

# Executive Summary

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## ES.A. Introduction

This Final Environmental Impact Statement (Final EIS) was prepared pursuant to requirements of the National Environmental Policy Act (NEPA) for the Salmon-Challis National Forest (S-CNF) Noxious Weed Management Program. The S-CNF proposes to implement an integrated series of weed treatment practices that would eradicate, reduce, and/or slow the spread of noxious and invasive non-native populations of weeds on the S-CNF. The project area covers more than three million acres of the S-CNF, excluding the Frank Church River of No Return Wilderness (FCRONRW), and includes existing as well as future potential weed infestation sites. Map ES-1 shows the boundaries of the S-CNF and its location in Idaho.

More than 40 weed species are considered in this analysis, including species designated as “noxious” by the State of Idaho and additional invasive species found on or near the S-CNF. Weed species that occur on the S-CNF are referred to as established or new invaders, while those that occur near the S-CNF are referred to as potential invaders.

## ES.B. Purpose and Need

### ES.B.1. Project Purpose

The purposes of the proposed S-CNF Noxious Weed Management Program are to:

1. Protect the natural condition and biodiversity of ecosystems and watershed function within the S-CNF by preventing and/or limiting the introduction and subsequent spread of invasive, non-native plant species that displace native vegetation.
2. Eliminate new invaders (weed species not previously reported in an area) before they become established.
3. Contain and reduce known and potential weed seed sources throughout the S-CNF.
4. Prevent or limit the spread of established weeds into areas containing little or no infestation.
5. Protect sensitive and unique habitats including Research Natural Areas (RNAs), wetlands, riparian areas, and plant populations.
6. Develop criteria to prioritize invasive weed species and treatment areas. Use these criteria to identify priority weed treatment locations within the S-CNF.
7. Comply with and implement current Federal and State law, Presidential Executive Orders, Forest Service policy and strategies, and Forest Service plans regarding the control of noxious and other invasive, non-native weeds.

8. Cooperate with county, state, other federal agencies, and private land owners, and other organizations (including Cooperative Weed Management Areas [CWMAs]) interested in managing invasive weeds.

The Notice of Intent (NOI) to prepare this EIS stated that prioritization would be given to treating areas that may contribute to the continuing spread of weeds into Lemhi, Custer, and Butte Counties within the S-CNF.

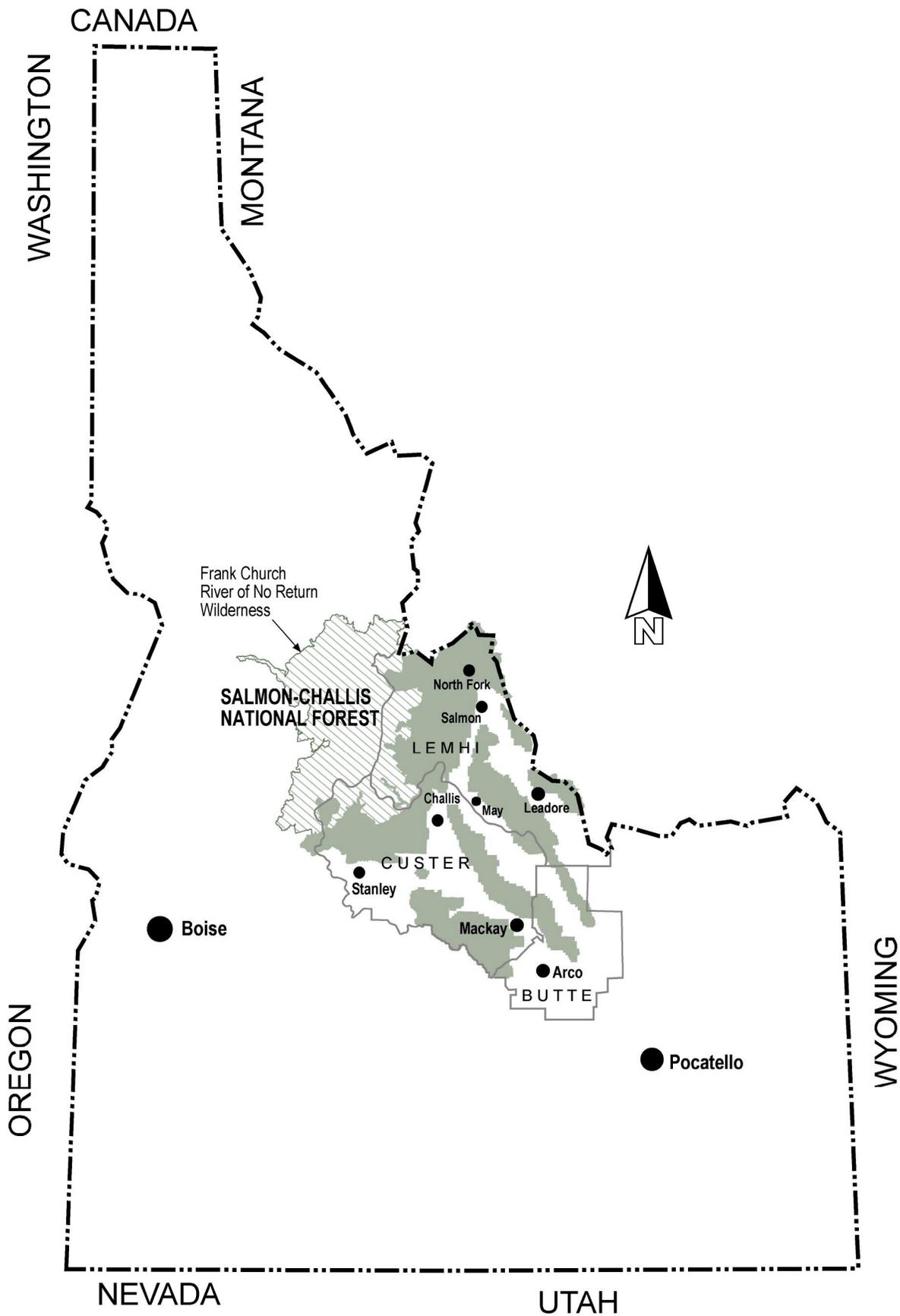
## **ES.B.2. Project Need**

According to the recent scientific assessment of the Interior Columbia Basin, invading weeds can alter ecosystem processes, including productivity, decomposition, hydrology, nutrient cycling, and natural disturbance patterns such as frequency and intensity of wild fires (Quigley and Arbelbide 1997). Changing these processes can lead to displacement of native plant species, eventually impacting wildlife and native plant habitat, recreational opportunities, natural hydrologic processes, and scenic beauty.

Noxious and invasive, non-native weeds are spreading on public and private lands at an alarming rate. The Departments of Agriculture in 11 western states estimate that there are about 70,000,000 acres of invasive weeds on private, state, and federal wildlands (Asher and Spurrier 1998). At an average annual rate of spread of 14 percent (U.S. Bureau of Land Management 1985), the 70,000,000 acres of weed infestations would lead to 3,500,000 acres of new weed infestations in 1 year. The spread of weeds can primarily be attributed to human activities associated with vehicles and roads (Roche and Roche 1991), contaminated livestock feed, contaminated seed, and ineffective re-vegetation practices on disturbed lands (Callihan et al. 1991). Wind, water, birds, wildlife, and livestock also contribute to weed spread.

Noxious and undesirable weeds have established themselves throughout the Northwest, including the S-CNF where nine species with established populations and 15 species with new populations are known to infest more than 66,000 acres on more than 2,500 sites. It is likely many more infestations are yet to be discovered. The North Fork Ranger District contains the greatest number of weed species (16) and acres of weed infestations (54,638) among the seven S-CNF Ranger Districts, followed by the Salmon-Cobalt Ranger District (13 species; 8,182 acres). Weed infestations on these two Ranger Districts together comprise approximately 94 percent of all inventoried noxious weed infestations on the S-CNF. The three most abundant weed species (acres of infestations) within each S-CNF Ranger District are represented by a total of seven species. They include spotted knapweed, musk thistle, Canada thistle, bull thistle, leafy spurge, yellow toadflax, and sulphur cinquefoil.

Many weed species reproduce by sprouting from roots as well as by prolific seed production. Quigley and Arbelbide (1997) make reference to colonizer and invader noxious weeds. Colonizers tend to germinate under a wide range of environmental conditions, establish quickly, exhibit fast seedling growth, and, once established, out-compete native species for water and nutrients. Invaders can establish on relatively intact vegetative cover and displace native species without the aid of soil surface disturbance. Many of the most insidious noxious weed species (knapweeds, leafy spurge, rush skeletonweed, and yellow starthistle) have characteristics of both colonizers and invaders.



**MAP ES-1**  
**Salmon-Challis National Forest**  
**Location Map**

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Most habitat criteria for weeds are fairly broad, which is one of the characteristics that makes these species so successful in adapting to new environments. Other general characteristics that often aid in the invasion and spread of weeds are their high reproductive potentials; adaptations to disturbed sites; allelopathic (toxic) compounds that provide weeds a competitive edge by suppressing growth of other vegetation; poisonous compounds, latex sap, barbs, or prickles that make weeds unpalatable; and/or their lack of natural enemies outside their native country and range. Because of the ability to invade or colonize new areas and a lack of natural predators to keep them in check, weeds can spread rapidly to non-infested areas.

Noxious and invasive weed expansion and establishment does not recognize ownership or administrative boundaries. Weeds that have become established on roadways are likely to encroach upon adjacent private croplands. Infestations on private lands are likely to encroach upon public lands and vice versa. The economic effects on private land productivity and treatment costs are considerable. This Final EIS lists the species and acres of noxious weeds inventoried just outside the S-CNF boundaries that are associated with the S-CNF Ranger Districts. The presence of these weeds was documented as part of the overall database compilation for the proposed Noxious Weed Management Program on the S-CNF. Gathering near-Forest data such as these contributes to the cooperative weed management programs involving the Forest Service and neighboring counties like Custer County and Lemhi County, and is integral to the overall success of weed management on and near the S-CNF. As more inventories are completed, weed acres and distribution will surely increase.

