SALMON-CHALLIS FORESTWIDE INVASIVE PLANT TREATMENT PROPOSED ACTION

Currently there approximately 45,500 acres of mapped infestations of noxious weed species on the SCNF, exclusive of the Frank Church-River of No Return Wilderness Area. This acreage includes the portion of the SCNF that has been inventoried. The value is expected to change as more inventories are conducted and to account for the spread of weeds. The proposed action is to prevent the establishment of new invasive plant species, prevent further spread of existing noxious weed species, and maintain native plant communities. The proposed action would implement an adaptive integrated weed management (IWM) strategy to eradicate or control existing or newly discovered invasive plants over the next ten to fifteen years as budgets allow. The IWM strategy is derived from the Forest Service National Strategy and Implementation Plan for Invasive Species Management (2004), Strategy for Noxious and Nonnative Invasive Plant Management (1998), and the Forest Service Invasive Species Management Manual (FSM 2900), all of which direct National Forests to implement adaptive integrated weed management programs with the following nationally established program components.

Prevention

Prevention is the "first line of defense" and is a crucial element of IWM. The goal is to prevent the introduction and establishment of new weed species. External and internal education and outreach is essential. A variety of educational materials such as signage, exhibits, presentations, and workshops would be used by the forest and cooperative partners to raise public awareness of weeds and the ecological and economic damage created by their establishment and spread. Internal training would be used to educate personnel to recognize weed species, understand vectors and preventative measures, include preventative measures into the project design of all projects and activates, follow procedures for reporting and mapping weed infestations, and communicate with other programs and agencies. This is a non-treatment aspect of the IWM approach. The SCNF weed prevention plan is located in Appendix A; however, the practices in the plan are not part of the EIS analysis.

Early Detection/Rapid Response

Early Detection and Rapid Response (EDRR) is a critical component of an IWM program. As new weed infestations are detected, a quick and coordinated inventory and eradication response would reduce negative environmental and economic impacts.
EDRR is intended to find new infestations at the earliest stages of invasion resulting in decreased control costs and the need for repeated treatments. New invasive species may not be listed as a noxious on the statewide list; however, these plants are identified on statewide watch or EDRR lists.

The Proposed Action would direct treatment of new detections. Invasive plant sites that are discovered subsequent to the current invasive plant inventory would be evaluated to determine that the eradication treatments and environmental impacts are consistent with those analyzed in this EIS.

Control and Management

The integrated and adaptive weed management strategy proposed would facilitate the use of a variety of treatment options and combinations intended to minimize the effect of invasive plants and limit their spread.

Control techniques include manual/mechanical, chemical, and biological methods. Areas infested by invasive plants on the SCNF may exhibit a wide range of site conditions. Effective control relies on a clear understanding of the target species: its biology, the ecosystem it has infested, associated introduction pathways, and effective control methods. Control often requires repeat treatments and monitoring of control efficacy.

A variety of treatment options and combinations that could be applied to a wide range of site conditions are necessary so that flexibility is provided to increase effectiveness, reduce cost, and minimize potential for adverse effects from treatments. As monitoring identifies the effectiveness of treatments, specific control measures are adjusted.

The proposed action identifies the treatment of up to 20,000 acres of noxious weeds annually. This number exceeds the current budget allocated for treatments, but is intended to be robust enough to address both known and future weed infestations. This aspect of the IWM strategy is the focus of the analysis in this EIS.

Rehabilitation and Restoration

Ultimately, the goal for weed management efforts is to restore and maintain healthy native or desired plant communities that are resistant to weed establishment, which recover quickly from disturbances, and provide ecosystem functionality. Many weed-infested plant communities are able to successfully re-establish without intervention after control efforts. However, sites that are severely damaged or at which few desirable species remain may not be able to recover without help.

Rehabilitation and restoration are, therefore, vital components of an adaptive IWM program. Rehabilitation is defined as short-term mitigation to ensure minimum site stability and functionality. This may include site preparation and seeding of desirable non-native vegetation. Restoration is a long-term objective and involves returning sites to natural functions and native species.

Monitoring

Monitoring is a necessary part of implementing an adaptive IWM program. Monitoring provides the data for adaptive management. Information collected from monitoring may be used by managers to evaluate the efficacy of prevention EDRR, treatment, and rehabilitation and restoration actions. There are two basic types of monitoring essential to an adaptive integrated weed management plan: implementation monitoring and effectiveness monitoring. Implementation monitoring answers the question, “Did we do what we said we would do?” and effectiveness monitoring answers the questions, “Were prevention, treatment and restoration actions effective?” and “Were intended goals accomplished?”.

Managers may use monitoring data from one site or set of sites to predict the effects of similar actions on other parts of the project area. This information can be used to promote the use of the most effective techniques for prevention, detection, treatment, and restoration, and avoid the use of ineffective methods.

Noxious Weed Species to be Controlled

Twenty-two noxious weed species are known to occur in the planning area to date. Some species occur across the planning area, while others are localized. Table 2 lists the species known to occur on the SCNF. Species' characteristics and distribution are discussed in Chapter 3. Treatment would not be limited to the species shown in the table. If infestations of new non-native plant species are discovered, they would be treated with one or more of the methods described in this document. Species that do not currently occur on the SCNF, but are on the EDRR watch list are identified in Appendix B. Treatment of aquatic invertebrate species is not addressed in this document.

Thousands of acres of common, non-native invasive plants, such as cheatgrass, are known to occur on the Forest; these are not the focus of treatment. However, some sites may be treated for such species if they are associated with other weeds to be treated within the scope of this program. Additionally, these species may be included in the treatment plan for some specific areas, such as along roadsides. However, whether treated or left un-treated, these non-native, invasive species will not be considered non-target species for the purposes of protection (i.e. project criteria intended to protect non-target plants would not apply).

TABLE 1. Inventoried Weed Infestations and Acreage by Weed Zone

Noxious Weeds	# of Infestations	Total Infested Acres	Lemhi Zone	North Zone	Pahsimeroi-Lost Zone	Salmon Zone	Upper Salmon Zone
Russian Knapweed	2	0		0	0		
Hoary Alyssum	584	1,947	0	850		1,097	0
Whitetop	51	51	9	0	38	3	
Diffuse Knapweed	16	1		0	0	0	0
Spotted Knapweed	2404	38,114	1,720	20,722	351	14,058	1,264
Rush Skeletonweed	257	208	0	99	2	106	2
Oxeye Daisy	123	126		120		5	1
Canada Thistle	520	2,164	311	116	1,446	220	71
Field Bindweed	3	1			0		0
Houndstongue	448	827	109	579		139	0
Leafy Spurge	516	916	73	89	735	17	2
Black Henbane	150	301	40	14	244	2	
Common St. John's Wort	11	5		5			
Dyer's Woad	2	0	0	0			
Perennial Pepperweed	2	0	0				

Noxious Weeds	# of Infestations	Total Infested Acres	Lemhi Zone	North Zone	Pahsimeroi-Lost Zone	Salmon Zone	Upper Salmon Zone
Dalmatian Toadflax	76	128		0	86	41	
Yellow Toadflax	165	230		45		89	96
Scotch Thistle	2	0	0				
Knotweed	13	1		1			
Sulphur Cinquefoil	235	422	5	375		42	1
Saltcedar	9	0		0		0	
Puncturevine	11	4		4		0	
Grand Total	**5600**	**45,447**	**2,268**	**23,019**	**2,903**	**15,820**	**1,437**

Treatment Method

The proposed adaptive IWM program would utilize a variety of tools, used alone or in combination, to treat weeds on the SCNF. Proposed treatment methods include the following:

- Biological control through the use of predators, parasites, and pathogens.
- Herbicide control using ground-based application methods.
- Herbicide control using helicopter aerial application methods.
- Herbicide control using aquatic application methods.
- Mechanical methods, such as hand pulling, mowing, cutting or torching.
- Cultural methods such as seeding sites to improve competition or prevent establishment of non-native invasive plant species

TABLE 2. Acres to be Treated Annually by Treatment Method

Treatment Method	Annual Acres of Noxious Weeds Treated
Biological Control	2,000 acres
Mechanical Control	2,000 acres
Herbicide Control	16,000 acres

The treatments would abide by Design Criteria (DC), the purpose of which is to reduce or eliminate the potential adverse impacts of the various weed treatments. Design Criteria are a set of required implementation features applied to projects to ensure that the project is conducted according to environmental standards and that adverse effects are within the scope of those predicted in this EIS. Implementation of the DCs is mandatory. The effectiveness of the DCs is addressed throughout Chapter 3.

