

CHAPTER 2

PUBLIC PARTICIPATION, ISSUES, AND ALTERNATIVES

INTRODUCTION

This chapter provides information on how the public was involved in providing comment on this Project, how the alternatives were developed, and a description of how issues and alternatives were addressed in this document. This is followed with a description of the four alternatives that are studied throughout the document, a description of adaptive management, a brief economic comparison of the alternatives, and a list of protection measures. A summary comparison and maps of the three alternatives can be found at the end of the chapter.

PUBLIC PARTICIPATION

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. A copy of this strategy is located in the project record. During its duration, the project was also listed in each Custer National Forest (CNF) quarterly Notice of the Schedule for NEPA projects.

In order to help identify specific areas of concern, a scoping document was sent to on November 19, 2001 to 360 individuals, government agencies, tribal interests, news media, businesses, and organizations that have 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. People were asked to comment in 30 days, which period ended on December 31, 2001. The scoping document and mailing list are included in the project file.

A legal advertisement inviting comments was placed in The Billings Gazette (Billings, MT) and the Rapid City Journal (Rapid City, SD) in November 2001, summarizing the information provided in the letter. News releases were sent to local newspapers, as well. These media efforts helped to publicize the proposal and comment period.

In response to these efforts, nine letters, personal comments, or phone calls were received. Review of the public's responses showed that all respondents were in agreement that noxious and invasive weeds are of urgent concern on the CNF and surrounding areas and those steps should be taken to reduce or eliminate their presence on the CNF. 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. All comments were considered by the ID team and responsible official, and 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.

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

ALTERNATIVE DEVELOPMENT PROCESS

Comments from the public and from the Custer National Forest resource specialists were used to determine potential issues which were then categorized according to relevance to the purpose and need. The categories included significant issues as well as issues deemed to be beyond the scope of the purpose and need for this project. Also included are those suggestions for protection measures, monitoring recommendations, and alternatives. Significant issues were used to develop alternatives to the proposed action. Issues that were considered outside the scope of the EIS are described in this chapter, along with alternatives that were dismissed from detailed analysis. Protection measures are outlined in Appendix C and monitoring aspects are listed near the end of this chapter.

The issues that drove the development of different alternatives include the concern of potential impacts of herbicide on human health, wildlife and aquatic resources, and the impact of aerial application potential drift on non-target areas and species. In response to these issues, three alternatives were developed: Alternative 1 - Proposed Action Alternative (Integrated Pest Management, including the use of both ground and aerial application of herbicide, herbicide use within the Absaroka-Beartooth Wilderness Area, and use of additional EPA approved herbicides), Alternative 2 - No Herbicide Alternative, Alternative 3 - No Action, no change from current management decisions (1987 Custer Noxious Weeds EIS and the 1987 West Fork Rock Creek EA) which limits use of many of the available herbicides, does not authorize aerial treatment, and does not allow herbicide use within the Absaroka-Beartooth Wilderness Area.

ISSUES USED TO EVALUATE ALTERNATIVES

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 they 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).

Issue Indicators:

- Potential for spread or reduction of weeds in acres.

HERBICIDES EFFECTS 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, and the carcinogenicity 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. A list of documents assessing risk to human health is contained in the Human Health section of Chapter 4.

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).

Issue Indicators:

- Potential for exposure and/or doses in excess of safe reference dose.
- Potential for spray drift

HERBICIDE EFFECTS 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 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.

Issue Indicator:

- Impacts that exceed regulatory compliance thresholds;
- Potential impact of herbicides to non-target resources.

HERBICIDE EFFECTS 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.

Issue Indicator:

- Impacts that exceed regulatory compliance thresholds;
- Potential impact of herbicides to non-target resources.

HERBICIDE EFFECTS ON WILDLIFE

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

Issue Indicator:

- Impacts that exceed regulatory compliance thresholds;
- Potential impact of herbicides to non-target resources.

OTHER ISSUES

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

- Effects on wilderness, recommended wilderness, inventoried roadless areas, wild and scenic rivers, and research natural areas;
- Effects on recreation users;
- Effects on heritage resources; and
- Effects on Social and Economic considerations, including effects on Partnerships/Cooperators.

ISSUES AND ALTERNATIVES NOT STUDIED IN DETAIL

A few issues raised during the scoping period were not analyzed in detail because: 1) there are no direct or indirect effects from the proposed action; 2) the issue is outside of the scope of decision; or 3) past research and analysis show no significant effects for similar actions.