The degradation of public land resource values because of noxious weed infestations also has economic impacts. A study on the impact of spotted knapweed on Montana's economy (Hirsch and Leitch 1996) found that spotted knapweed infestations in wildlands have affected wildlife-associated recreation expenditures and soil and water conservation benefits. The direct impact on Idaho's economy has been estimated at more than \$300 million annually (Idaho Strategic Plan for Managing Noxious Weeds, Idaho Department of Agriculture February 1999).

Data presented in this Final EIS indicate how quickly weeds could potentially spread and dominate the S-CNF under the No Action Alternative. Five years from now, presently known weed infestations of approximately 66,000 acres would have doubled or tripled in size. Ten years from now, weeds would cover from over 200,000 acres (14 percent annual spread) to over 500,000 acres (24 percent annual spread) of the S-CNF. Twenty years from now, weeds would cover from just under 1,000,000 acres of the S-CNF at the most conservative spread rate (14 percent) to all of the S-CNF lands at the risk of invasion at the least conservative spread rate (24 percent).

These estimates are a sobering prediction of what could occur if treatment efforts remain at current levels.

Noxious weeds negatively impact the natural plant communities they invade by reducing plant diversity and species richness, by decreasing the quality of habitat values for wildlife, and by overwhelming sensitive plant populations. Without aggressive treatment, noxious weeds would continue to displace native vegetation at the same or higher rates than currently. This would mean continued declines in plant diversity and species richness across native plant communities, particularly in the northern districts of the S-CNF where

current infestations are heaviest. Declines in natural vegetative communities would result in declines in the quality of wildlife habitats. Populations of sensitive plant species in the path of weed expansion that could be expected to occur under less aggressive treatment would be impacted and probably overwhelmed by noxious weeds. Sensitive plant populations that are within or along the perimeter of the currently infested areas would have the highest potential to be negatively impacted.

The S-CNF must exercise responsible land management to prevent weed infestations from causing substantial habitat loss, with subsequent loss of plant diversity and ecosystem functions. Lack of effective weed management, in conjunction with the land use patterns around and within the S-CNF, will result in continued infestation onto Federally administered land from non-Federal land. Conversely, lack of effective weed management on some Federally administered land may infest neighboring non-Federal land or render weed control efforts on adjacent non-Federal land ineffective.

## **ES.C. Alternatives Analyzed in Detail**

A Proposed Action, two other action alternatives, and a No Action Alternative for the proposed S-CNF Noxious Weed Management Program were analyzed in detail. They are described below and include the following:

- No Action Alternative (No Change from Current Management)
- Proposed Action – Aerial and Ground-Based Herbicide Applications Plus Mechanical, Biological, Controlled Grazing, and Combinations of Treatments
- Alternative 1 – Ground-Based Herbicide Application Plus Mechanical, Biological, Controlled Grazing, and Combinations of Treatments (No Aerial Herbicide Application)
- Alternative 2 – Mechanical, Biological, Controlled Grazing, and Combinations of Treatments (No Herbicide Application)

The Proposed Action was selected by the S-CNF Weed EIS Content Analysis Team following further review of the six preliminary alternatives presented at the public scoping meetings, evaluation of comments received from the public on alternatives and components of alternatives for the proposed project, and an assessment of which action alternative appeared to best meet the near- and long-term weed management goals for the S-CNF as defined in the project purposes and needs. For each alternative analyzed in detail, vegetative treatments were combined with site restoration activities rather than keeping them as a separate set of weed treatments, because vegetative treatment (in some form) becomes the restoration action.

In addition to the features of the alternatives described below, best management practices (BMPs), standard operating procedures (SOPs), and mitigation measures will be implemented under the various alternatives. These measures are described in detail in Chapter 2 of this Final EIS. Many measures apply to all alternatives and involve safe operating procedures for weed control.

### **ES.C.1. No Action Alternative (No Change from Current Management)**

Under the proposed S-CNF Noxious Weed Management Program, the No Action Alternative would continue the same weed management programs, treatments, and levels of effort for controlling noxious weeds on the S-CNF as are currently being used. Current weed management is conducted according to the Forest Service's Integrated Weed Management (IWM) Program, and is authorized by the Findings of No Significant Impact (FONSI), Decision Notices, and Environmental Assessments for the Challis National Forest (U.S. Forest Service 1989) and Salmon National Forest (U.S. Forest Service 1987a) noxious weed control programs. Weed treatments on the S-CNF were very limited prior to 1995. Since then, acres of lands treated have generally increased each year from 586 acres in 1995 to 3,371 acres in 2001. Virtually all of these acreages were treated using herbicides. Monitoring has been geared toward program implementation and measuring the effectiveness of treatments on target species.

The current noxious weed management program for the S-CNF fulfills the need to develop relationships with local and state agencies and complies with current federal and state laws. However, recent watershed analyses show that weed infestations continue to plague the S-CNF. The current level of weed treatment is considerably less than known weed infestations (greater than 66,000 acres) on the S-CNF. New invaders continue to establish populations on the S-CNF, and would likely increase in size unless a more aggressive noxious weed management program than that associated with the No Action Alternative is developed and implemented.

The No Action Alternative does not include a forest-wide integrated action plan to reduce or eliminate the spread of weeds on the S-CNF. It also does not include an adaptive weed management strategy or a minimum tool approach. Site restoration and monitoring activities would be limited in scope. Expanding target species, treatment acres, or choice of chemical would require further NEPA analysis and documentation. This would constrain S-CNF managers from responding in a timely and cost-effective manner to new weed infestations.

### **ES.C.2. Proposed Action—Aerial and Ground-Based Herbicide Applications Plus Mechanical, Biological, Controlled Grazing, and Combinations of Treatments**

#### **a. Weed Treatment Objectives and Priorities**

The overall management objective of the Proposed Action is to maximize the treatment of noxious and invasive weeds throughout the S-CNF using an IWM approach as quickly as reasonably possible to protect the forest and its resources. This strategy is a holistic, *systems* approach to weed management. It involves the use of the best available management techniques to limit the impact and spread of the weed. IWM typically includes strategies for awareness and education, early detection and proactive prevention of noxious weeds, the use of all treatment "tools" such as mechanical, biological, controlled grazing, and chemical management practices, followed by restoration and revegetation (cultural) (as appropriate) and monitoring of weed-impacted lands. A full array of treatment and management strategies is important in IWM, including weed treatment and non-treatment practices,

prevention, restoration, monitoring, adaptive strategy, minimum tool, and site-specific implementation process. These strategies are discussed below and throughout this Final EIS.

Weed treatment objectives under the Proposed Action of an IWM approach include eradication (elimination), control (reducing the population over time), and containment (preventing the population from spreading). Weed treatment priorities would be directed to where they have the greatest potential for removing or minimizing the adverse effects of weeds on other S-CNF resource values. Treatment priorities, in descending order, are as follows:

- 1) Eradicate new populations of aggressive weeds
- 2) Control existing populations of aggressive weeds
- 3) Contain existing populations of aggressive weeds
- 4) Eradicate new populations of less aggressive weeds
- 5) Control existing populations of less aggressive weeds
- 6) Contain existing populations of less aggressive weeds

Levels of S-CNF funding, staffing, and other resource availability would ultimately determine the schedule for addressing and implementing treatment priorities. If funding and staffing levels are inadequate for full implementation of the IWM program, treatment at a specific weed site may be deferred. This is defined as a “custodial” action.

#### **b. Weed Treatment Practices**

The Proposed Action includes a full array of integrated weed treatment practices: restoring and revegetating (where appropriate) sites; developing monitoring programs to follow treatment; implementing a broad range of mitigating BMPs and SOPs; employing a site-specific minimum tool approach; and following an adaptive strategy in managing future weed infestations. Options for weed treatment that would be considered for use on a site-specific basis under the Proposed Action include a variety of mechanical, biological, controlled grazing, chemical (ground-based and aerial applications of herbicides), and combinations of these treatments. A number of non-treatment practices, which are a cornerstone of IWM programs, would continue under the Proposed Action. These IWM practices include proactive weed prevention programs; weed inventory and early detection; information and education programs; cooperative partnerships and coordination; and compliance with laws, orders, policies, and Forest Plans. Weed treatment practices are described in detail in *Section 2.C.1, Treatment Practices*.

#### **c. Mitigating BMPs and SOPs**

BMPs for weed prevention and management that are followed by Region 4 of the Forest Service would be adhered to under the Proposed Action. In addition, BMPs and SOPs specifically associated with non-chemical weed treatments and with the ground-based and aerial applications of herbicides would be implemented as integral parts of the Proposed Action. These BMPs and SOPs are intended to avoid, minimize, or offset the potential for adverse impacts on S-CNF resources. Mitigating BMPs and SOPs are described in detail in *Section 2.D.3, Management Practices and Mitigation Measures*, and Appendix A.

#### **d. Restoration and Monitoring**

Restoration and monitoring of treatment areas are integral components of the IWM program. Site restoration objectives include revegetating areas with desired vegetation where weeds have been eradicated, controlled, or contained; preventing future weed infestations; and slowing expansion of existing adjacent weed infestations. Implementation and effectiveness monitoring of treated and restored sites would be used to determine if the desired management objectives are being achieved, whether site restoration was successful, if follow-up treatments are needed, and to validate buffering effectiveness. Restoration and monitoring are described in detail in *Section 2.C.3, Restoration and Monitoring*.