Treatment Priority and Strategy

Treatment priorities are based on factors such as the current abundance and distribution of the species and type and values of the site affected. Other program management considerations may affect priorities. For example, priority may be given to sites located in areas proposed for ground-disturbing management activities. In addition, opportunities for special funding or cooperative projects with other landowners, agencies, and organizations may be considered. Treatment priorities do not necessarily refer to the order in which an infestation is treated during a given fiscal year. They are part of an adaptive integrated weed management strategy used by managers in determining how to allocate resources.

For weed management purposes, the forest has been divided into five Weed Management Zones to help make determinations of treatment objectives and priorities. Due to the large size of the project area, zones were developed to assist managers by grouping geographic areas with similar habitat conditions and noxious weed management concerns. The zones are Lemhi, North Salmon, Pahsimeroi/Lost River, Salmon and Upper Salmon (Map 1). Table 1 lists the known infestations of noxious weeds and the number of acres infested by weed management zone.

The SCNF has developed criteria for determining treatment priority of weed infestations (Table 3). Higher priority is generally given to those new weed infestations where reduction or eradication of infestations is likely to be successful. For established infestations, suppression strategies play a much more important role. In general, the vast majority of currently inventoried infested acres are associated with human-caused disturbance such as travel routes. Because they are common to infestations at all potential priority levels, spread vectors such as trailheads, roadways, campgrounds, and parking areas are not explicitly considered when setting priorities.

TABLE 3. Treatment Priorities

Priority	Description	Treatment Objective
Highest	• Infestations of species new to the project area (EDRR)	Eradication of new species
Second priority	• Infestations of species that occur rarely within the project area. • Infestations of species that occur rarely within a given zone.	Control via aggressive suppression to reduce existing infestations and reduce or eliminate new infestations of uncommon noxious weeds.
Third priority	• Infestations in or near areas that experience disturbance due to human activity, such as designated travel routes, recreation sites, emergency staging areas, and gravel pits. • Infestations in or near areas that experience disturbance due to natural forces, such as those recently affected by wildfire. • Infestations with the potential to spread across ownership boundaries onto lands that are not currently infested. • Infestations for which treatment has a high probability of success.	Control via aggressive, direct suppression. Utilize indirect suppression where feasible.
Fourth priority	• Infestations in or near areas that contain desirable plant communities, such as intact native plant communities and sensitive,	Control via aggressive, direct suppression

Priority	Description	Treatment Objective
	threatened, or endangered plant or animal habitat. • Infestations of established species occurring in an otherwise uninfested area.	
Fifth priority	• Infestations in habitat susceptible to invasion by and spread of invasive plants. • Infestations of established invasive plants in generally infested areas. • Large infestations of established invasive plants.	Control via direct suppression when possible. Emphasis placed on indirect suppression.

Table 4 summarizes commonly used species-specific integrated control measures that would be applied to known weed species on the SCNF. The table shows a range of effective treatment options. Different treatment choices may be used based on circumstances such as new ESA consultation requirements, information on treatment effectiveness, and availability of new products. The priority and intensity of treatment needed varies widely based on site conditions, resources at risk from invasion, and the range and aggressiveness of individual target species.

MAP 1. Weed Management Zones on the Salmon-Challis National Forest

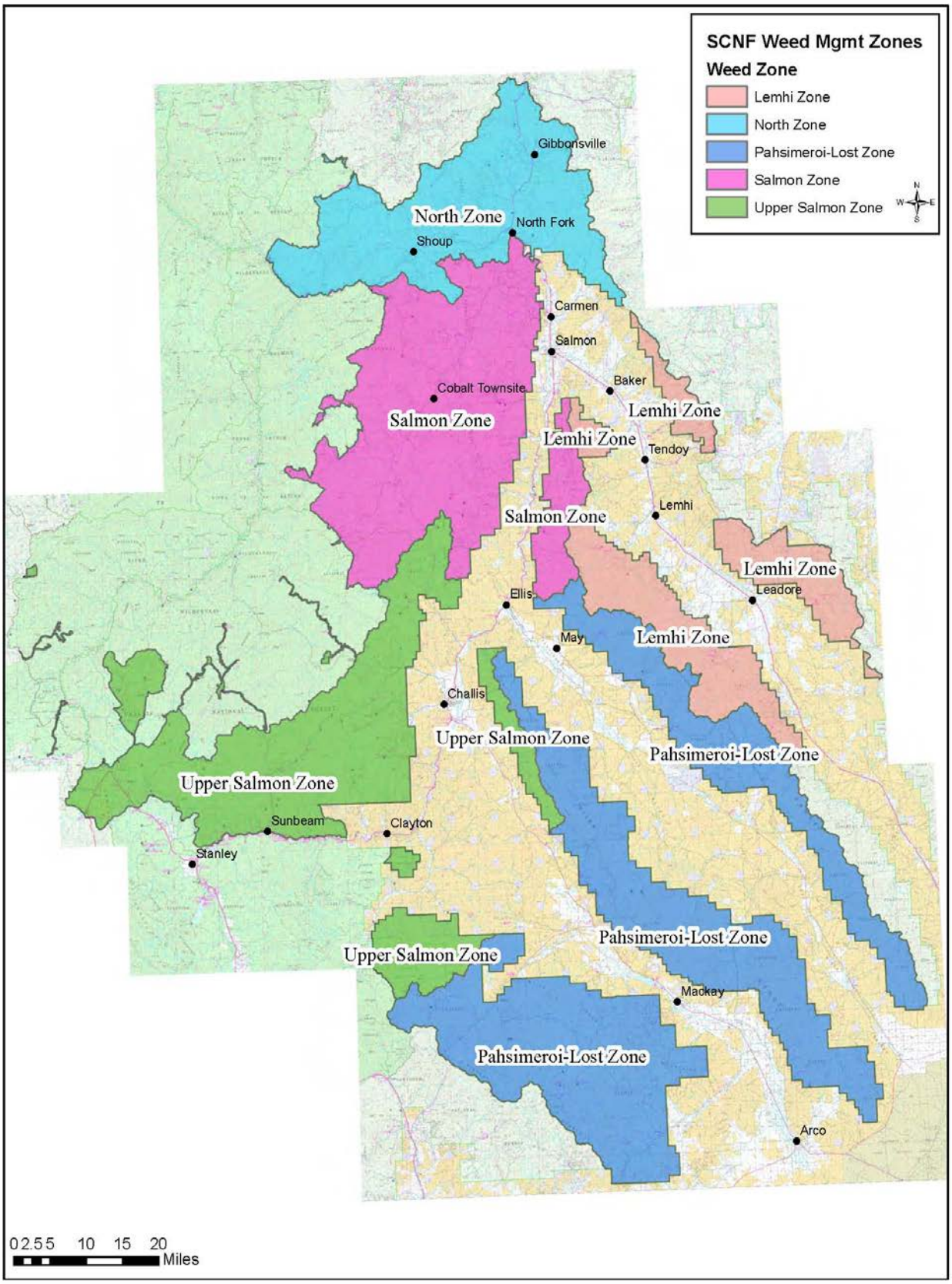


TABLE 4. Common Range of Effective Treatment Options by Target Species[1]

