species are susceptible. Grasses are tolerant.</p> <p>Renovate3 (TEA formulation) is labeled for aquatic applications.</p> <p>Garlon 3A, Garlon 4, and Pathfinder II is labeled for Upland sites, non-irrigation ditchbanks, and seasonally dry wetlands, floodplains, deltas, and transition areas between uplands and wetlands. Do not apply directly to water.</p>	<p>Use Permitted</p> <ul style="list-style-type: none"> Aquatic formulations only Consult with Fisheries Specialist. <p>Use Prohibited</p> <ul style="list-style-type: none"> Non-aquatic formulations 	<p>Limited Use</p> <ul style="list-style-type: none"> Use only formulations approved for use in or near water. Aquatic labeled formulations can be applied up to the water's edge (without direct contact to the water). <p>Use Prohibited</p> <p>Non-aquatic formulations</p>	<p>Same as SZ for triclopyr</p>	<p>Use Permitted</p>	<p>Use Prohibited</p>	<p>Limited Use</p> <ul style="list-style-type: none"> Spot treatment only within 50 feet of non-targeted woodlands or under canopy of desired woody plants. Avoid direct or indirect application to non-target plants or soil.

⁴⁸ SZs: **Prohibited Herbicides.** Herbicides that are prohibited within 50 feet of water are very mobile with generally moderate persistence. Triclopyr targets many of the same noxious weeds as clopyralid and has been formulated for use near water. Consequently triclopyr is a more acceptable alternative than clopyralid or metsulfuron methyl in a SZ.

Cooperative Control Efforts

The selected alternative also allows for continued cooperative efforts. To increase the effectiveness of all control efforts, the Custer National Forest will continue, and expand where possible, cooperative, multi-ownership weed control efforts. These efforts may include any number of the following activities:

- Share databases and information on the presence of weeds.
- Share resources such as personnel, equipment, and chemicals, as documented in any number of agreements like Challenge Cost Share Agreements, Participating Agreements, Cooperative Agreements, or Memorandums of Understanding.
- Use input from the counties, other agencies, and local land owners in setting treatment priorities for any given year.
- Apply for and share grants and aid as a block of cooperators as opposed to single agencies or organizations
- Use cooperative agreements to pay for weed control work that crosses ownership boundaries.

MONITORING AND EVALUATION

Monitoring of treatment sites will be conducted annually. Assessment of the effectiveness of control efforts will consider the weed management objective for each site as well as the infestation size and percent occupancy of the target weed species following treatment. Monitoring will evaluate how well objectives of the EIS are being met and to determine the effects of project implementation on the environment. Depending on the stage of the project, monitoring will vary in intensity by resource element being monitored. All monitoring programs are designed to assure impacts to resources are minimal and to allow corrective actions to be taken immediately should unanticipated actions occur.

The adequacy of the findings and resource data in the EIS will be monitored over time to insure future weed treatment conforms to laws, regulations and resource management requirements in effect at that time. Monitoring results will evaluate: 1) Whether existing weed treatment should continue, be modified or discontinued, and 2) Whether additional monitoring is needed

Treatment methods for each site will be determined based on weed species ecology, cost-effectiveness of treatment and management objectives for the site, (eradication or reduction of seed production). Proposed treatments will be evaluated to determine if they fit within the scope of the EIS relative to the issues analyzed.

ENVIRONMENTALLY PREFERABLE ALTERNATIVE

Alternative 1 is the environmentally preferred alternative because it allows for the use of all available tools for weed control. Consequently, it best protects native species and habitat diversity while having a minimal negative impact on other resources. Concerns of herbicide impacts on aquatic resources, wildlife and humans have been minimized through effective protection measures and monitoring.

FINDINGS REQUIRED BY LAYS AND REGULATIONS

Numerous laws, regulations and agency directives require that my decision be consistent with their provisions. My decision is consistent with all laws, regulations and agency policy relevant to this project. The following discussion is intended to provide information on the regulations that apply to areas raised as issues or comments by the public or other agencies.

National Forest Noxious Weed Management Policy (FSM 2080-2083): Alternative 1 is consistent with the National Forest Noxious Weed Management Policy, which requires district rangers to implement prevention measures to minimize the introduction and establishment of weeds, along with providing for the containment and suppression, 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. My decision is consistent with this direction.