Several alternatives for the proposed project were considered but eliminated from detailed analysis. Reasons for their dismissal include not meeting project purposes and needs; not meeting CEQ (NEPA) guidelines of being reasonable, feasible, and viable; not differing substantially from other alternatives being analyzed in detail; being beyond the scope of the EIS; and/or not complying with current laws, regulations, policies, and Forest Plan direction.

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 will not be considered further.

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

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-herbicidal 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 purposes and needs.

ALTERNATIVES CONSIDERED IN DETAIL

FEATURES COMMON TO ALL ALTERNATIVES

Best Management Practices (BMPs) for weed prevention and weed management would be included and followed (see Appendix D).

Establishing native species would be the long-term goal. Re-vegetation would only be used on those small sites most prone to erosion or in need of competing vegetation.

The Administration Travel Policy would 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.

Appendix E, Table E – 1 depicts weed treatment priorities to be utilized on the Custer National Forest since funding is generally not sufficient for total treatment. 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, and parking areas.

COOPERATIVE CONTROL EFFORTS

To increase the effectiveness of all control efforts, the CNF would continue, and expand where possible, cooperative, multi-ownership weed control efforts. However, under Alternative Two, Cooperators would likely diminish or cease due to ineffectiveness of that particular IPM strategy when not applying herbicides. 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. This would include working with counties to prioritize roads for weed treatments and developing funding agreements for weed control work along priority roads crossing CNF and county lands.
- Use input from the counties 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.

FEATURES COMMON TO ALTERNATIVES 1 AND 2

Adaptive Management Approach

The adaptive management strategy outlined in Appendix E applies to Alternative 1- Proposed Action and Alternative 2 – No Herbicide. However, herbicide aspects of the adaptive management strategy would not be available under Alternative 2. The adaptive management approach is made up of two principle components as outlined in Appendix E.

ALTERNATIVE 1 – PROPOSED ACTION

The Custer National Forest proposes 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). Actual treatment would provide for adaptive management practices while addressing current infestations as follows:

- About 1415 net infested acres ground herbicide application is proposed (includes 45 acres of in the AB 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. 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 biological control is proposed. Herbicide treatment will be used along the perimeter and small patches to contain the weeds. Current targeted areas include 80 Ac Stillwater, 5 Ac Dry Creek, 28 Ac Rock Cr, 20 Ac Ski Run Rd, 2 Ac Pryor Mountain (Beartooth Ranger District), 10 Acres Powder River Breaks (Ashland Ranger District), 10 Ac 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 pull isolated plants);
- Less than 5 acres of cultural treatment of seeding is proposed. Herbicides or grazing may be used to reduce plant density, then plant more desirable and competing vegetation; 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. Treatment would be within one foot from paved road shoulders and a minimal amount of hairline cracks in paved roads. Other examples include helibases, drainage culverts, special use permits such as telephone and electric transmission lines that may have undesirable vegetation growing in or adjacent to them. Undesirable plants may increase maintenance costs of the infrastructure, can be a safety problem, or cause injury.

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 to be re-treatment or if treatment areas could be reduced based on effectiveness of previous treatments.

Appendix A has a current list of 53 invasive and poisonous plants that occur on the Custer Forest or occur nearby. Under Alternatives 1 and 2 the list will be updated as new plants are recognized as a threat to the ecosystem or agricultural economics. Alternative 3 is limited to the plants listed in the 1987 Custer Forest Noxious Weeds Control EIS, and the 1987 West Fork Rock Creek EA.

Under the proposed action alternative new weed infestations could be treated provided that the steps identified in the Adaptive Management section (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 the Appendix E, Table E – 1 to determine the type of treatment on each weed infestation. If the weeds are in the AB Wilderness, then Wilderness Minimum Tool Guidelines found in Appendix E, Table E - 3 will be used.

One feature of the proposed action Alternative 1 is the flexibility to use updated agents as they are registered and approved by the EPA (see 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 this chapter and 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. Appendix G lists the herbicides addressed in this analysis. Appendix E outlines adaptive management that would be used to address use of herbicides or biological agents not analyzed in this analysis. The herbicide section in chapter 3 displays herbicide properties regarding the physiological or biochemical activity and behavior in or on soils.