Noxious Weed	Treatment Method		
	Biological	**Chemical**	**Mechanical**
Black Henbane		Metsulfuron; Picloram; Dicamba; Metsulfuron + Chlorsulfuron; Part A: Metsulfuron, Part B: Dicamba + 2,4-D	Pulling, Hoeing and Mowing
Canada Thistle	*Rhinocyllus conicus, Urophora cardui*	Clopyralid + Triclopyr; Clopyralid; Aminopyralid; Aminopyralid + Metsulfuron; Aminopyralid + 2,4-D; Picloram; Metsulfuron + Chlorsulfuron; Part A: Metsulfuron, Part B: Dicamba + 2,4-D; Chlorsulfuron; Glyphosate; Dicamba	
Common St. John's Wort	*Agrilus hyperici, Aplocera plagiata, Chrysolina hyperici, Chrysolina quadrigemina*	2,4-D; Metsulfuron; Glyphosate; Imazapic; Picloram	
Dalmatian Toadflax	*Brachypterolus pulicarius, , Mecinus janthinus*	Chlorsulfuron; Metsulfuron; Picloram + Chlorsulfuron; Picloram; Dicamba	Pulling
Diffuse Knapweed	*Cyphocleonus achates, Larinus minutus, Sphenoptera jugoslavica, Urophora affinis, Urophora quadrifasciata, (Agapeta zoegana)*	Clopyralid + Triclopyr; Picloram; Clopyralid; Aminopyralid; Aminopyralid + Metsulfuron; Aminopyralid + 2,4-D; Clopyralid + 2,4-D; Glyphosate; 2,4-D	Pulling and Hoeing
Field Bindweed	*Aceria malherbae*	Dicamba; Picloram; Dicamba + 2,4-D; Part A: Metsulfuron, Part B: Dicamba + 2,4-D; Metsulfuron; Metsulfuron + Chlorsulfuron; Glyphosate, 2,4-D	
Hoary Alyssum		Metsulfuron; Chlorsulfuron	Pulling
Houndstongue		Metsulfuron; Aminopyralid + Metsulfuron; Imazapic; Part A: Metsulfuron, Part B: Dicamba + 2,4-D; Picloram	Pulling and Hoeing
Knotweed		Triclopyr; Imazapyr; Glyphosate	Cutting, Pulling and Hoeing
Leafy Spurge	*Aphthona cyparissiae, Aphthona czwalinae, Aphthona flava, Aphthona lacertosa, Aphthona nigriscutis, Hyles euphorbiae, Oberea erythrocephala*	Imazapic; Picloram + 2,4-D; Picloram; Glyphosate; Dicamba	Mowing

Noxious Weed	Treatment Method		
	Biological	**Chemical**	**Mechanical**
Musk Thistle	*Rhinocyllus conicus, Trichosirocalus horridus*	Chlorsulfuron; Metsulfuron; Part A: Metsulfuron, Part B: Dicamba + 2,4-D; Metsulfuron + Chlorsulfuron; Triclopyr + clopyralid; Clopyralid; Aminopyralid; Aminopyralid + Metsulfuron; Aminopyralid + 2,4-D; Picloram; Clopyralid + 2,4-D; Dicamba; 2,4-D; Glyphosate + 2,4-D	Mowing/ Hoeing
Oxeye Daisy		Metsulfuron; Aminopyralid; Aminopyralid + Metsulfuron; Aminopyralid + 2,4-D; Picloram; Clopyralid	Pulling and Hoeing
Perennial Pepperweed		Chlorsulfuron; Metsulfuron; Aminopyralid + Metsulfuron; Metsulfuron + Chlorsulfuron; Glyphosate; 2,4-D; Imazapyr; Part A: Metsulfuron, Part B: Dicamba + 2,4-D; Metsulfuron + Chlorsulfuron	Mowing
Puncturevine		Chlorsulfuron; 2,4-D	Pulling, Mulching, and Torching
Rush Skeletonweed	*Cystiphora schmidti, Eriophyes chondrillae, Puccinia chondrillina*	Clopyralid; Aminopyralid; Aminopyralid + metsulfuron; Picloram; Metsulfuron + chlorsulfuron; 2,4-D	Mowing
Russian Knapweed	*Subanguina picridis*	Triclopyr + Clopyralid; Picloram; Clopyralid + 2,4-D; Clopyralid; Aminopyralid; Aminopyralid + Metsulfuron; Aminopyralid + 2,4-D; Glyphosate; 2,4-D; Chlorsulfuron	Pulling and Hoeing
Saltcedar		Triclopyr; Imazapyr; Glyphosate	Cutting
Scotchthistle		Aminopyralid; Clopyralid; Dicamba; Glyphosate + 2,4-D; Picloram; 2,4-D; Chlorsulfuron; Metsulfuron; Clopyralid + 2,4-D; Dicamba + 2,4-D; Triclopyr + 2,4-D	Pulling and Mowing
Spotted Knapweed	*Cyphocleonus achates, Larinus minutus, Larinus obtusus, Metzneria paucipunctella, Urophora affinis, Urophora quadrifasciata*	Triclopyr + Clopyralid; Picloram; Clopyralid + 2,4-D; Clopyralid; Aminopyralid; Aminopyralid + 2,4-D; 2,4-D; Glyphosate	Pulling and Hoeing
Sulfur Cinquefoil		2,4-D; 2,4-D + Dicamba; Picloram; 2,4-D + Picloram	Pulling and Hoeing
Whitetop		Metsulfuron; Chlorsulfuron; Metsulfuron + Chlorsulfuron; 2,4-D	
Yellow Toadflax	*Brachypterolus pulicarius, Calophasia lunula, Rhinusa antirrhini*	Chlorsulfuron; Picloram + Chlorsulfuron; Picloram + Metsulfuron; Picloram; Dicamba	Pulling

[1]Pacific Northwest Weed Management Handbook 2011 and Idaho's Noxious Weeds Control Guidelines 2011

Early Detection/Rapid Response

Early detection and rapid response (EDRR) allows for treatment of invasive plant infestations located outside of currently identified infested areas. Infestations outside of currently identified areas may include new sites of noxious weeds known to exist, weed species previously unknown on the Forest, or sites that currently exist, but have not been identified in Forest inventories to date. The intent of EDRR is to allow timely control, so that new infestations can be treated when they are small, preventing establishment and spread, while reducing the costs, potential side effects of treatment, and impacts from the invasive weed. EDRR is based on the premise that the impacts of similar treatment methods are predictable, even though the exact location or timing of the treatment may be unpredictable.