#### **e. Adaptive Strategy**

An adaptive weed management strategy would be employed to determine appropriate future actions to treat new populations of weeds, expansion of existing weed infestations, or weed infestations that have not yet been inventoried. The adaptive strategy would also cover any new weed species that occur on the S-CNF; any new federal-, state-, or county-designated species of noxious weeds; and any non-designated nuisance weeds present on the S-CNF. The process would include the following: 1) determine the weed species, level of aggressiveness, and infestation size; 2) determine the proximity to susceptible habitats, sensitive resources or species, administrative, or recreation sites; 3) determine a treatment priority level; 4) select and implement a treatment method using the site-specific minimum tool concept; and 5) conduct site restoration, monitoring, and assess follow-up needs. The scope of this EIS is intentionally broad relative to the issues and geographic scale analyzed in order to establish a basis for covering future weed treatments on the S-CNF using an adaptive strategy. Adaptive strategy is described more fully in *Section 2.C.4, Adaptive Strategy*.

#### **f. Minimum Tool**

Invasive weed treatments will incorporate the use of the “minimum tool” concept. During planning, S-CNF managers will select for use the minimum necessary method(s) to accomplish the weed management objectives at a specific site. If all treatment options are equally effective in controlling a particular species or infestation, the method with the least impact would be used. Parameters considered when selecting minimum tools include species biology, infestation size, proximity to water and recreation sites, and extent of sensitive habitats adjacent to infestations. The minimum tool would be determined using a site-specific implementation process and decision tree analysis that evaluates environmental parameters. Minimum tool is described in detail in *Section 2.C.5, Minimum Tool*. The site-specific implementation process and decision tree analysis is summarized in the following text.

#### **g. Site-Specific Implementation Process**

A number of steps would be followed under the Proposed Action and Alternatives 1 and 2 to determine and implement the most appropriate treatment method for a site-specific weed infestation. They include the following:

- Detection of the weed
- Prioritization of weed treatment at a particular site

- Determination if sensitive environmental receptors are present
- Determination of the appropriate treatment method for the weed
- Restoring then monitoring the treatment site to determine if follow-up or alternative treatment is warranted.

Following detection of a weed or weed population, treatment prioritization would take place. Highest priority would be given to stopping potential invaders before they can become established on the S-CNF. New invaders, usually having a small patch size, would have the second highest priority, followed by established invaders. The degree and intensity of treatment recommended is based on the importance the S-CNF places on limiting the spread of each weed species and the size of the infestation.

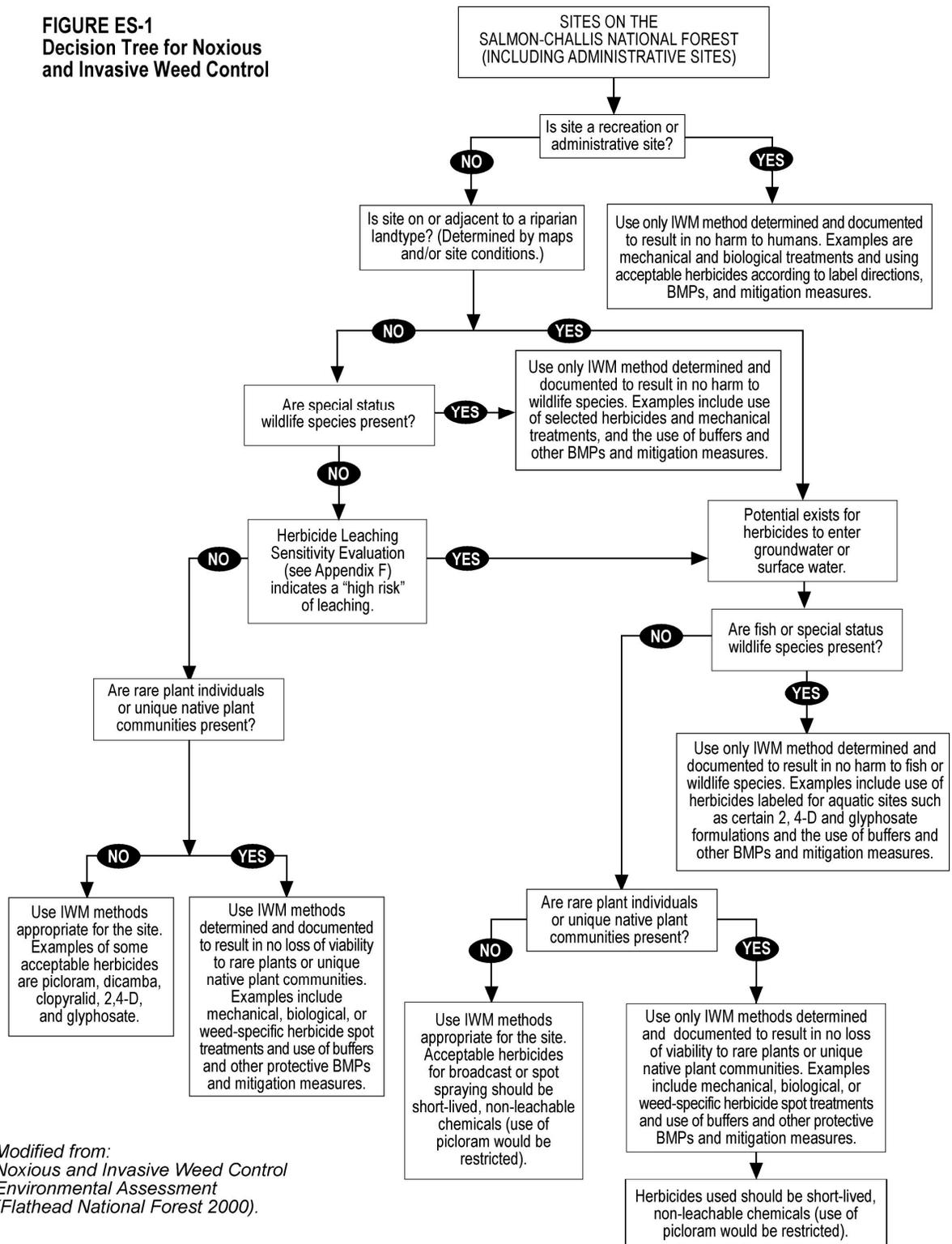
After the weed treatment priority and objective have been determined for a specific infestation, a decision tree (Figure ES-1) would be used as a guide to determine the most appropriate treatment method (mechanical, biological, controlled grazing, chemical, or combinations). This site-specific approach to treating weed infestations embraces the minimum tool concept. It is designed for present use as well as future use under the adaptive weed management strategy. This approach also incorporates all of the identified BMPs and SOPs, depending on the alternative. The site-specific process is described in detail in *Section 2.C.6, Site-Specific Implementation Process*.

#### **h. Weed Treatment Acres, Sites, and Management Goals**

Table ES-1 summarizes the acres of weed infestations on the S-CNF that would be treated annually under the Proposed Action (as well as under the No Action Alternative and Alternatives 1 and 2) using various available treatment options. The expected time frames and goals for accomplishing the Proposed Action management objective would vary depending on the extent and severity of weed infestations. As discussed in Chapter 2, known acres of weed infestations are considerably greater on the North Fork and Salmon-Cobalt Ranger Districts (primarily spotted knapweed infestations) than on the other five S-CNF Ranger Districts and may require more time to achieve weed management goals. The following management goals are proposed for the S-CNF Ranger Districts:

- Eradicate all new starts (less than 5 acres in size) of aggressive weeds.
- Reduce established infestations of aggressive weeds 5 to 25 acres in size by 75 to 100 percent.
- Reduce established infestations of aggressive weeds greater than 25 acres in size by 50 percent.
- Eradicate all new starts (less than 5 acres in size) of less aggressive weeds.
- Reduce infestations of less aggressive weeds greater than 5 acres in size by 50 percent.
- Implement site restoration and revegetation actions (where appropriate) and monitoring programs following treatment to reduce or eliminate the subsequent reinvasion of weeds and to measure the degree of treatment success.

**FIGURE ES-1**  
**Decision Tree for Noxious**  
**and Invasive Weed Control**



*Modified from:*  
*Noxious and Invasive Weed Control*  
*Environmental Assessment*  
*(Flathead National Forest 2000).*

- Employ the minimum tool approach and an adaptive strategy using the site-specific implementation process.

The period of weed treatment under the Proposed Action would continue until a change in weed conditions on the S-CNF becomes evident, consistent with the proposed weed management goals. Future, presently undefined weed infestations would be treated using the adaptive strategy approach. For purposes of analysis in this Final EIS, it has been assumed that full funding would be available for implementing the Proposed Action to work toward achieving those goals.

### **E.S.C.3. Alternative 1—Ground-Based Herbicide Application Plus Mechanical, Biological, Controlled Grazing, and Combinations of Treatments (No Aerial Herbicide Application)**

The management objective of Alternative 1 is similar to the Proposed Action, except that it would not include the aerial application of herbicides and is, therefore, less aggressive than the Proposed Action (see Table ES-1). The approximately 15,000 acres per year that would be chemically treated from both ground and air applications under the Proposed Action would instead be treated under Alternative 1, to the extent possible, using a combination of ground-based herbicide application plus primarily biological treatments. This affects the time frame and degree of success that would be anticipated on large infestations of weeds in the S-CNF. Except for this difference, all other integrated weed treatment and non-treatment practices, prevention, restoration and monitoring, adaptive strategy and minimum tool, and the site-specific implementation process would be implemented under Alternative 1.

Proposed weed management goals would be similar to the Proposed Action except for established infestations of aggressive weeds 5 to 25 acres in size and greater than 25 acres in size in all Ranger Districts. Differences in management goals between Alternative 1 and the Proposed Action would be greatest in the North Fork and Salmon/Cobalt Ranger Districts where the largest and continuous blocks of weed infestations suitable for aerial application are located. A combination of biological and ground-based chemical methods rather than aerial herbicide application would be used to treat the numerous large infestations of spotted knapweed. These large weed infestations would be more difficult to access and the treatment less effective, and would require more time to treat compared to aerial herbicide applications. The period of weed treatment for Alternative 1 would continue until a change in weed conditions on the S-CNF becomes evident, consistent with the proposed weed management goals. It is assumed that full funding would be available for implementing Alternative 1 to work toward achieving those goals.