36 CFR Sub A, Sec 222.8: The selected alternative complies with this direction: “. . . The Chief, of the Forest Service, will cooperate with County or other local weed control Districts in analyzing noxious farm weed problems and developing control programs in areas which the National Forests and National Grasslands are a part.”

Consistency with Forest Service Natural Resource Agenda: My decision furthers the USDA Forest Service Natural Resource Agenda by providing for healthy watersheds and promoting vegetative conditions that maintain biodiversity and sustainable forest ecosystems.

Compatibility with Law, Policy, Other Agency, and Tribal Goals: Coordination and consultation has been conducted with adjacent Forest Service units, the Bureau of Land Management, Bureau of Indian Affairs, Tribal Councils, National Park Service, States, and Counties (Carbon, Stillwater, Park, Sweet Grass, Rosebud, Powder River, and Carter Counties of Montana, and Harding County of South Dakota), Montana Weed Control Association, and others. The project contains examples of current cooperative agreements and weed management areas. This decision will allow the Custer National Forest to better support existing weed control by surrounding land managers and owners and to meet fully the obligations under laws listed in the FEIS Chapter 1.

The Montana Noxious Weed Law 1948, amended in 1991: This law 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. My decision is consistent with this law.

The South Dakota CL 38.22: This law provides for designation of noxious weeds in the State of South Dakota, direction of control efforts, registration of pesticides and licensing of applicators, and enforcement of statutes. The law delegates enforcement to County Commissioners. My decision is consistent with this law.

The National Historic Preservation Act of 1966: Alternative 1 would result in the lowest loss of biotic heritage resources. Herbicide spraying poses no impact to archeological or historic sites and mechanical treatment (mostly hand pulling of weeds) is typically very limited. Mechanical and chemical treatments would have no effect on the qualities that make the sites eligible for the National Register of Historic Places.

Public Law 90-583 (Carlson-Foley Act, October 17, 1968): Cooperative agreements described in the FEIS (page 1-3) are in compliance with this law that authorizes and directs heads of Federal Departments and Agencies to permit control of noxious plants by State and local governments on a re-imbusement basis in connection with similar and acceptable weed control programs being carried out on adjacent non-Federal land.

National Environmental Policy Act (NEPA) of 1969: The purposes of NEPA are to “encourage productive and enjoyable harmony between man and his environment, to promote efforts which will prevent or eliminate damage to the environment and biosphere and stimulate the health and welfare of man.” I believe Alternative 1 meets the purposes of the Act because of the reasons already stated and as disclosed in this record of decision and associated FEIS.

Clean Water Act of 1972: Based on the measures outlined in the FEIS to protect soil and water resources (EIS, pages 2-18 through 2-22) and the Soil and Ground Water, and the Water Quality analysis in Chapter 4, I have concluded that Alternative 1 is consistent with the Clean Water Act. Mitigation measures listed in the Table 4 of this decision document, also in the EIS (pages 2-18 through 2-22, Appendices D and E), which I have adopted as part of my decision, are designed to prevent contamination of surface and ground water.

Montana Clean Water Act: Regulatory Framework: Section 313 of the Montana Clean Water Act requires Federal Agencies to comply with all substantive and procedural requirements related to water quality. This decision complies with those requirements as addressed in the EIS, page 4-43.

South Dakota Water Quality Law Framework: The South Dakota Administrative Rules (SDAR) requires Federal Agencies to comply with all substantive and procedural requirements related to water quality. This decision complies with those requirements as addressed in the EIS, page 4-43.

Endangered Species Act (ESA) of 1973: The Custer National Forest wildlife biologist, fisheries biologist, and botany coordinator evaluated Alternative 1 with regard to threatened and endangered animal and plant species. Findings are summarized in Chapter 4 of the EIS and in the Biological Assessment (project file). The conclusions of the Biological Assessment were that Alternative 1 was not likely to adversely affect the black-footed ferret (*Mustela nigripes*), the gray wolf (*Canis lupus*), the grizzly bear (*Ursus arctos horribilis*), the bald eagle (*Haliaeetus leucocephalus*) or the Canada lynx (*Lynx canadensis*). The Biological Assessment also concluded that the actions were not likely to jeopardize the continued existence of the nonessential experimental population of gray wolves. Concurrence with these conclusions was received from US Fish and Wildlife Service on October 20, 2006 and is included in Chapter 6 of the final EIS.