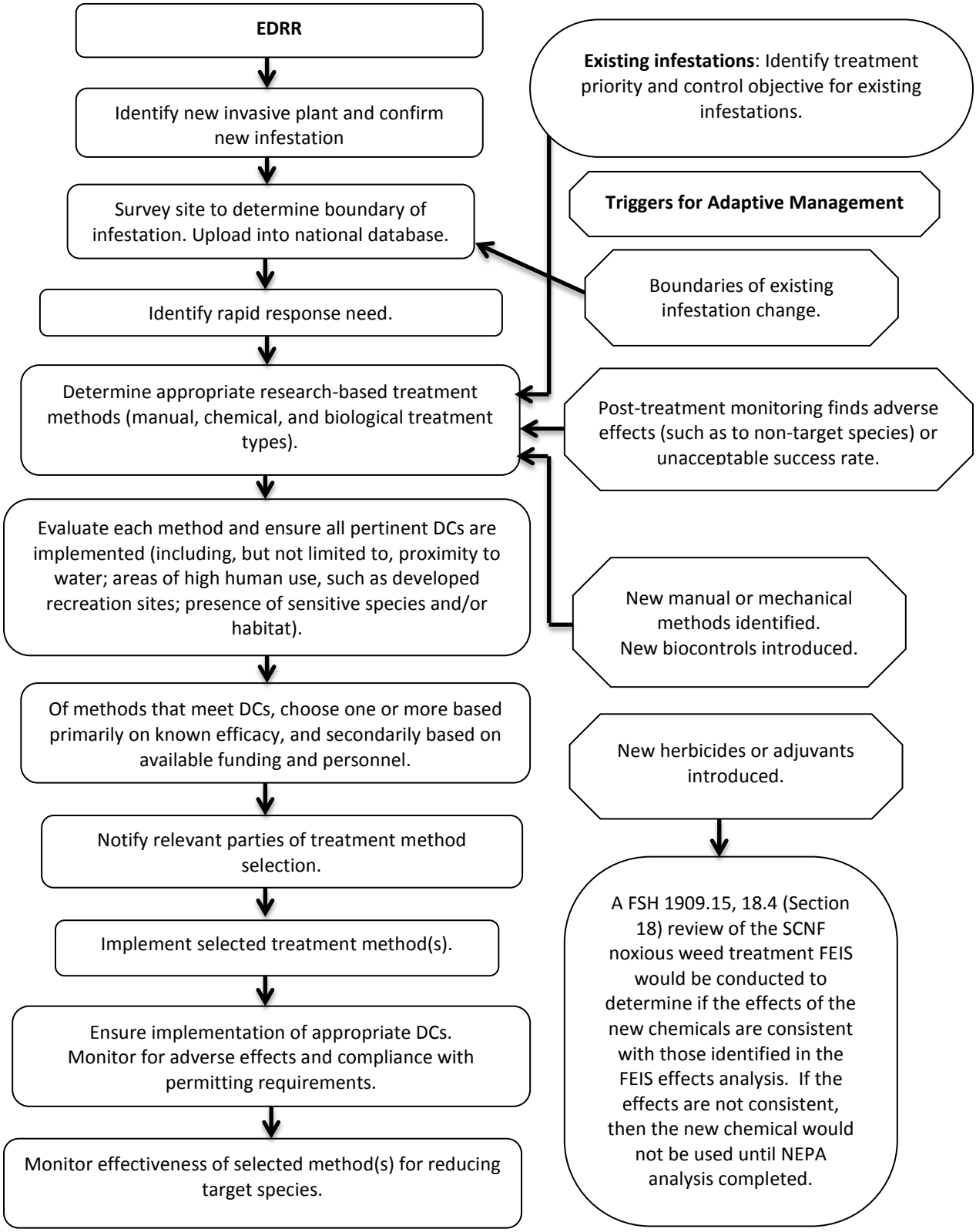
Adaptive Management

The proposed action, which incorporates EDRR, contains an adaptive management strategy to deal with weed infestations that are constantly changing. An adaptive management strategy offers the means to describe and evaluate the consequences of changing or new weed infestations and new treatment options. Provided that the result of treating new infestations and the impacts of new treatment methods remain within the effects described, then the results of this analysis remain valid.
The adaptive management strategy consists of three principle components. Two are described below, and the third, monitoring, is discussed later in this section.

1. In order to quickly and effectively treat newly discovered weed infestations while still addressing other resource concerns, a flowchart based on infestation size, location, site characteristics, and consultation with specialists would be used to select treatment methods (see Figure 1). Priorities would be evaluated and established based on the criteria discussed in Table 3. All new sites would be mapped and inventoried. Appropriate design criteria must be applied to any invasive plant treatment.

2. New technology, biological controls, herbicide formulations, and supplemental labels are likely to be developed within the lifetime of this EIS. These new treatments would be considered when there are indications that their use would be consistent with or less than the effects of those analyzed in this process. The Adaptive Management Strategy would allow incorporation of these new treatment methods if they meet the following criteria:
    - The new or existing herbicide must have an Environmental Protection Agency (EPA) approved herbicide label.
    - A risk assessment must be completed for the herbicide by the Natural Resources Conservation Service (NRCS), USDA Agriculture Research Station (ARS), Environmental Protection Agency (EPA), USDA Forest Service, or other federal land management agency.
    - New biological agents must be determined to be detrimental to the target plants while at the same time being virtually harmless to native or desirable non-native plants. New biological agents must be approved by USDA Animal, Plant Health Inspection Service (APHIS) and the state of Idaho prior to their introduction.
    - A FSH 1909.15, 18.4 (Section 18) review of the SCNF noxious weed treatment FEIS would be conducted to determine if the effects of the new or existing herbicide are consistent with those identified in the FEIS effects analysis. If the effects are not consistent, then the herbicide would not be used until NEPA analysis was completed.
    - Endangered Species Act (ESA) section 7 consultation would be completed prior to the use of new herbicides.

FIGURE 1. EDRR and Adaptive Management Decision Tree



Control and Management

Biological Control

Biological control is the use of plant predators or pathogens which attack and weaken targeted weed species and reduce their ability to compete or reproduce in order to reduce or eliminate weed infestations. Biological controls would be used when the target species occupies extensive portions of the landscape, other methods of control are prohibitive based on cost and location, and an effective biological control regime exists. Biological weed control activities typically include the release of parasitic and "host specific'' insects, mites, nematodes, and pathogens. Biological treatments do not eradicate the target species, but rather reduce target plant densities and competition with desired plant species for space, water, and nutrients. Biological control treatments are not consistent with an eradication objective, but are an integral part of an integrated weed management approach.

Animal and Plant Health Inspection Service (APHIS) and the State of Idaho have approved invertebrate plant feeders and plant pathogens that are proven natural control agents that suppress, inhibit, or control specific target weed species. Biological control activities include collection of invertebrate plant feeders and pathogens, development of insectaries for collection, transportation and transplantation of parasitic invertebrate plant feeders and pathogens, and supplemental stocking of populations. Biological control agents are transported in containers that safely enclose the agent until release. Releases can be ground-based or aerial. Each release is equivalent to treating approximately five acres (NFSISP 2009). The treated areas would continue to be inventoried and monitored to determine the success of the treatments and when the released bio-control agents have reached equilibrium with the target species. Repeat visits may need to be made several times a season and over a series of years to determine if additional releases are needed or if a different agent needs to be released.

The use of biological control treatment usually results in delayed effectiveness, often requiring five to ten years for successful reduction of target noxious weed infestations. However, simultaneous increase of native vegetation often eliminates the need for restoration. Because of this, biological control is the preferred method in remote areas where access is limited, on large extensive populations where other control methods may not be appropriate, on species where biological control agents are available and proven effective, and in conjunction with other control methods to reduce density of the target species.