### **ES.C.4. Alternative 2—Mechanical, Biological, Controlled Grazing, and Combinations of Treatments (No Herbicide Application)**

The objective of Alternative 2 is to increase the level of noxious weed management throughout the S-CNF compared to current conditions using mechanical, biological, controlled grazing, and combinations of these treatments. Except for the exclusion of herbicides, integrated weed treatment and non-treatment practices, prevention, restoration and monitoring, adaptive strategy and minimum tool, and the site-specific implementation process would be implemented under Alternative 2 (see Table ES-1). Herbicides would not

be applied under Alternative 2, and they would not be authorized for future use in the adaptive weed management strategy under this alternative. This would limit the choice and in most cases the effectiveness of treatments available for various species and sizes of noxious weed infestations. It would also limit the flexibility to select from a wide range of treatment options if initial treatments are unsuccessful and re-treatments with a different option are necessary.

The expected time frames and goals for accomplishing the management objective would vary depending on the extent and severity of weed infestation – the same as noted for the Proposed Action and Alternative 1. However, it is anticipated that because of fewer treatment methods available for use under Alternative 2 it is not likely that the same level of success would be achievable as the Proposed Action and Alternative 1. This is especially true for the North Fork and Salmon/Cobalt Ranger Districts where weed infestations are considerably greater than on the other five S-CNF Ranger Districts. The period of weed treatment for Alternative 2 would continue until a change in weed conditions on the S-CNF becomes evident, consistent with the proposed weed management goals. In many cases where a reduction in the size of infestation is possible under other alternatives, only controlling or containing the infestation is realistic under Alternative 2, without the use of herbicides. It is assumed that full funding would be available to work toward achieving those goals.

## **ES.D. Comparison of the Effects of Alternatives**

Table ES-2 (back of Executive Summary) compares and contrasts important features, properties, benefits, and costs of the No Action Alternative, Proposed Action, and Alternatives 1 and 2. Table ES-2 provides summary information for each of these four alternatives on noxious weed management goals, degree to which the eight components of project purpose and need would be met, and components of the IWM Program that would be implemented, including treatment practices, site restoration and monitoring, adaptive strategy, minimum tool approach, and site-specific implementation process. Table ES-2 concludes with a summary of estimated annual total treatment cost, estimated annual average cost per acre treated, and cost versus benefit for each alternative.

Table ES-3 (back of Executive Summary) summarizes and compares the potential environmental benefits and impacts of the No Action Alternative, Proposed Action, Alternative 1, and Alternative 2 for each resource area. The Proposed Action, followed by Alternative 1, would be the most effective of the alternatives evaluated in eradicating, controlling, and containing noxious weeds on the S-CNF and in benefiting a broad range of S-CNF resources. The No Action Alternative (No Change from Current Management) would be less effective and Alternative 2 would be the least effective of the alternatives evaluated in treating weeds and in benefiting S-CNF

**TABLE ES-1**

Estimated Acres of Weed Infestations to be Treated Annually and Possible Treatment Options on the S-CNF for the No Action Alternative, Proposed Action, Alternative 1, and Alternative 2<sup>1,2,3</sup>

	Possible Treatment Options									Total Acres
	Mechanical	Biological	Chemical	Mechanical and Chemical	Biological and Chemical	Grazing and Chemical	Mechanical and Biological	Mechanical and Grazing	Biological and Grazing	
No Action Alternative	50	550	2,350	50	500	0	0	0	0	3,500
Proposed Action	100	2,600	13,600	100	1,200	100	100	100	100	18,000
Alternative 1	100	2,600	7,000	200	7,600	200	100	100	100	18,000
Alternative 2	2,000	8,000	0	0	0	0	6,000	500	1,500	18,000

<sup>1</sup>Excludes the Frank Church River of No Return Wilderness.

<sup>2</sup>Estimated treatment acres based on values contained in Appendix B and information contained in Appendices C and J.

<sup>3</sup>Estimated treatment acres for the No Action Alternative reflect current and anticipated trends.

resources because of the comparatively few acres of weeds that would be treated each year (No Action Alternative) and the absence of herbicides as a weed treatment option (Alternative 2).

Potential risks for some S-CNF resources were identified for those alternatives that would use herbicides to treat weeds. These include aerial and ground-based herbicide applications under the Proposed Action and ground-based herbicide applications under Alternative 1 and the No Action Alternative. Such risks would be non-existent under Alternative 2. In all instances involving herbicide and other potential risks, BMPs and mitigation measures would be implemented to avoid or minimize the potential for adverse effects to occur. In addition, the Proposed Action, Alternative 1, and Alternative 2 include the use of a site-specific implementation process and a decision tree, a minimum tool approach, and an adaptive strategy. These management tools are designed to consider site-specific resource conditions that result in the selection of a treatment option that achieves weed management goals with the least impact on S-CNF resources. The protection of worker health and safety and public health and safety in selecting and implementing a site-specific treatment option would receive the very highest priority.

## **ES.E. Selection of the Preferred Alternative**

The Forest Service has selected the Proposed Action as the Preferred Alternative based on the analyses presented in this Final EIS. Among the alternatives evaluated, the Proposed Action best meets all of the project purposes and needs, contains the most aggressive and flexible treatment practices for achieving noxious weed management goals, and would provide the greatest weed treatment benefits at the lowest cost per acre. The Proposed Action would be the most effective of the alternatives evaluated in eradicating, controlling, and containing noxious weeds on the S-CNF and in benefiting a broad range of S-CNF resources.

## **ES.F. Environmentally Preferred Alternative**

The Forest Service has identified Alternative 2 as the Environmentally Preferred Alternative. This recognition is based on its lack of herbicide use and their potential impacts to the environment. However, Alternative 2 is also recognized as being the least effective of the alternatives evaluated in controlling noxious and non-native invasive weeds, thus having the greatest long-term impacts to native plants, wildlife habitat, and ecosystem health. While Alternative 2 is Environmentally Preferred in the short-term, the Proposed Action is expected to result in the greatest environmental benefits over the long-term and was therefore selected as the Preferred Alternative.

## **ES.G. Public Involvement, Consultation, and Coordination**

Public involvement formally began with the publication of a NOI to prepare a Draft EIS for a proposed noxious weed management program on the S-CNF, excluding areas within the Frank Church River of No Return Wilderness (FCRONRW). The NOI was published in the Federal Register on December 14, 2001. A project scoping letter was mailed to 502 individuals, interest groups, local governments, and other agencies on December 18,

2001. The Shoshone-Bannock Tribes were sent a notice on January 15, 2002, describing the project and requesting input.

Three public scoping meetings were held in the three local communities surrounding the project area in early January 2002. The first scoping meeting was in Arco, Idaho, on January 8, the second in Challis, Idaho, on January 9, and the third in Salmon, Idaho, on January 10. Notices of the public meetings appeared in the three local newspapers (Arco Advertiser, Challis Messenger, and Salmon's Recorder Herald) during the week of December 24, 2001. Notices of the public meetings also were announced over the local radio stations in Salmon and Challis the week of January 1, 2002. The meetings were only lightly attended by the public, including three individuals in Arco, six in Challis, and one in Salmon. Most of the attendees provided written comments either during the meeting on the comment form provided or by mail (and/or e-mail) at a later date. Notes describing issues and concerns raised by the public were recorded at each meeting and a sign-in list was distributed.

A total of 25 individuals or organizations responded with 88 written comments on the proposed project as a result of public scoping. Based on comments received from the public during and following scoping meetings, there appears to be little opposition regarding the use of chemicals or livestock as weed treatment options on the S-CNF. In addition, it appears there is support for using the full array of weed treatment options and the need to include provisions for chemical use, acreage, and treatment site flexibility on the S-CNF.

Although there is acceptance to the use of chemicals in the treatment of noxious weeds, there is still a concern over the environmental and health risks herbicides pose. However, in general, the public recognizes that noxious weeds pose a greater threat to the physical, biological, and ecological environment of the S-CNF. These environmental and health concerns led to the development of the following issues:

1. Potential effects on wildlife habitat, fisheries, native plant communities, threatened/endangered/sensitive (TES) species, vegetation diversity, and ecosystem function because of noxious weeds.
2. Potential effects on wildlife species and their habitat from ground and aerial applications of herbicides.
3. Potential effects on fisheries and aquatic habitat from ground and aerial applications of herbicides.
4. Potential effects on TES terrestrial and aquatic species from ground and aerial applications of herbicides.
5. Potential effects on TES plant species from ground and aerial applications of herbicides.
6. Potential effects on human health from ground and aerial applications of herbicides.

There also seems to be reasonable support from the public (13.6 percent of those who responded) for the need to address human-caused activities or uses that lead to or exacerbate weed expansion, encroachment, and establishment, namely, livestock grazing, logging, roads, mining, and recreation (OHVs). These concerns led to an additional issue:

7. Human uses exacerbate the spread and establishment of noxious and invasive non-native weeds. Without a proactive prevention strategy that limits, modifies, or curtails current human uses on the S-CNF, any type of physical treatment will not be successful in controlling weeds.

This issue led to the development and consideration early in the project of an additional alternative – the Proactive Prevention Alternative. This alternative alters the original intent and scope of weed treatment activities and focuses taking action on numerous human use activities as a means to actively prevent the establishment and spread of weeds, while at the same time incorporating the full range of weed treatment activities.

Public, government, and Tribal distribution of the Draft EIS for review and comment began with a Notice of Availability published in the Federal Register on November 15, 2002. Additional notices were published in the Challis Messenger, the Arco Advertiser, and the Salmon Recorder-Herald during the week of November 10, 2002. The Draft EIS was sent to the members of the public and other individuals who attended public meetings and/or requested a copy of the Draft EIS. It was also made available on the S-CNF web site ([www.fs.fed.gov/r4/sc](http://www.fs.fed.gov/r4/sc)). A hard copy and compact disc version of the Draft EIS were made available for public review at the Forest Service Office in Salmon, Idaho.