Sensitive Species: Federal law and direction applicable to sensitive species include the National Forest Management Act and the Forest Service Manual (FSM) 2670. Those plants and animals, for which population viability is a concern, are periodically identified by the Regional Forester (EIS, Chapter 3). In making my decision, I have reviewed the analysis of projected effects on all sensitive species listed as occurring or possibly occurring on the Custer National Forest. Based on this discussion I have concluded that Alternative 1 will have no adverse impacts on sensitive species.

Federal Noxious Weed Act of 1974 (sec 9): Alternative 1 complies with this authorization for the Secretary to cooperate with other Federal and State Agencies or political subdivisions thereof, and individuals in carrying out measures to eradicate, suppress, or control the spread of noxious weeds.

The Federal Land Policy Management Act of 1976 (PL 94-579): Alternative 1 complies with this authorization to control of weeds on rangeland. Most of the weeds that will be treated are located on rangelands.

The National Forest Management Act of 1976 (PL-94-588): Alternative 1 complies with this authorization to remove deleterious plant growth.

The Wilderness Act of 1964; Amended October, 1978: The Absaroka-Beartooth Wilderness Area was established in 1978. The goal for Wilderness Areas is to retain primeval character and influence, without permanent improvements or human habitation, and to protect and manage these Areas so as to preserve the natural conditions within it. My decision expands on weed management techniques that can be used in the A-B Wilderness Area. It also provides a decision tree for adaptive management use within the Wilderness Area.

Custer National Forest Plan - 1987: Based on the discussion provided in Chapter 4 of the FEIS, I have concluded that my decision is consistent with the Custer Forest Plan. More specifically, the Forest Plan directs resource managers 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 a noxious weed control program be developed for the Absaroka-Beartooth Wilderness Area in order to maintain wilderness values (FP Appendix II, p. 156).

Environmental Justice and Civil Rights: Executive Order 12898, issued in 1994 ordered Federal Agencies to identify and address any adverse human health and environmental effects of agency programs that disproportionately impact minority and low-income populations. At this time, no minority or low-income communities have been identified in south central and eastern Montana, and northwestern South Dakota (FEIS, Chapter 3). This project does not disproportionately impact any human populations.

The selected alternative will not alter opportunities for subsistence hunting and fishing by Native American tribes. Tribes holding treaty rights on the Custer National Forest had the opportunity to provide comments on this project but did not raise concerns.

Presidential Executive Order 12962, June 7, 1995: This order furthered the purpose of the Fish and Wildlife Act of 1956, the National Environmental Policy Act of 1969, and the Fish and Wildlife Coordination Act, seeking to conserve, restore, and enhance aquatic systems to provide for increased recreational fishing opportunities nationwide. This order directs Federal agencies to “improve the quantity, function, sustainable productivity, and distribution of aquatic resources for increased recreational fishing opportunity by evaluating the effects of Federally funded, permitted, or authorized actions on aquatic systems and recreational fisheries and document those effects relative to the purpose of this order.” This decision will allow for maintenance of aquatic resources.

Consistency with Northern Region Overview Detailed Report, 1998: The Northern Region Overview indicates that Aspen, Ponderosa pine, Whitebark pine Dry Douglas fir, Lodgepole pine (moderate), Upland grass/shrubs, Sagebrush/grass, and riparian vegetation are most at risk due to a number of variables, including noxious weeds such as, leafy spurge, spotted knapweed, sulfur cinquefoil, houndstongue, and Dalmatian toadflax. This decision fully addresses the concerns identified in the Northern Region Overview.

Presidential Executive Order 13112, Invasive Species, February 3, 1999: Alternative 1 complies with this order directing Federal Agencies whose actions may affect the status of invasive species to detect and respond rapidly to, and control, populations of such species in a cost-effective and environmentally sound manner, as appropriations allow.