Design Criteria – Biological Control

- Obtain Animal and Plant Health Inspection Service (APHIS) permit to Move Live Plant Pests, Noxious Weeds or Soil for those agents when transportation across state lines is involved.
- There would be no intentional releases of unapproved biological control agents.
- There would be no intentional releases of agents known to feed on species other than those they were introduced to control.
- Use appropriate Forest Service protocols for documentation of releases and monitoring and share release information with the Idaho State Department of Agriculture.
- Where possible, collect biological control agents locally or from areas with similar climatic and weather conditions, land and soil types, and cover types to maximize successful establishment, to the extent practicable.
- Distribute biological control agents at the optimal season and life cycle stage to optimize the likelihood of successful establishment. Distribute quantities sufficient to optimize successful short-term establishment.

- For those agents that self-disperse poorly, actively assist the distribution throughout target infestations by redistribution (collecting and moving the agent to new locations).

Herbicide Application

This method involves the use of herbicides and associated adjuvants. Ground-based or aerial application of herbicides would be used based on (a) treatment objective and priority of the target weed species, (b) accessibility, topography and the size of treatment area and (c) the expected efficiency and effectiveness of the method selected.

Four types of herbicide application would be used:

- **Spot spraying –** This method targets individual plants and the immediate area around them. Most spot spraying is usually done with a backpack sprayer. However, spot spraying may also be applied using a hose from a truck-mounted or OHV-mounted tank, or tanks mounted on pack animals. This is the most common herbicide application method.
- **Broadcast –**Herbicide is applied to cover an area of ground rather than individual plants. In addition to backpack pumps, this method may employ a spray system mounted on a truck or OHV. Broadcast applications are used in areas where weeds occupy a large percentage of plant cover on the site, making spot spraying impractical.
- **Aquatic application-** This application method would be used in response to EDRR associated with aquatic weed species. This method may employ spot or broadcast spray over the surface of or into water. Application methods may be from shore using use backpacks, truck-mounted or OHV-mounted tank, or from boats.
- **Aerial application -**This method would be used in areas where physical features, such as topography; restricted access; size and/or rate of spread of infestation; personnel safety; or other factors such as prohibitive unit cost of ground application occur, weeds would be treated with the use of helicopters.

Herbicide formulations and mixtures could contain one or more of the active ingredients displayed in Table 5 and 6. The range of application rates for each chemical is derived from Human Health and Ecological Risk Assessments and the herbicide label. Additional herbicides may be added in the future at either the Forest Plan or project level through appropriate risk analysis, NEPA procedures, and ESA consultation (discussed in the adaptive management section).

The application rates and method depend on factors such as the target species, phenological stage, abundance and distribution of the target species, type of herbicide used, site condition, type of non-target vegetation, soil type, and depth to the water table, the distance to open water sources, riparian areas, and sensitive plant species.

TABLE 5. Herbicides Used Currently Used on the SCNF for Noxious Weed Control Activities

Herbicide (Active Ingredient)	Maximum Label Application Rate (lbs. AI/AC*)	Proposed Typical Application Rate (lbs. AI/AC)	General Application
2,4-D amine	4.0 lb/ac	0.5-1.5 lb/ac	Upland, Riparian
Chlorsulfuron	2.6 oz/ac	0.5 - 2.0 oz/ac (0.01 lb/ac - 0.03 lb/ac)	Upland, Riparian
Clopyralid	0.5 lb/ac	0.28 - 0.5 lb/ac	Upland, Riparian
Dicamba	2.0 lb/ac	0.75 - 2.0 lb/ac	Upland
Glyphosate	10.8 lb/ac	0.35 -5.0 lb/ac	Upland, Riparian
Imazapic	0.19 lb/ac	0.1 - 0.19 lb/ac	Upland
Metsulfuron-methyl	4.0 oz/ac	1.0 - 3.0 oz/ac (0.02 lb/ac - 0.06 lb/ac)	Upland, Riparian
Picloram	1.0 lb/ac	0.5 - 0.75 lb/ac	Upland
Sulfometuron methyl	8.0 oz/ac	2.0 - 5.0 oz/ac (0.05 lb/ac - 0.13 lb/ac)	Upland, Riparian
Triclopyr: triethylamine salt (TEA)	9.0 lb/ac	4.5 - 6.0 lb/ac	Upland, Riparian

TABLE 6. Additional Herbicides Proposed for Use on the SCNF for Noxious Weed Control Activities

Herbicide (Active Ingredient)	Maximum Label Application Rate (lbs. AI/AC*)	Proposed Typical Application Rate (lbs. AI/AC)	General Application
Aminopyralid	0.11 lb/ac	0.06 – 0.11 lb/ac	Upland, Riparian, Aerial
Glyphosate	10.8 lb/ac	0.35 -5.0 lb/ac	Aquatic
Imazapic	0.19 lb/ac	0.1 - 0.19 lb/ac	Aerial
Imazapyr	1.5 lbs/ac	0.5-1.0 lb/ac	Upland, Riparian, Aquatic
Imazamox	0.5lb/ac	0.25-0.5 lb/ac	Aquatic
Picloram	1.0 lb/ac	0.5 - 0.75 lb/ac	Aerial
Triclopyr: triethylamine salt (TEA)	9.0 lb/ac	4.5 - 6.0 lb/ac	Aquatic

Adjuvants

Chemical control activities frequently utilize adjuvants in addition to herbicides for more effective control of target species. Adjuvants are compounds added to the herbicide solution to improve its performance. They can either enhance the activity of an herbicide's active ingredient (activator adjuvant) or offset any problems associated with its application (special purpose or utility modifiers). For example, some adjuvants increase herbicide effectiveness by reducing the surface tension of water, increasing the area of the plant covered by the solution and increasing the plant's uptake of the herbicide itself. They can be added during the manufacturing process or by the applicator as needed based on site conditions. A complete list of adjuvants used on the SCNF is in Appendix C.

Design Criteria - General Herbicide Application

Herbicide application shall comply with applicable laws (Idaho Statute Title 22, Chapter 34 and Idaho Administrative Code Rule 02.03.03), Forest Service policy and guidelines (FSH 2109 and FSM 2150) and with product label directions for the herbicide being used to assure worker safety and to manage potential impacts of herbicide application.

- Always read and follow label directions, including instructions for herbicide use, application rates, equipment and techniques and personal protective equipment for applicators.
- See Appendix X regarding application of herbicides in proximity to water.
- Prior to implementation, program managers would ensure proper permitting is in place.
- Make sure Material Safety and Data Sheets, safety plan, spill prevention plan and cleanup kits are available to applicators, per the requirements of FSH 2109.
- Keep accurate and detailed application records, per Idaho Department of Agriculture Rules Governing Pesticide and Chemigation Use and Application.
- Perform herbicide applications by or under the direct supervision of licensed Idaho professional herbicide applicators for forest and contract crews, per Idaho Department of Agriculture Rules Governing Pesticide and Chemigation Use and Application.
- Ensure that contracts and agreements include appropriate prescriptions and that herbicides and application rates meet label requirements and site specific design criteria
- Monitor wind speed and direction and equipment and spray parameters throughout an herbicide application. No herbicide shall be applied in sustained wind conditions exceeding five (5) miles per hour in riparian areas or in any wind conditions exceeding product label directions.
- Conduct equipment and personnel inspections and calibration as needed to ensure proper herbicide application and to meet regulatory requirements. Regularly check equipment and components for wear. Attend to repairs and parts replacement promptly.
- Transport only the quantity of herbicide and adjuvants needed for a project. Secure containers being transported in such a way to prevent the likelihood of spills. Make periodic checks en route to help avoid spillage. Carry herbicides and adjuvants in water-tight, floatable containers when supplies need to be carried over water by boat, raft or other watercraft.
- When out in the field, restrict access to herbicides and adjuvants and spray equipment by unauthorized personnel to the extent possible.
- OHVs used to transport or spray herbicides are administratively allowed to travel off designated motorized routes. These vehicles would not be taken off designated routes if damage to soils could occur due to wet conditions. Take care to ensure that disturbance to desirable vegetation is minimized and that no visible “trail” creation occurs.
- Follow the procedures in the SCNF Spill Plan in the event of a spill.
- Use indicator dye in the herbicide mix to visually assure uniform coverage and minimize overlapped or skipped areas.