Herbicide selection would be based on environmental conditions (such as groundwater vulnerability, proximity to water, and non-target vegetation) to meet management objectives. Appendix F displays herbicide effectiveness by species. Appendix I display examples of herbicides proposed for use and a range of application rates. Appendix I also displays other treatments and their effectiveness by species. Herbicide selection considers the following criteria:

- Herbicide label considerations;
- Herbicide effectiveness on target weed species;
- Proximity to water or other sensitive resources;
- Soil characteristics;
- Potential unintended impacts to non-target species such as conifers or shrubs;
- Application method (i.e., aerial, ground, or wick applicator);
- Other weed species present at the site, and effectiveness of herbicides on those species (for example spotted knapweed infestations with inclusions of toadflax);
- Adjacent treatments (private land);
- Timing of treatments (spring/fall) for effectiveness; and
- Priority weed – new invaders vs. existing.

ALTERNATIVE 2 – NO HERBICIDE

This alternative describes a weed control program as outlined in Alternative 1, but that does not use herbicides. The adaptive management strategy applies to this Alternative as do priority criteria (see Appendix E). However, herbicide aspects of the adaptive management strategy would not be available under Alternative 2.

Under Alternative 2 the following activities would occur: less than five net acres of hand pulling or other mechanical or cultural treatments, and 155 net infested acres with biological control agents (primarily knapweeds and leafy spurge).

Approximately 60 acres tall larkspur could be treated with sheep. Sheep are more resistant to larkspur poisoning than cattle. Grazing larkspur with sheep before cattle turn-in may reduce the threat of cattle poisoning. Sheep, however, are not necessarily consistent in grazing various species of larkspur, but they could be compelled to increase consumption by trailing or bedding in larkspur patches (Michael H. Ralphs and John D. Olsen, 1992). This treatment of larkspur would largely be dependent upon the permittees' commitment to the treatment and is currently unlikely to be a preferred option for permittee commitment.

This alternative would also result in 1,345 net infested acres not being treated for the following reasons: (1) there is not an approved biological control agent or very limited effectiveness; (2) the weed patch is too large and can not be hand pulled because of lack of resources; and/or (3) the plant spreads via roots and extensive soil disturbance is not acceptable.

The effectiveness of these treatments is diminished because weed density will not be controlled with herbicides. Mechanical treatments will only occur in areas with low weed density (a few weeds per acre) for maximum cost effectiveness. Cultural treatments, such as seeding native plants without removing the weeds will cause a decrease in seedling survival due to plant competition. Biological control agents that are currently available will only reduce the plant density of a few weed species (most agents have not been effective as of yet) and will not prevent the weeds from spreading into new areas.

ALTERNATIVE 3 – NO ACTION, NO CHANGE FROM CURRENT WEED TREATMENT

This alternative is the same as current management practices covered by previous NEPA decisions. No additional herbicide treatment would occur outside of those areas identified in the 1987 Custer National Forest Noxious Weeds Control EIS and the 1987 West Fork Rock Creek EA. Alternative 3 would allow for treatment of listed noxious weed species with only four herbicides (2, 4-D, picloram, dicamba, and glyphosate), and allows for manual, cultural, and biocontrol treatments (the 1987 Noxious Weeds EIS combined these activities). This Alternative would not treat about 45 acres inside the AB Wilderness Area with herbicides because it was not analyzed in the previous environmental analysis. No larkspur or infrastructure herbicide treatments would occur under this alternative. No aerial treatment would be done under this alternative. There would be no allowances for adaptive management strategies to be employed for new species, infestations, or herbicides.

A summary of the different treatment types for each alternative is provided in Table 2 - 1. Maps of treatment areas by Alternatives by Ranger District are displayed in Map Section, at the end of this document. More detailed and larger scaled maps are available in the project file.

TABLE 2 - 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

CHOOSING TREATMENT METHODS

Selection of weed management tools is not a choice of one tool over another, but rather selection of a combination of tools that would be most effective on the target species for a particular location. Reliance on one method or restricting the use of one or more weed management tools may prove less effective. Effectiveness and applicability of each tool varies and depends on weed biology and ecology, location and size of the infestation, environmental factors, management objectives, and management costs. Methods include mechanical, cultural, biological, and chemical.