Three public meetings were held during December 2002 to receive comments on the Draft EIS:

- Arco, Idaho, on December 10, 2002, 6:00 p.m., at the “Business Incubation Center.” Two individuals attended.
- Challis, Idaho, on December 11, 2002, 6:00 p.m., at the Forest Service Office on Highway 93. Two individuals attended.
- Salmon, Idaho, on December 12, 2002, 6:00 p.m., at the Forest Service Headquarters on Highway 93. Three individuals attended.

Notices of these meetings were published in local newspapers and on the S-CNF web site. Officials from the Forest Service were available to answer questions. Comment forms were available at each meeting. One individual filled out a comment form in support of the Proposed Action. No other comment forms were received at the public meetings.

All notices of availability of the Draft EIS announced a 60-day public comment period, which closed on January 14, 2003. Comments were received in the form of written letters (11), e-mail messages (2), and comment forms from public meetings (1, as described above). Comments received after the close of the comment period were also reviewed and responded to accordingly.

The Forest Service’s NEPA handbook (40 CFR1503.4) gives direction on what to do with comments received on a Draft EIS. The Interdisciplinary (ID) Team is to review, analyze, evaluate, and respond to substantive comments on the Draft EIS. All comment letters were reviewed, in full, by the ID Team. The ID Team then analyzed each comment for content, and evaluated whether the statement/question was indeed a substantive comment or an opinion. Substantive comments and responses were divided into five general categories as identified in the FS 1905.15 handbook. They are listed in the following text and described in *Chapter 5, Consultation and Coordination*.

- Modify alternatives including the Proposed Action
- Develop and evaluate alternatives not previously given serious consideration by the agency
- Supplement, improve, or modify the analyses
- Make factual corrections
- Explain why the comments do not warrant further agency response

The first step in responding to public comments was to identify comments and assign comment numbers to the individual remarks in each piece of correspondence. A total of 272 individual comments were reviewed. Next, the ID Team wrote a response to each identified comment. Where commenters shared the same concern about an issue, the ID Team generally referenced the first comment and response where the concern was raised. The full text of the comments and responses is provided in Appendix M of this Final EIS.

This Final EIS was developed by incorporating and reviewing comments from the public and responses to those comments prepared by the ID Team. Some comments generated the text revisions that have been included in the body of this Final EIS. Responses to comments in Appendix M note where such text changes have been made, generally to provide additional information or to clarify discussions of project area resources and potential project effects. All issues raised during the official comment period were reviewed by the ID Team, which then generated the responses shown in Appendix M.

This Final EIS was distributed upon publication of a Notice of Availability in the Federal Register, additional notices published in local news outlets, and placement on the S-CNF web site. Notices were also mailed to commenters and others who requested information about the Final EIS. A hard copy and a compact disc of the Final EIS were also made available for public review at Forest Service Headquarters in Salmon, Idaho.

The Record of Decision (ROD) will describe the alternative selected for implementation and its potential project effects. When the ROD becomes available, a notice will be placed in the same news outlets previously used in this process for the Draft and Final EISs, and it will also be available on the S-CNF web site. The ROD will be distributed to all who request a copy.

**TABLE ES-2**

Comparison of Features, Properties, Costs, and Benefits of the No Action Alternative, Proposed Action, Alternative 1, and Alternative 2

Items of Comparison	No Action Alternative	Proposed Action	Alternative 1	Alternative 2
<p><b>Management Goals</b> See Section 2.D.2.</p>	<ul style="list-style-type: none"> <li>• Maintain noxious weed prevention, education, and public awareness programs</li> <li>• Treat about 3,000 to 3,500 acres annually</li> <li>• Eradicate new invaders using approved herbicides and other treatment methods</li> <li>• Control and reduce spread of established weed infestations</li> <li>• Coordinate with counties and state agencies to determine priorities and develop uniform treatment strategies</li> </ul>	<p>The management objective is to maximize treatment of noxious weeds throughout the S-CNF as quickly as reasonably possible through a full array of treatment and non-treatment practices. The Proposed Action would treat about 18,000 acres of weeds each year and employ the following management goals:</p> <p>For all S-CNF Ranger Districts:</p> <ul style="list-style-type: none"> <li>• Eradicate all new starts (&lt;5 acres in size) of aggressive weeds</li> <li>• Reduce established infestations of aggressive weeds 5 to 25 acres in size by 75 to 100%</li> <li>• Reduce established infestations of aggressive weeds &gt;25 acres in size by 50%</li> <li>• Eradicate all new starts (&lt;5 acres in size) of less aggressive weeds</li> <li>• Reduce infestations of less aggressive weeds &gt;5 acres in size by 50%</li> <li>• Implement site restoration and revegetation actions (where appropriate) and monitoring programs following treatment to reduce or eliminate the subsequent reinvasion of weeds and to measure degree of treatment success</li> <li>• Employ minimum tool approach and adaptive strategy using site-specific implementation process</li> </ul>	<p>Essentially the same as the Proposed Action, except this alternative does not include the aerial application of herbicides and is, therefore, less aggressive. About 18,000 acres of weeds would be treated each year. Different, lowered expectations for this alternative require different goals, depending on the conditions in the Ranger Districts:</p> <p>For Challis, Leadore, Lost River, Middle Fork, and Yankee Fork Ranger Districts:</p> <ul style="list-style-type: none"> <li>• Eradicate all new starts (&lt;5 acres in size) of aggressive weeds</li> <li>• Reduce established infestations of aggressive weeds 5 to 25 acres in size by 25 to 50%</li> <li>• Reduce established infestations of aggressive weeds &gt;25 acres in size by 25%</li> <li>• Eradicate all new starts (&lt;5 acres in size) of less aggressive weeds</li> <li>• Reduce infestations of less aggressive weeds &gt;5 acres in size by 50%</li> <li>• Implement site restoration and revegetation actions (where appropriate) and monitoring programs following treatment to reduce or eliminate the subsequent reinvasion of weeds and to measure degree of treatment success</li> <li>• Employ minimum tool approach and adaptive strategy using site-specific implementation process</li> </ul>	<p>This alternative limits the kind of treatment methods available (no herbicides), and the success of these methods would be limited. About 18,000 acres of weeds would be treated each year. Different, lowered expectations for this alternative require different goals, depending on the conditions in the Ranger Districts:</p> <p>For Challis, Leadore, Lost River, Middle Fork, and Yankee Fork Ranger Districts:</p> <ul style="list-style-type: none"> <li>• Eradicate all new starts (&lt;5 acres in size) of aggressive weeds</li> <li>• Reduce established infestations of aggressive weeds 5 to 25 acres in size by 25 to 50%</li> <li>• Contain established infestations of aggressive weeds &gt;25 acres</li> <li>• Eradicate all new starts (&lt;5 acres in size) of less aggressive weeds</li> <li>• Control infestations of less aggressive weeds &gt;5 acres in size</li> <li>• Implement site restoration and revegetation actions (where appropriate) and monitoring programs following treatment to reduce or eliminate the subsequent reinvasion of weeds and to measure degree of treatment success</li> <li>• Employ minimum tool approach and adaptive strategy using site-specific implementation process</li> </ul>

**TABLE ES-2**

Comparison of Features, Properties, Costs, and Benefits of the No Action Alternative, Proposed Action, Alternative 1, and Alternative 2

Items of Comparison	No Action Alternative	Proposed Action	Alternative 1	Alternative 2
<p><b>Purpose and Need</b> See Section 1.C. 1. Protect the natural condition and biodiversity of ecosystems and watershed function within the S-CNF by preventing and/or limiting introduction/spread of invasive non-native plant species.</p>	<p>Does not meet purpose and need. Would continue current noxious weed program. This alternative does not have the flexibility of the Proposed Action. The proportion of acreage treated with a particular chemical or method would vary from year to year, but would generally be limited to about 3,500 acres. Weeds in untreated areas would continue to spread.</p>	<p>Meets purpose and need. Uses full array of treatment and non-treatment methods to maximize the treatment of weeds as quickly as reasonably possible. Use of adaptive strategy, the minimum tool approach, and site-by-site implementation process would manage current and future weed populations. With aerial application and other cost-efficient methods available, the cost of treatment can be effectively spread throughout the S-CNF, based on the priorities identified.</p>	<p>For the North Fork and Salmon-Cobalt Ranger Districts:</p> <ul style="list-style-type: none"> <li>• Eradicate all new starts (&lt;5 acres in size) of aggressive weeds</li> <li>• Reduce established infestations of aggressive weeds 5 to 25 acres in size by 25 to 50%</li> <li>• Contain established infestations of aggressive weeds &gt;25 acres in size</li> <li>• Eradicate all new starts (&lt;5 acres in size) of less aggressive weeds</li> <li>• Reduce infestations of less aggressive weeds &gt;5 acres in size by 50%</li> <li>• Implement site restoration and revegetation actions (where appropriate) and monitoring programs following treatment to reduce or eliminate the subsequent reinvasion of weeds and to measure degree of treatment success</li> <li>• Employ minimum tool approach and adaptive strategy using site-specific implementation process</li> </ul> <p>Meets purpose and need, but less effectively than the Proposed Action. In the largest infested areas (typically steep and rocky), the most cost-effective mechanical and ground-spraying methods would not be available or limited. However, the need would be somewhat met through more expensive ground applications such as backpack and ATV applications where access and terrain are favorable. In the long term, the purpose and need would not be met or only very minimally met. Inaccessible large infestations could not be effectively treated due to limited mechanical treatment options and ground-based chemical applications.</p>	<p>For the North Fork and Salmon-Cobalt Ranger Districts:</p> <ul style="list-style-type: none"> <li>• Eradicate all new starts (&lt;5 acres in size) of aggressive weeds</li> <li>• Contain established infestations of aggressive weeds 5 to 25 acres</li> <li>• Contain established infestations of aggressive weeds &gt;25 acres</li> <li>• Contain all new starts (&lt;5 acres in size) of less aggressive weeds</li> <li>• Contain infestations of less aggressive weeds &gt;5 acres in size</li> <li>• Implement site restoration and revegetation actions (where appropriate) and monitoring programs following treatment to reduce or eliminate the subsequent reinvasion of weeds and to measure degree of treatment success</li> <li>• Employ minimum tool approach and adaptive strategy using site-specific implementation process</li> </ul> <p>Does not meet purpose and need. This alternative would not use herbicides; most mechanical methods would be ineffective on the larger infestations occupying the steep and rocky terrain of the North Fork and Salmon-Cobalt Ranger Districts. Choice of treatment methods would be severely limited and in most cases the effectiveness of the treatment would be questionable. Flexibility of treatment would be limited. In the long term, weeds would continue to spread.</p>