- Within areas of special concern, such as developed recreation, trailheads, campsites and other high human areas, utilize treatments methods that minimize potential exposure to the public.
- To minimize herbicide drift during broadcast operations, use low pressure and larger droplet size to the extent possible with the equipment being used. Use nozzles designed for herbicide application.
- Equip drafting equipment used with back siphoning prevention devices.
- Wherever possible, mix and load at a distance greater than 100 feet from water and where spilled materials will not flow into groundwater, wetlands or streams.
- Provide herbicide "awareness" information to forest users as opportunities arise. Treatment areas will be signed prior to herbicide applications within areas of special concern, such as trailheads, campsites, and other high use areas. Make information on where and when spraying and other treatments would occur available to the public at the local Ranger District office. Forest Service and other websites may also be used for public notification.
- Follow label directions and other information sources to apply herbicides to the target species during phenological stages that optimize target control.
- To the extent practicable, apply herbicides to infestations containing biological control agents at times when the effects of herbicides to the host plants would not interfere with the agent's life cycle.
- Avoid non-target damage to the extent practicable. Native or desired plant species may compete well with the target weed species once its density has been reduced and help in recovery of the site through natural means.

Design Criteria- Sensitive Species

- Evaluate sites considered for herbicide treatment for sensitive plant habitat suitability. Survey suitable habitat as necessary prior to treatment. The need for field surveys is based on factors such as plant phenology at the time of treatment and species' susceptibility to the herbicide(s) being used.
- Mechanical treatment, individual plant treatment (e.g. wiping, cut stump, injection), or spot herbicide application are preferred methods when treating weed infestations associated with sensitive plant populations.
- For identified sensitive plant populations, there would be a 50-foot no spray zone for all herbicides applied by broadcast-type spray equipment e.g. UTV, vehicle, or helicopter-mounted booms or boomless sprayers.
- Glyphosate would only be applied within a 50-foot buffer if the sensitive plant species is dormant. Remaining herbicides may be applied following label instructions.
- Sites within ½ mile of active raptor nests would not be treated until young fledge.

Design Criteria -Aerial Herbicide Application

- Provide a minimum buffer of 300 feet for aerial herbicide application developed campgrounds and private land (unless otherwise authorized by adjacent private landowners).

- All live water (perennial streams, flowing intermittent streams, lakes, ponds, springs, and wetlands) would have a 300 foot "No Application" aerial herbicide buffer.
- Aerial herbicide application would not occur in designated municipal watersheds. Idaho DEQ Source Protection Areas would not be included in aerial application project areas.
- Aerial herbicide applications would not occur in Research Natural Areas (RNAs) or proposed wilderness areas. No aerial application would occur within ¼ mile of wild, scenic, and eligible rivers.
- Aerial herbicide application would not occur over areas with >30% live tree canopy cover.
- No aerial herbicide application would occur within ¼ mile of occupied pygmy rabbit habitat.
- Within known or potential sage-grouse nesting/early brood-rearing habitat, any aerial herbicide application would occur after June 30.
- Helicopters would avoid by ½ mile (one mile around known peregrine falcon eyries, USFWS 1984), known raptor nesting territories when flying to and from treatment sites. No aerial herbicide application would occur within ¼ mile from known nest sites during the following periods:
    - northern goshawks - from April 1 through August
    - bald eagles - February 1 through August 15
    - peregrine falcons - April 1 through August 31
- Aerial spray units (and perennial seeps, ponds, springs, and wetlands in proposed aerial units) would be ground-checked, flagged and marked using GPS prior to spraying to ensure only appropriate portions of the unit are aerially treated. A GPS system would be used in spray helicopters and each treatment unit mapped before the flight to ensure that only areas marked for treatment are treated. Plastic spray cards would be placed out to 300 feet from and perpendicular to perennial streams to monitor herbicide presence.
- Constant communications would be maintained between the helicopter and the project leader during spraying operations. Ground observers would have communication with the project leader. Observers would be located at various locations adjacent to the treatment area to monitor wind direction and speed as well as to visually monitor drift and deposition of herbicide.
- Aerial herbicide application would not occur when sustained wind speeds exceed 5 mph or label recommendations, whichever is less.
- Aerial herbicide applications would not occur during inversions, or below minimum relative humidity or above maximum temperature, as stated on label.
- Weed infestation considerations for choosing sites for aerial application would include the extent of the weed infestation, the cumulative size of the infestation (many small sites in close relative proximity of each other), and the density of the invasive species.
- Aerial treatment areas could be treated recurrently on a 2 or 3-year rotation to ensure effective control. Monitoring would show which areas would need to be re-treated or if treatment areas can be reduced based on effectiveness of previous treatment.
- Public notification would be conducted through press releases in local newspapers and the use of social media and websites which would identify the potential windows of treatment

for specific areas. Signing and on site layout would be performed one to two weeks prior to actual aerial treatment.

- Temporary area, trail, and road closures would be used to ensure public safety during aerial spray operations.
- Grazing permittees would be notified that aerial application would be conducted and of the specific time frames in which treatment would occur to ensure grazing animals are removed from the area if necessary.

Design Criteria - Aquatic Herbicide Application

- Perform herbicide applications by or under the direct supervision of licensed Idaho professional herbicide applicators with Aquatic Pest Control certifications for Forest and contract crews.
- Aquatic applications would not be applied aerially.
- When the product label recommends use of an adjuvant, only aquatic-approved adjuvant may be used.
- Conduct evaluation of the infested site to determine best control method, including (a) location, number and extent of infestations, (b) depth, flow, substrate, water quality and configuration of the water body involved, (c) density and diversity of native flora, and (d) direct and indirect effects to native flora and fauna and to people (e.g. domestic water use).
- Consider whether to apply herbicide to entire body of water, or to areas with highest risk as vectors, such as boat ramps.
- Use label to determine what proportion of water body may be treated at one time without causing excessive oxygen depletion from decaying plant matter.
- Prefer spot-spraying techniques when applying herbicides to emergent vegetation. Do not apply to water where weeds are not present if herbicide is not labeled for submerged vegetation.
- Notify the public of dates and type of treatment and duration of closure period.

Manual and Mechanical Treatment Methods

Mechanical and manual treatments are typically used to remove seed heads, individual plants or small infestations. They may be used in sensitive areas to avoid impacts to non-target species or water quality, or to prevent seed production, etc. Mechanical and manual approaches are slow and very labor intensive; they are effective only for small infestations.

The term “manual” defines treatments such as hand pulling or using hand tools, such as hand clippers, hoes, rakes, shovels, etc., to remove plants or cut off seed heads. Manual treatments can be effective for annual and tap-rooted weeds, but are ineffective against perennial weeds with deep underground stems or roots, or fine rhizomes that can be easily broken and left behind to re-sprout. Use of this method might need to be repeated several times throughout the growing season depending on the species. This treatment may require digging below the soil surface to remove the main root of plants.