See Chapter 3 for use of these treatments and Appendices F and J for technique effectiveness for individual weed species. Table 2 - 2 displays a comparison of Treatment Methods by Alternative.

TABLE 2 - 2. COMPARISON OF TREATMENT METHODS BY ALTERNATIVE

Treatment Type	Alternative 1 Proposed Action	Alternative 2 No Herbicide	Alternative 3 Current Direction
Manual	All manual techniques known to be useful for treating invasive plants	Same as Proposed Action.	Hand pulling and use of hand tools.
Mechanical	Same as Current Direction	Same as Proposed Action.	Any mechanical tool that is known to be useful for treating invasive plants.
Biological	Agents used would be APHIS and State-approved. Agents demonstrated to negatively impact non-target organisms would not be used.	Same as Proposed Action	Agents used would be APHIS and State approved
Cultural	Same as Current Direction, plus mulching with a variety of materials, and other local remedies that may be determined to be effective.	Same as Proposed Action.	Grazing animals, addition of fertilizer/soil amendments, competitive planting or any other cultural practice known to be useful for treating undesirable plants.
Herbicides	Herbicide formulations and mixtures containing one or more of the following active ingredients: 2, 4-D, aminopyralid, chlorsulfuron, clopyralid, dicamba, diuron, glyphosate, hexazinone, imazapic, imazapyr, metsulfuron methyl, picloram, sulfometuron methyl, and triclopyr, and associated adjuvants. Ammonium sulfate, an adjuvant, can also be used as an herbicide for use of larkspur control. All of herbicide application methods are allowed including wicking, wiping, injection, spot, ground level broadcast and aerial, as permitted by product label.	No herbicides would be used.	Herbicide formulations containing only the following active ingredients are permitted: glyphosate, picloram, dicamba, and 2, 4-D and associated adjuvants. All application methods consistent with label requirements are permitted. Only ground applications outside of the AB Wilderness are permitted. No aerial applications are permitted.

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 acreage 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.

Treatment Type	Alternative 1 Proposed Action	Alternative 2 No Herbicide	Alternative 3 Current Direction
	Ground applications permitted in entire project area, including the AB Wilderness Area. Aerial applications are not permitted in the AB Wilderness.		

MONITORING

A monitoring program would be incorporated as part of each alternative. Monitoring is the collection of information to determine effectiveness of management actions in meeting prescribed objectives. Monitoring would focus on the: 1) density and rate of spread, and the effect these aggressive plants have on natural resources; 2) effects of herbicides on noxious weeds; 3) establishment and effectiveness of biological control agents; and 4) presence of herbicide in surface or ground water in high risk areas (i.e. accidental spills, aerial application), and 5) implementation of protection measures.

The weed monitoring program includes annual survey and mapping of weed populations and treatment areas. In addition, long term herbicide test plots and long term biological control plots may be established for the purpose of tracking the effectiveness of control.

Monitoring of herbicide use will be completed annually and on a daily basis during periods of herbicide application. Per state requirements, daily herbicide application logs will be kept and will include information on the type of herbicide, total amount of the herbicide used, method of application, and location of treatment. This information will be consolidated in the annual Forest Service Pesticide Use Report.

For aerial herbicide application, adjacent sensitive resources (streams, lakes, wetlands, and sensitive plants) would be monitored to determine the amount and distribution of spray drift. Spray detection cards would be placed along the perimeter of the treatment area and inside the buffer around sensitive areas. The cards would be visually examined immediately after spraying and photographed. A written summary of the drift pattern as interpreted from the detection cards and the photos would be used to document the result. If necessary, aerial application methodology will be modified (change buffer size, change droplet size, and use different weather parameters) to reduce the amount of drift.

A Custer NF noxious/invasive plant inventory and database using national protocols will be maintained (TERRA and FACTS). Districts should annually monitor treated infestations to determine expansion and/or reduction of infestations over time.

Until the City of Red Lodge started using a well for their water source, the West Fork of Rock Creek historically served as the main water source for the city of Red Lodge. This area also received annual picloram treatments on weeds (mostly spot treatments with minor amounts of broadcast treatment). Because of this association with domestic use of the West Fork of Rock Creek water, the Beartooth Ranger District annually conducted water quality sampling and monitoring for picloram between 1990 and 2004. This area is also considered to be at high risk to groundwater contamination according to Chapter 4, Table 4 – 10 and the Ground Water Vulnerability map outlined in the Map section of the EIS. The design criteria and protocols used when treating weeds during this time period were similar to and somewhat less stringent than what is being proposed under the proposed action, Alternative 1. Test results have never shown any levels of picloram.