**TABLE ES-2**

Comparison of Features, Properties, Costs, and Benefits of the No Action Alternative, Proposed Action, Alternative 1, and Alternative 2

Items of Comparison	No Action Alternative	Proposed Action	Alternative 1	Alternative 2
2. Eliminate new weed invaders before they become established.	Minimally meets purpose and need. Does not include adaptive weed management strategy or the full array of treatment options. S-CNF personnel would be limited in the timeliness and scope of response to new infestations. This is the top treatment priority. In order to meet this purpose and need, resources would be reallocated from other treatment priorities/projects.	Meets purpose and need. Includes full array of treatment and non-treatment methods; allows swift response and follow-up monitoring if new weed invaders become established.	Minimally meets purpose and need. However, without aerial spraying, the largest weed infestations may only be contained or reduced by 25%. This is the top treatment priority. In order to meet this purpose and need, resources would be reallocated from other treatment priorities/projects.	Minimally meets the purpose and need, since eradication of new invaders is the primary goal for all treatment methods. However, the limited availability of alternative treatments and the expected time frame for effective success could result in only control or containment of the new infestation, not eradication.
3. Contain and reduce known and potential weed seed sources throughout the S-CNF.	Does not meet purpose and need. The current level (acres) of treatment is considerably less than known weed infestations, thus having little overall impact on weed seed sources.	Meets purpose and need. Known weed infestations would be eradicated, controlled, or contained.	Meets purpose and need, but not as effectively as the Proposed Action. Most known and potential weed sources would be reduced or contained.	Does not meet purpose and need, particularly if new and existing weed populations must be eradicated first. Given the cost of methods available under this alternative, the entire annual funding would likely be taken by eradication priorities.
4. Prevent or limit the spread of established weeds into areas containing little or no infestation.	Does not meet purpose and need. The No Action Alternative does not include a Forest-wide action plan to reduce or contain known weed sources. S-CNF personnel would be constrained from responding in a timely and cost-efficient manner to new weed infestations.	Meets purpose and need. Currently weed-free areas would be maintained in that condition through monitoring, adaptive strategy, site-specific implementation, and minimum tool approaches.	Meets purpose and need, but not as effectively as the Proposed Action. Most known weed infestations would be monitored, and any spread could be eradicated by use of the available treatment and non-treatment practices.	Does not meet purpose and need. This alternative focuses on containing established infestations. However, in the long term, the available treatment options would be unable to contain weed infestations as the “contained” infestations would continue to grow.
5. Protect sensitive and unique habitats from new and existing weed infestations.	Does not meet purpose and need. The No Action Alternative does not prevent new or existing weed populations from spreading.	Meets purpose and need. This alternative uses non-treatment and a full array of treatment options to aggressively prevent the spread of new and existing weed populations.	Would meet purpose and need where terrain allows effective treatment options. In areas of steep and rocky terrain (also the areas with the largest infestations of aggressive weeds), this purpose and need would not be met in the long term. Weed invasion from inaccessible areas would prevail and probably spread into more sensitive areas.	Does not meet purpose and need. Aggressive noxious weeds would spread throughout sensitive areas that are already at high risk for infestation.

**TABLE ES-2**

Comparison of Features, Properties, Costs, and Benefits of the No Action Alternative, Proposed Action, Alternative 1, and Alternative 2

Items of Comparison	No Action Alternative	Proposed Action	Alternative 1	Alternative 2
6. Develop criteria to prioritize invasive weed species and treatment areas.	Does not meet purpose and need. Prioritizes treatment methods and acres treated according to species of weed, its aggressiveness, whether it is new or established, and the location and size of the infestation. However, a full range of options to implement priorities is not available.	Meets purpose and need. Identifies treatment based on species of weeds present, their degree of aggressiveness, and the sizes and numbers of infestations; corresponding treatment priorities and objectives; treatment methods available; and estimated annual acres for treatment (18,000).	Meets purpose and need, but not as effectively as the Proposed Action. The largest areas of infestations may be treated with less aggressive measures since the typically steep and rocky terrain cannot be treated effectively with the available options. Although species and treatment areas would be identified and prioritized, the infestation may go unchecked while available options are implemented.	Does not meet purpose and need. Although management goals and priorities have been assigned under this alternative, these goals have greatly reduced “control and reduce” goals while increasing “contain” goals. Thus, prioritization and effectiveness are substantially reduced. Costs of eradication (the first priority in all alternatives) would also limit the ability to meet other control priorities.
7. Comply with and implement current Federal and State law regarding the control of noxious and other invasive, non-native weed species.	Does not meet purpose and need. Under this alternative, weed populations would not be contained or eradicated as required by law.	Meets purpose and need.	Meets purpose and need.	Minimally meets purpose and need, but containment is the only realistic goal in many locations under this alternative.
8. Cooperate with county, state, and other Federal agencies, private landowners, and other organizations interested in managing invasive weeds.	Minimally meets purpose and need.	Meets purpose and need. Would provide the most comprehensive weed treatment and communication with non-U.S. Forest Service organizations.	Meets purpose and need using the same methods as the Proposed Action.	Minimally meets purpose and need. The obligations of the S-CNF in cooperative efforts of weed control would be greatly reduced under this alternative.
<b>Treatment Practices</b> See Section 2.C.1.	No action implies no change from current weed management practices. Generally limited by selection of chemicals and mechanical methods, and the realm of treatment and non-treatment methods is limited to existing strategies. Total acres to be treated annually: up to about 3,500.	Most aggressive application of full array of treatment and non-treatment methods, including aerial application of herbicide. Total acres to be treated annually: about 18,000.	Employs full array of treatment and non-treatment methods, except aerial application of herbicide. Total acres to be treated annually: about 18,000.	Employs full array of treatment and non-treatment methods, except herbicide application. Total acres to be treated annually: about 18,000.
<b>Site Restoration and Monitoring</b> See Section 2.C.3.	Limited in scope. Monitor program implementation and measure the effectiveness of treatments on target species.	Implement (where appropriate) site restoration, re-vegetation, and implementation and effectiveness monitoring following treatment to reduce or eliminate the subsequent reinvasion of weeds, measure the degree of treatment success, and validate buffering effectiveness.	Same as the Proposed Action.	Similar to the Proposed Action (excluding buffer validation monitoring).

**TABLE ES-2**

Comparison of Features, Properties, Costs, and Benefits of the No Action Alternative, Proposed Action, Alternative 1, and Alternative 2

Items of Comparison	No Action Alternative	Proposed Action	Alternative 1	Alternative 2
<p><b>Adaptive Strategy</b> See Section 2.C.4.</p>	Not included. Constrains S-CNF managers from responding in a timely and cost-effective manner to new weed infestations and expansion of existing weed infestations.	Implements S-CNF-wide action plan to reduce or eliminate spread of weeds; adaptive weed management strategy for managing future new weed infestations or expansion of existing infestations.	Same as the Proposed Action	Same as the Proposed Action
<p><b>Minimum Tool Approach and Site-Specific Implementation Process</b> See Sections 2.C.5 and 2.C.6.</p>	Not included	Employ site-specific minimum tool approach for effectively managing future weed infestations with the least impact on S-CNF resources, uses, and values.	Same as Proposed Action.	Same as Proposed Action.
<p><b>Total Cost per Year</b> See Table 2-8 for detail.</p>	\$843,226	\$3,017,588	\$6,852,750	\$16,370,000
<p><b>Cost Per Acre per Year</b> See Table 2-8 for detail.</p>	\$241	\$168	\$381	\$909
<p><b>Cost vs. Benefit</b> Cost per acre: <b>Low:</b> \$&lt;200 <b>Moderate:</b> \$201-300 <b>High:</b> &gt;\$300 See Table 2-8 for detailed supporting information and assumptions regarding costs per acre for different treatment methods for the Proposed Action and alternatives. Benefit is the overall effectiveness in light of the purpose and need compared to other alternatives:</p>	<p>Total annual cost is considered moderate, since treatment options are limited and the number of acres to be treated is much less than the other alternatives. Average cost per acre for all acres treated is moderate. See Table 2-8 for details on costs. Benefit is considered low. Overall weed treatment effectiveness of the No Action Alternative would be lower than for the Proposed Action or Alternative 1 because of fewer treatment options and fewer acres treated each year, but greater than for Alternative 2 because of more treatment options. See Table 4-8 for details on benefits.</p>	<p>Total annual cost is considered low, depending on treatment combinations and acres treated. Average cost per acre for all acres treated is low. See Table 2-8 for details on costs. Benefit is considered high. Provides the greatest number of weed treatment options and ability to reach large acreages and difficult access areas. Overall weed treatment effectiveness of the Proposed Action would be greater than for Alternatives 1 and 2 and the No Action Alternative because of a full range of treatment options and the number of acres to be treated each year. See Table 4-8 for details on benefits.</p>	<p>Total annual cost is considered high, depending on treatment combinations and acres treated. Average cost per acre for all acres treated is high. Weed treatment options limited by lack of aerial herbicide application. See Table 2-8 for details on costs. Benefit is considered moderate/high. Overall weed treatment effectiveness of Alternative 1 would be less than for the Proposed Action because of fewer treatment options, but greater than for Alternative 2 and the No Action Alternative because of more treatment options and/ or more acres treated each year. See Table 4-8 for details on benefits.</p>	<p>Total annual cost is considered high. Average cost per acre for all acres treated is high. Weed treatment options are limited to mechanical, biological, and grazing methods. Grazing may not be an option for many areas, and some mechanical treatments may be limited in application. See Table 2-8 for details on costs. Benefit is considered low. Overall weed treatment effectiveness of Alternative 2 would be less than for the Proposed Action, Alternative 1, and the No Action Alternative because of fewer effective weed treatment options. See Table 4-8 for details on benefits.</p>