The term “mechanical” refers to the use of equipment and power tools, including actions like mowing, torching (using a propane burner to kill weeds with heat), weed whipping, etc. Choosing the appropriate

power tool depends on factors such as characteristics of the target weed species (e.g. stem size or sprouting ability), the density of the target species and size of the infestation, site location and condition, and soil or topographic considerations. Mechanized treatments are typically used to remove flowering stems to prevent seed production or to reduce or remove above ground biomass.

Design Criteria – Manual and Mechanical Treatment

- Obtain necessary state and federal permits, when and where required.
- Consult an archaeologist prior to initiation of work when the mechanical method to be used has the potential to result in ground disturbance deep enough to affect cultural resource sites.
- Minimize soil disturbance as much as possible to prevent deeply buried weed seeds being brought to the soil surface, promoting a sprouting event that could increase the density of the weed species or create areas of bare soil that would provide an optimal seed bed in which new weeds can sprout.
- Avoid non-target species damage to the extent practicable. Select mechanical methods to effectively control the target species (e.g. grubbing/hoeing is inappropriate for rhizomatous species and may increase the density of the weed as root fragments sprout and become new plants).
- Apply mechanical treatments at the proper stage of plant growth when treatment will be most effective at controlling the target weed.
- Thoroughly inspect and clean all equipment and clothing to remove weed seeds or vegetative propagules to prevent the movement of the weed to another site.
- To the extent practicable, conduct clipping and removal of seed stalks when seeds are at or nearing maturity to reduce inputs to the seed bank or when seeds are easily picked up and transported by vectors such wind, humans or animals (e.g. wind-dispersed seeds such as rush skeletonweed or bur-like seeds such as houndstongue that cling to fur and clothing).
- Specific to aquatic noxious weeds, hand-pulling may be used when an infestation is very limited in extent and occurs close to the shoreline of a water body, but has not yet infested deeper waters.

Rehabilitation and Restoration

Sites that have been severely impacted by weeds can be devoid of desirable plant species or consist of only scattered individual relict plants. Soil erosion may have taken place. Ecosystem structure and function may no longer be in place (e.g. mycorrhizal relationships between plants and soil fungi). Natural revegetation can often be slow, but in cases where there are few or no desirable plant species to take the place of weeds, natural recovery may not take place at all. In such cases, management activities may be required to assist vegetation recovery and prevent soil erosion. In turn, the revegetation measures would impede the re-establishment of weeds on the site. The objective is to re- establish a desired plant community and a return to conditions that foster the recovery of natural ecosystem processes. Equipment that could be used during reseeding activities includes, but is not limited to, hand tools such as rakes or larger equipment such OHV-drawn harrows.

Design Criteria – Rehabilitation and Restoration

- Natural revegetation is the preferred option whenever possible. Assess weed-infested sites to determine if the area is capable of natural recovery after weed control treatments. Determine what mix of desirable or native grass and forb plants still occur on the site and if they are numerous and vigorous enough to be capable of spreading vegetatively or via seed production.
- Assess erosion processes that may be affecting the site and the degree of severity of any soil erosion.
- Consider the most effective, practical and suitable means of providing rehabilitative or restorative measures, whether eliminating sources of disturbance other than weeds, seeding, mulching, etc.
- Consider the need to control annual grasses, such as cheatgrass, and forbs (e.g. annual mustards) that are known to compete aggressively with perennial seedlings trying to establish.
- Determine whether additional assistive measures may be required, such as cover crops, hydraulic mulches, and mycorrhizal inoculums.
- Use native plants in rehabilitation and restoration where practicable.
- If it is determined that non-native species are the best choice for interim or permanent revegetation, be sure to select species that do not behave invasively under conditions similar to those at the site to be revegetated.
- Purchase only certified and certified weed-seed free seed. Consider the use of site-adapted seed, if available and practicable.
- When seeding, determine the need for site preparation and protective measures that may need to be taken to allow the seeding to establish successfully.
- Plan revegetation activities at the optimal season and site conditions for successful establishment.
- Design seed mixes, whether native or desirable species, that are adapted to site conditions (including soil type, precipitation patterns, plant hardiness zones, etc.)
- Following establishment, continue to practice proper vegetation management to maintain a healthy, functioning plant community that is resilient to disturbance and resistant to weed re-invasion.
- Use only weed seed-free mulches and other products for uses such as erosion control and improved seed germination.
- Ensure that treatment tools and other equipment are free of weed seed before moving to or using on the project site.
- Minimize ground disturbing activities to the extent possible during reseeding efforts.
- Consult an archaeologist prior to initiation of work when the method to be used has the potential to result in ground disturbance deep enough to affect cultural resource sites.

Monitoring

Monitoring is an integral part of any adaptive, integrated weed management program. Monitoring addresses prevention, EDRR, treatment, and restoration efforts, and informs future decision-making and strategy. Both quantitative and qualitative monitoring efforts are included in the overall monitoring program. Post-treatment reviews of monitoring data would occur on a sample basis to determine whether treatments were effective, the type and extent of damage which may have occurred to non-target species, whether design criteria were applied correctly, and if recovery occurred as expected. Retreatment and active rehabilitation or restoration prescriptions would be developed as needed based on post-treatment results. Changes in treatment methods would occur based on effectiveness of treating the invasive plant infestations. For example, an invasive plant population treated with a broadcast herbicide may be retreated with a spot spray or hand pulled, once the size of the infestation is reduced.

Implementation Monitoring

Program elements and site-specific projects should include the following to accomplish implementation monitoring:

- Develop a project work plan for herbicide use as described in FSH 2109.14.3. This plan would present organizational and operational details including treatment objectives, equipment, materials, and supplies needed; herbicide application method and rate; field crew organization and lines of responsibility, and a description of any interagency coordination. The plan would also include a job hazard analysis to assure applicator safety.
- Conduct site visits during work periods to monitor compliance.
- Initiate monitoring during implementation to ensure Project Design Features are implemented as planned. Document daily field conditions, activities, accomplishments and/or difficulties. Use contract administration mechanisms to correct contractor performance deficiencies.
- Document and report herbicide use and certified applicator information in the National Pesticide Use Database, via the database of record to determine the amount, type and location of herbicide use annually.
- For biological control releases, monitor a selection of biological control release sites annually, tracking agent establishment and target species response, to determine the efficacy of the release.
- For aquatic herbicide applications, obtain, as required, pre- and post-treatment water quality data for water chemistry, impacts to fauna and to non-target flora and response of the aquatic noxious weed species to treatment.
- For mechanical treatments, monitor rehabilitative and restoration measures throughout the recovery process to quickly identify and correct any problems that may impede successful revegetation.

Effectiveness Monitoring

Effectiveness monitoring generates data that aids managers in assessing trends in infestation number, size, and density, the effective of noxious and invasive weed infestations on native vegetation, the effect of treatments on target and non-target species, and the effectiveness of

treatments as implemented. Effectiveness monitoring must be done at multiple scales in order to provide the best insight into the effects of treatment actions. All treatment methods (manual, biological, and chemical) are subject to effectiveness monitoring.

- Monitor size, density, and other biological characteristics of weed infestations.
    - Maintain noxious and invasive plant inventory in the appropriate database of record.
- Evaluate immediate and short-term impacts of treatment on target weeds and non-target vegetation.
    - Monitor and document observations of treated sites as practicable in accordance with established guidelines.
- Evaluate long-term effects of treatment on target weeds and non-target vegetation.
    - Establish permanent monitoring plots for long-term site assessment
    - Monitor survival, distribution, and effectiveness of biological control agents.