The following are situations of higher risk where an interdisciplinary team should evaluate whether or not water quality monitoring (surface or groundwater) is recommended for line officer support and approval. A high commitment to water quality monitoring in these high risk situations is strongly encouraged.

- Whenever there is reason to suspect that herbicides may have entered water during a spraying operation (such as herbicides detected on drift cards, or if a spill⁶ occurred),

⁶ Chapter 5 contains a web link to a bioassay technique using aquatic species sensitive to herbicides (including brook and rainbow trout). This technique is outlined in EPA toxicity testing manual entitled: "Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms", EPA/600/4-90/027, September 1991.

- In situations of large-scale broadcast treatment using persistent herbicides (i.e. picloram), especially within highly leachable soils and proximity of depth to ground water (see Chapter 4, Table 4 – 10), or in close proximity to surface waters
- When picloram levels approach the maximum allowable annual treatment acreage by watershed (sixth code level hydrologic unit – see Chapter 4, Table 4 – 14).

The associated water quality monitoring should display sampling locations relative to the area of herbicide treatment, parameters to be monitored, methodologies to be used, frequency, pattern and number of samples to be collected. Typically, samples should be collected immediately after spraying. Water samples could also be collected after the first substantial rain to detect herbicides that could possibly enter surface water through leaching or runoff. Laboratory analysis, by an independent lab, should test the water samples for herbicides. The design of the monitoring should:

- Ensure State water quality objectives and standards are met
- Provide a mechanism to initiate additional measures if needed to meet State water quality standards and goals
- Evaluate the effectiveness of the Best Management Practices utilized in a project
- Evaluate the accuracy of estimates made in the analysis, and
- Provide a feedback mechanism for future projects.

PROTECTION MEASURES

Appendix C outlines the environmental protection measures that would be implemented for each alternative. These are management requirements and constraints that apply to various aspects of weed treatments.

ENVIRONMENTALLY PREFERRED AND AGENCY PREFERRED ALTERNATIVE

Alternative 1 is both the environmentally and agency preferred alternative because it best meets public land laws and protects native species and habitat diversity with protection measures adequate to protect other resource values.

SUMMARY COMPARISON OF ALTERNATIVES

With each alternative, there is a trade-off between beneficial and adverse impacts. This section focuses on issues described earlier in this Chapter. Key components of these issues are impacts to human health, non-target plants, animals, fish, soils, and water. These tradeoffs are analyzed in Chapter 4 and summarized in the Table 2 - 3. Impacts are based upon the application of appropriate protection measures discussed in this chapter.

TABLE 2 - 3. 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
<p>Impacts of weed spread:</p> <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.
<p>Impacts of using herbicides:</p> <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.
<p>Additional risks of aerial spraying:</p> <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>
<p>Impacts of Non-herbicide treatments (Mechanical and Cultural)</p> <ul style="list-style-type: none"> • Air Quality • Water Quality / Fisheries • Soils 	<ul style="list-style-type: none"> -Moderate short-term emissions; air quality standards will not be exceeded. -Insignificant effects to water quality; effective protection measures. -Low potential for short-term insignificant soil 	<ul style="list-style-type: none"> -Moderate short-term emissions; air quality standards will not be exceeded -Insignificant effects to water quality. -Moderate to low potential for short-term insignificant soil 	<ul style="list-style-type: none"> -Moderate short-term emissions; air quality standards will not be exceeded. -Insignificant effects to water quality; effective protection measures. -Low potential for short-term insignificant soil impacts or

Chapter 2: Public Participation, Issues, and Alternatives

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"> Vegetation Heritage Resources 	<p>impacts or surface erosion from mechanical treatment methods.</p> <p>-Best weed control; minimum impact to non-target vegetation from biological treatment.</p> <p>-Some to low probability of site damage from mechanical methods.</p>	<p>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>surface erosion from mechanical treatment methods.</p> <p>-Good weed control with minimum impact to non-target vegetation from biological treatment.</p> <p>-Some to 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 AB Wilderness; no adaptive management and fewer protection measures than Alternative 1.</p> <p>70-80 %</p>