**TABLE ES-2**

Comparison of Features, Properties, Costs, and Benefits of the No Action Alternative, Proposed Action, Alternative 1, and Alternative 2

Items of Comparison	No Action Alternative	Proposed Action	Alternative 1	Alternative 2
<p><b>Low:</b> Does not meet purpose and need.</p> <p><b>Moderate:</b> Meets purpose and need, but not effectively.</p> <p><b>High:</b> Meets purpose and need effectively.</p> <p>See Table 4-8 for a summary of project-related effects and benefits for the Proposed Action and alternatives.</p>	<p>Cost effectiveness is considered low to moderate because fewer acres would be treated under this alternative and weed treatment goals would not be met.</p>	<p>Cost effectiveness is considered high because treatment methods could be selected to most efficiently and effectively meet all weed treatment goals.</p>	<p>Cost effectiveness is considered low to moderate because of limited use of the most economic and effective treatment methods and not meeting all weed treatment goals.</p>	<p>Cost effectiveness is considered low because of the use of expensive weed treatment methods with limited effectiveness and not meeting weed treatment goals.</p>
<p><b>Cost Effectiveness</b> See Section 4.D.4</p>				

**TABLE ES-3**  
Comparison of Effects Between Alternatives

<b>Resource Area</b>	<b>No Action Alternative</b>	<b>Proposed Action</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
<b>Biological Resources</b>				
Vegetation Resources and Noxious Weeds	Noxious weeds negatively impact the natural plant communities they invade by reducing plant diversity and species richness, by decreasing the quality of habitat values for wildlife, and by overwhelming sensitive plant populations. Noxious weeds would continue to displace native vegetation at the same or higher rates than currently.	Would use a blend of weed treatment methods and site restoration, designed to aggressively eradicate, control, and contain weeds and to restore areas (where appropriate) following treatment. Expected beneficial effects are: 1) improve and increase the biodiversity of native vegetation, 2) improve quality habitat for wildlife, and 3) protect the integrity of ecological sites for sensitive plant species. Aerial treatment is used to control and eradicate very large infestations in isolated areas with steep slopes and rocky soils.	Benefits described for the Proposed Action could still be achieved, but it would take much longer. The further spread of noxious weeds would be controlled, but little would be done to eradicate large infestations currently in place. There would need to be constant efforts to control the spread of weeds from current sites.	Alternative 2 may, with a large, constant labor outlay, control the further spread of noxious weeds. The reduction in size or elimination of current weed sites would likely not occur and it would take much longer than the Proposed Action, Alternative 1, or the No Action Alternative to see any positive results. No herbicide use would mean there is no possibility of inadvertently impacting native vegetation, wildlife habitat, or sensitive plants from chemical drift.

**TABLE ES-3**  
Comparison of Effects Between Alternatives

<b>Resource Area</b>	<b>No Action Alternative</b>	<b>Proposed Action</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
Aquatic Resources	Increased potential for soil erosion and stream sedimentation at weed-infested sites would continue. This can adversely affect aquatic habitat and associated fish and aquatic invertebrate populations.	Treating and reclaiming weed-infested areas would result in improved aquatic and riparian habitat conditions and reduced threats to all aquatic species. Four worst-case situations involving the use of herbicides include the inadvertent entry of herbicides into aquatic ecosystems through surface runoff, leaching through soils, accidental spills, and wind drift. BMPs and mitigation measures would avoid or minimize these effects.	Similar to the Proposed Action, except that no aerial application of herbicides would take place, making it a less aggressive weed treatment alternative than the Proposed Action. This decreases the chance for wind drift into aquatic systems during application, but increases the time before weeds are eradicated, contained, or controlled and habitat is restored.	Benefits to aquatic resources under Alternative 2 would be less than those for the Proposed Action, Alternative 1, or the No Action Alternative. It would take longer to realize some limited benefits to aquatic and riparian resources resulting from reduced erosion and sediment delivery at successfully treated weed-infested sites to drainages. The increased use of mechanical treatments would result in increased surface disturbance potentially increasing sediment delivery to streams. There would be no potential for any of the worst-case situations involving herbicide application.

**TABLE ES-3**  
Comparison of Effects Between Alternatives

<b>Resource Area</b>	<b>No Action Alternative</b>	<b>Proposed Action</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
Wildlife Resources	All wildlife species would be affected to varying degrees from weed expansion. As weeds expand they displace native plant communities; reduce hiding cover, which may cause smaller wildlife species to abandon an area, in turn displacing predators; and reduce forage on big game winter range. Long-term threats to wildlife would be moderate to high.	Minimal impacts from weed control activities are expected to any wildlife species. Short-term disturbance and displacement is expected during treatment applications; usually less than 1 day. Long-term benefits to all wildlife species would be high as native plant communities are restored following weed treatment.	Long-term benefits to wildlife would be moderate and less than the Proposed Action, and would occur at a slower rate because of no aerial application of herbicides under Alternative 1.	Long-term threats to wildlife would generally be high. Infestations would continue to expand, since this alternative incorporates relatively non-aggressive treatment technologies. The result would be a reduction in available forage for wildlife. Additionally, it would take a longer period of time to achieve the same or lesser levels of weed control than could be achieved using herbicides; rapidly expanding infestations would likely continue to increase in size. Therefore, it would take longer to realize any benefits to wildlife from the control and eradication of weeds.

**TABLE ES-3**  
Comparison of Effects Between Alternatives

<b>Resource Area</b>	<b>No Action Alternative</b>	<b>Proposed Action</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
Ecosystem Function	Ecosystem function would experience little to no impact from treatment of noxious weeds, but ecosystem function would be adversely affected by continued weed population expansion.	Impacts would be less under the Proposed Action than the No Action Alternative. Weeds would be aggressively eradicated, controlled, or contained using a variety of methods, and treatment sites would be restored to native vegetation. Loss of native plant communities would decrease over time as weeds are reduced and eliminated. Long-term eradication in steep and rocky terrain would be most effective with aerial application.	Effects on ecosystem function would generally be similar to those described for the Proposed Action, but would occur at a slower pace because of no aerial herbicide application under Alternative 1. Treatment success and improvements to ecosystem function on infested steep slopes or inaccessible areas would not be as effective or as widespread as under the Proposed Action. Earlier efforts on this terrain have only been marginally successful. There would be negative effects on these areas (e.g., infestations would increase) because these methods alone cannot be effectively used on this terrain.	Direct and indirect adverse effects on ecosystem function would be greater than those described for the Proposed Action, Alternative 1, and the No Action Alternative. The timeframe for implementation and any visible treatment success would be longer, but there would be no risk from herbicide application. Indirect adverse effects would include continued expansion of infestations, especially in steep and rocky terrain where mechanical methods cannot be used.

**TABLE ES-3**  
Comparison of Effects Between Alternatives

Resource Area	No Action Alternative	Proposed Action	Alternative 1	Alternative 2
<b>Physical Resources</b>				
Surface Water	Although increased runoff from weed-infested sites may result in local, short-term variations in a stream's hydrograph, this would not be expected to alter a drainage's seasonal flow regime. The existing use of herbicides would continue at the current rate, limited monitoring indicates these activities have not impacted surface water quality, hydrology, 303(d)-designated water bodies, or designated beneficial uses.	Effects of weed treatment under the Proposed Action would be expected to result in some improvement in surface water quality. Potential short-term impacts on surface water quality could occur if there were an accidental spill of a relatively toxic herbicide in a small drainage. Adherence to BMPs and mitigation measures would reduce the likelihood of such a spill occurring. Aerial applications also would help minimize the threat of spills at or near treatment areas.	Effects on surface water would generally be similar to those effects described for the Proposed Action, except there would be no aerial application of herbicides. Benefits to surface water quality resulting from reductions in erosion and sediment delivery from weed-infested areas would still be expected, but they would take longer to achieve and be less widespread than under the Proposed Action.	The magnitude of direct and indirect benefits to surface water quality would be expected to be less than those for the Proposed Action, Alternative 1, or the No Action Alternative. It also would take longer to realize any benefits to surface water quality resulting from reduced erosion and sediment delivery at weed-infested sites to drainages.
Groundwater	The No Action Alternative would not affect groundwater resources or drinking water quality.	If the worst-case situation involving leaching of herbicides that was discussed did occur, it would have a very minor or negligible effect on groundwater quality and would not be expected to result in violations of drinking water standards.	The potential effect of Alternative 1 on groundwater resources would be the same as described for the Proposed Action.	Alternative 2 would not affect groundwater resources or drinking water quality.
Soils, Geology, and Minerals	Soils, geology, and minerals would experience little to no impact from treatment of noxious weeds, but soil stability and productivity would be affected by weed population expansion.	Declines in soil productivity would diminish with the Proposed Action as native plant communities become established on eradicated weed sites and restore the nutrient and organic matter balance over time.	There would be long-term benefits to soils from the reduction in size of weed populations and subsequent reduction in erosion. Similar to the Proposed Action, Alternative 1 would not affect geology and minerals.	It would take longer to realize any benefits to soils from the control and eradication of weeds. Alternative 2 would not affect geology and minerals. Eradication or control of larger infestations would not occur, thus leaving soils in jeopardy of continued degradation.