Consistency with Montana Weed Management Plan - 2004: The purpose of the Montana Weed Management Plan is to coordinate private, county, state, and federal weed management efforts in the state, and to promote the implementation of ecologically based integrated weed management programs. The plan provides guidelines for private, county, state, and federal land managers to develop goals and plans consistent with state and national strategies; and to provide methods for prioritizing management strategies. My decision prioritizes management strategies in a manner that is consistent with the Montana Weed Management Plan.

Valid Existing Rights: Valid existing rights are those rights or claims to rights that pertain to mining claims, mineral or energy easements, rights-of-way, reciprocal rights-of-way, leases, agreements, permits and water rights. Private individuals or companies may hold other Federal, State or local government agencies or valid existing rights. This decision does not affect any existing rights; however, the current prevention standards and guidelines could result in adjustments to operating plans and permits over time.

IMPLEMENTATION

The responsible official is Nancy T. Curriden, Forest Supervisor on the Custer National Forest. Copies of the Record of Decision and Final Environmental Impact Statement are available on the internet at <http://www.fs.fed.us/r1/custer> or a paper or CD copy will be mailed to those who request a copy. Should you desire a copy of the Final EIS and the Record of Decision please contact the Custer National Forest, 1310 Main St., Billings, MT 59105, or phone (406) 657-6205 x233.

This decision is subject to appeal pursuant to 36 CFR 215.11. Only individuals or organizations that submitted substantive comments during the comment period may appeal. A written appeal must be submitted within 45 days following the publication date of the legal notice of this decision in the Billings Gazette, Billings, Montana or Rapid City Journal, Rapid City, South Dakota. It is the responsibility of the appellant to ensure their appeal is received in a timely manner. The publication date of the legal notice of the decision in the newspaper of record is the exclusive means for calculating the time to file an appeal. Appellants should not rely on date or timeframe information provided by any other source.

Paper appeals must be submitted to: USDA Forest Service, Northern Region, ATTN: Appeal Deciding Officer, P.O. Box 7669, Missoula, MT 59807; or USDA Forest Service, Northern Region, ATTN: Appeal

Deciding Officer, 200 East Broadway, Missoula, MT 59802. Office hours: 7:30 a.m. to 4:00 p.m. Fax (406) 329- 3411.

Electronic appeals must be submitted to: appeals-northern-regional-office@fs.fed.us . In electronic appeals, the subject line should contain the name of the project being appealed. An automated response will confirm your electronic appeal has been received. Electronic appeals must be submitted in MS Word, Word Perfect, or Rich Text Format (RTF).

It is the appellant's responsibility to provide sufficient project- or activity-specific evidence and rationale, focusing on the decision, to show why the decision should be reversed. The appeal must be filed with the Appeal Deciding Officer in writing. At a minimum, the appeal must meet the content requirements of 36 CFR 215.14, and include the following information: the appellant's name and address, with a telephone number, if available; a signature, or other verification of authorship upon request (a scanned signature for electronic mail may be filed with the appeal); when multiple names are listed on an appeal, identification of the lead appellant and verification of the identity of the lead appellant upon request; the name of the project or activity for which the decision was made, the name and title of the Responsible Official, and the date of the decision; the regulation under which the appeal is being filed, when there is an option to appeal under either 36 CFR 215 or 36 CFR 251, subpart C; any specific change(s) in the decision that the appellant seeks and rationale for those changes; any portion(s) of the decision with which the appellant disagrees, and explanation for the disagreement; why the appellant believes the Responsible Official's decision failed to consider the substantive comments; and, how the appellant believes the decision specifically violates law, regulation, or policy.

If no appeal is received, implementation of this decision may occur on, but not before, five business days from the close of the appeal filing period. If an appeal is received, implementation may not occur for 15 days following the date of appeal disposition.

CONTACT FOR FURTHER INFORMATION

For further information regarding this project contact Kim Reid, Project Leader, Custer National Forest, 1310 Main St., Billings, MT 59105, phone (406) 657-6205 x233.

/s/ Nancy T. Curriden

Nancy T. Curriden
Custer National Forest Supervisor

Date: November 1, 2006