**TABLE ES-3**  
Comparison of Effects Between Alternatives

<b>Resource Area</b>	<b>No Action Alternative</b>	<b>Proposed Action</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
Land Uses and Designations	Invasive weeds would continue to affect commercial and recreational values on the S-CNF—and in the communities that rely on a healthy forest ecosystem. There would be a high threat of weed encroachment into roadless areas and risk of impacts to RNA and WSR characteristics.	Commercial and recreational activities may be affected as access to infested areas is restricted during spraying and other weed treatments. However, the Proposed Action would eradicate some weed populations, and would effectively reduce the size and rate of spread of other infestations, which ultimately benefits land use. There would be a low threat of weed encroachment into roadless areas and risk of impacts to RNA and WSR characteristics.	Because this alternative would not incorporate aerial spraying activities, large weed infestations on steep, inaccessible slopes of the S-CNF would be more difficult to control. This could lead to expansion of infestations and some additional loss of wildland acres. This would also affect recreational and commercial uses, since weed control activities would take longer and be less effective in that area. There would be a moderate threat of weed encroachment into roadless areas and risk of impacts to RNA and WSR characteristics.	While this alternative offers a full array of non-chemical weed treatment methods, it is anticipated that treatment would take longer and be less effective than the Proposed Action, Alternative 1, or the No Action Alternative. Commercial and recreational opportunities would be affected, since weed infestations would remain, and likely expand, as non-chemical treatments are implemented. There would be a high threat of weed encroachment into roadless areas and risk of impacts to RNA and WSR characteristics.
Visual Resources	Noxious weed populations primarily affect views of the immediate foreground and middle ground, rather than the background, except where plant infestations are large enough to impact views of hillsides. The opportunity to view native vegetation and wildlife would be reduced.	Visual quality in treated areas would improve. During treatment, however, visual opportunities may be temporarily diminished as weed populations die and natural vegetation is restored and recovers. This effect is expected to be short-lived, and would be most apparent where there are large weed infestations.	The visual impact would be most apparent where large infestations of weeds occur on steep slopes. Ground application of herbicides may have some long-term effects on weed infestations, but control and eradication goals may not be met, with a corresponding effect on visual opportunities. As a result, the vistas of these steep, often inaccessible slopes would be marred by weeds indefinitely.	Some loss of additional opportunities for viewing the natural landscape would occur as non-chemical treatments take time to implement. Other large weed infestations could also expand, since most weed types do not immediately respond to non-chemical treatment. Continued, permanent loss of opportunities may occur as weed infestations begin to spread beyond the capacity to manage expansion and new growth.

**TABLE ES-3**  
Comparison of Effects Between Alternatives

<b>Resource Area</b>	<b>No Action Alternative</b>	<b>Proposed Action</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
Air Quality and Noise	The only effects on air quality would be potential drift from herbicide spraying and some dust from mechanical treatment. Spot spraying would result in little drift. The odor of the chemicals may persist for several hours. Other effects on air quality would include dust from weed control efforts. The only short-term effect on noise levels would be from localized mechanical treatments such as mowing and mulching.	Weed treatments would have the same impacts as described for the No Action Alternative. Since the Proposed Action would provide for the greatest level of weed control, it would contribute the greatest reduction in the amount of airborne weed pollen present in the affected area. The short-term effects on noise levels would stem from aerial herbicide application and mechanical operations.	The direct effects on air quality of Alternative 1 would be virtually identical to those of the Proposed Action, although the short-term risk of drift from aerial spraying would be removed. Overhead noise from aerial herbicide applications would not occur, thus decreasing the impact on noise levels from weed treatments.	Short-term effects on air quality from herbicides would not occur. Beneficial effects of reduced weed pollen on any particular site would occur if weeds are reduced on that site. Individually, these effects may be too small to benefit local air quality. Extensive mechanical weed treatments may cause short-term effects on dust and noise levels within the areas of treatment.
<b>Human and Socioeconomic Resources</b>				
Human Health and Safety	Noxious weeds do not pose a human health and safety risk, except from minor cuts and scrapes and skin irritation from contact with weeds, and allergies from weed pollen. Current ground-based herbicide spraying has not impacted public health and safety and is not expected to cause an impact.	Workers are at risk from cuts, scratches, and skin irritation, and sprains and strains from working on uneven ground. Toxicity studies indicated that worker risks from herbicides would be extremely low. Safety protocols would minimize or eliminate this risk. Risks to the public while collecting wild edible vegetation are virtually non-existent.	Effects would be similar to the Proposed Action, except that the risk of herbicide drift would be reduced because aerial spraying would not be used. Treating steep, inaccessible areas with ground-based treatments increases the risk of worker injury.	Risks from herbicide application would be completely eliminated. However, workers would still be subject to potential sprains, strains, cuts, scratches, and skin irritation from contact with weeds. Increased mechanical treatments increase the risk of injury substantially, especially on steep slopes.

**TABLE ES-3**  
Comparison of Effects Between Alternatives

<b>Resource Area</b>	<b>No Action Alternative</b>	<b>Proposed Action</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
Indian Trust Assets/Treaty Rights	The spread of weeds would likely continue to displace and adversely affect native vegetation gathered by local Tribes. The traditional use of these plants would be further affected as access is affected by continued weed control efforts. Other Trust Assets that could also be directly affected are resident and anadromous fisheries and their habitat, which may experience degradation from increased sediment delivery to streams from weed infestations.	Biological and physical resources would benefit overall, as described above. However, there may be short-term adverse effects from herbicide odor and drift to non-target areas during aerial spraying. Other adverse, short-term effects may stem from chemical odors and drift as ground-based herbicides are applied and from disturbance of resources during mechanical treatment. The cultural gathering of plants may be affected, but only for a short time during treatment. Direct adverse impacts to terrestrial and aquatic habitats and species are expected to be none or minimal. With reduced weed infestations, long-term indirect beneficial effects to these habitats are expected, benefiting Tribal Treaty Rights.	This alternative would be identical to the Proposed Action, except no aerial herbicide application would occur. The experience of Native Americans using Trust Assets may be affected if the users know that weed control treatments are occurring nearby, or if access to these assets is restricted during and perhaps briefly following treatment. Long-term access to Trust Assets could be affected as weed eradication would take longer to perform under this alternative. Long-term beneficial effects to terrestrial and aquatic habitats would be less than the Proposed Action due to less effective treatment options, potentially affecting long-term Trust Assets and Treaty Rights.	This alternative would not incorporate herbicide applications, thus eliminating any potential risks of drift or chemical odor. However, this alternative may have a direct effect on weed control and expansion since the range of treatments would be limited, resulting in limited success and benefits compared to the Proposed Action, Alternative 1, and the No Action Alternative. Native American long-term access to Trust Assets would be affected by continued weed expansion expected under this alternative. In addition, with the continued weed expansion, long-term effects to terrestrial and aquatic habitats would likely be significant, adversely affecting Trust Assets and Treaty Rights.
Environmental Justice	The No Action Alternative would not alter subsistence rights and fishing by Native American Tribes, and would not disproportionately impact minority and low-income populations.	Same as the No Action Alternative.	Same as the No Action Alternative.	Same as the No Action Alternative.

**TABLE ES-3**  
Comparison of Effects Between Alternatives

<b>Resource Area</b>	<b>No Action Alternative</b>	<b>Proposed Action</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
Economics	Adjacent communities would share the economic impact of losses from weed infestations since these communities rely on the forest resources for their livelihood. Effects on vegetation, fisheries, wildlife, and ecosystem function would also influence the economic well-being of these adjacent communities. The land itself has value, the loss of which represents an important economic impact. A conservative estimate of the wildland acreage is approximately \$3.95 per acre, with rangeland values at \$10.73 per acre. The estimated cost of treating 3,500 acres annually under this alternative is approximately \$843,000 (\$241 per acre).	Given the economic cost of the No Action Alternative, a direct effect would be in savings of wildland and rangeland acres. A conservative estimate would include the savings of currently infested wildland acreage of approximately \$3.95 per acre, with rangeland values of \$10.73 per acre. The estimated cost of treating 18,000 acres annually under this alternative is approximately \$3,020,000 (\$168 per acre).	The economic effects stemming from the cost of this alternative would be essentially the same as the Proposed Action, except the cost of aerial herbicide application would not be included. There would be less acreage affected by wildland and rangeland acreage savings (approximately \$3.95 per acre and \$10.73 per acre, respectively) with this alternative since treatment in steep, rough terrain would be difficult. The estimated cost of treating 18,000 acres annually under this alternative is approximately \$6,850,000 (\$381 per acre).	Alternative 2 would consist of non-chemical weed treatment methods. These techniques take time and can be labor intensive, thus increasing the potential long-term costs of this alternative. Wildland and rangeland acreage savings (approximately \$3.95 per acre and \$10.73 per acre, respectively) would not be realized as non-chemical eradication efforts may not keep pace with infestations. The estimated cost of treating 18,000 acres annually under this alternative is approximately \$16,370,000 (\$909 per acre)

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Comparison of Effects Between Alternatives

<b>Resource Area</b>	<b>No Action Alternative</b>	<b>Proposed Action</b>	<b>Alternative 1</b>	<b>Alternative 2</b>
<b>Cultural Resources</b>				
Cultural and Historical Resources and Native American Religious Concerns	The spread of weeds would likely continue to displace native vegetation gathered by local Tribes. The traditional use of these plants would be affected as access is affected by continued weed control efforts. The continued presence of noxious weeds along the Lewis and Clark Trail could result in a reduction of the historical integrity of trail and camping sites.	Offers the greatest recovery potential for currently infested historic landscapes while having a minimal effect on cultural and historic values. Access to important cultural sites may be temporarily restricted during weed treatment efforts. Native American users' experiences in culturally important or sacred sites may be affected as the users become aware of ongoing treatment activities.	Similar to the Proposed Action.	Similar to Alternative 1. However, large weed infestations may take longer to treat under this method, since the aerial application of herbicide has been shown to be the quickest method of weed treatment. The potential for disturbing cultural resources would be greatest under this alternative because of the planned extensive use of mechanical treatments.
Paleontological Resources	No effects are anticipated from the No Action Alternative.	Same as the No Action Alternative.	Same as the No Action Alternative.	Same as the No Action Alternative.