Appendix A: *Salmon-Challis Forestwide Integrated Weed Management Prevention Plan*

INTRODUCTION

It has been well-established that the most effective method for managing noxious weeds is to prevent their invasion and expansion. Prevention is the most economical and ecologically sound method for weed management. However, no single element of Integrated Weed Management (IWM) operates independently. Within prevention are aspects of education, early detection, on-going monitoring, site restoration, general land use practices, and other elements of IWM. All elements of IWM are inter-connected in a variety of relationships. The challenge and the primary goal of IWM is to incorporate a variety of strategies in a coordinated, multi-disciplinary, ecological approach with the goal of maintaining or developing healthy plant communities that are relatively weed-resistant.

PREVENTION ASPECTS OF INTEGRATED WEED MANAGEMENT

The primary focus of this prevention plan is the prevention/education element of IWM. The goal is to increase public and agency personnel awareness about the noxious weed issue. To be most effective, the elements of IWM should not function independently. For example, prevention goes well beyond public education. The prevention aspects of other elements of IWM are highlighted below to illustrate the multi-disciplinary approach.

Inventory

- Continuing Inventory efforts provide the opportunity for repeated field visits and the detection of new invaders and new infestations of established species. Identification of weed-free areas provides baseline data on healthy, intact ecosystems.

Treatment

- Treatment practices restrict the encroachment of noxious weeds onto adjacent lands.
- Treatment practices limit the number of seeds produced and/or inhibit rhizomatous growth.

General Land Management Practices

- Minimizing soil disturbances by vehicles, machinery, wildlife, livestock, and recreation impacts is central to preventing weed establishment.

Monitoring/Evaluation

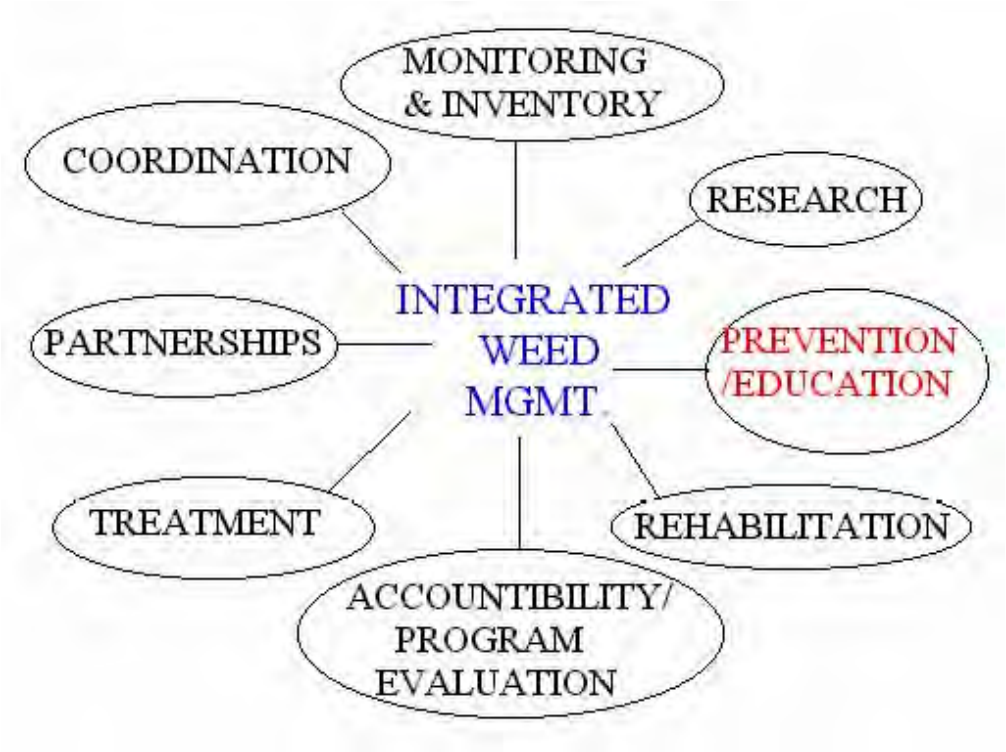
- Annual Monitoring efforts provide evaluation of effects of various treatments on weed populations and non-target resources and determine population trends such as expansion rates and habitat susceptibility.
- Adaptive strategies can be determined and implemented to maximize prevention efforts.

Partnerships/Coordination

- Information-sharing and a coordinated/cooperative approach within and outside the agency allow for a broad, regional perspective and rapid response to new infestations.
- The process of educating and motivating individuals to promote noxious weed management and prevention has positive, long-term, compounding effects.

Restoration

- Establishment of competitive, healthy plant communities in areas susceptible to invasion hinders the introduction or re-introduction of noxious weeds.



Prevention is one element of all the interrelated elements of Integrated Weed Management. A coordinated approach of a variety of tactics is the primary strategy of IWM.

1. Forest User Group Education and Prevention Practices

Forest access and recreation are two of the primary means of introduction and continuing spread of weed infestations. Some of the most common areas in which weed infestations become established on the Forest are along Forest roads, trail systems, boat launches, and in and around designated and dispersed camps. To reverse this trend, a well-planned, comprehensive education program targeted at Forest users is necessary.

The lists below outline education measures and prevention practices targeted at particular user groups. The intention is to have representatives of the various user groups and other stakeholders implement measures to reach their constituents. These lists should not be considered a finalized plan. They are provided as examples of the extensive variety of education options available for development and implementation.

ALL USERS

Action Items:

- General noxious weed information and specific management actions posted at strategic locations such as trailheads, roads, boat launches, information kiosks, and forest portals.
- Make a variety of weed materials (brochures, identification cards, etc.) available to users at Forest offices.
- Establish network of volunteer groups, individuals, outfitters, and landowners for treatment, inventory, and logistical support.

Specific Prevention Practices:

- Clean all equipment and transportation aids before traveling into the Forest and after leaving.

WATER RECREATION USERS

Action Items:

- Post general noxious weed information and specific management actions at all launch sites.
- Noxious weed information included when purchasing fishing licenses.
- Encourage users to clean boots and equipment before traveling to a new area.
- Provide Interpretation and Education (I&E) materials to river-based outfitters and guides.
- Provide I&E materials to recreation associations (Western Whitewater, Idaho Whitewater Association, etc.).

Specific Prevention Practices:

- Clean all boats, trailers, vehicles, and equipment before and after using water systems.
- Know how to identify noxious weeds and where to report observations of infestations.
- Interstate boat transport to comply with the Idaho Boat Inspection Program
- Boaters to comply with Idaho State Invasive Species sticker requirement.

MOTORIZED/MECHANIZED ROAD AND TRAIL USERS

Action Items:

- Post general noxious weed information and specific management actions at all trailheads and portals.
- In weed-infested areas, post weed awareness messages and prevention practices at roadsides.
- Include I&E materials on travel plan maps.

- Provide I&E materials to and coordinate implementation of prevention practices with local and regional recreation associations.

Specific Prevention Practices:

- Inspect and clean motorized and mechanized trail vehicles of weeds and their seeds before and after using Forest roads and trails.

HORSEPACKERS /BACKPACKERS:

Action Items:

- Enforce Intermountain Region weed free hay closure (04-00-97).
- Post general noxious weed information and specific management actions at all trailheads and portals.
- Include I&E materials on travel plan maps.
- Enforce weed seed free feed regulation.
- Provide I&E materials to and coordinate implementation of prevention practices with recreation associations such as [Rocky Mountain Elk Foundation, Foundation for North American Wild Sheep, local riding and hiking groups, etc.]
- Coordinate with State agencies and their Education efforts to increase compliance with the certified Weed-Seed Free Feed regulation.
- Make I&E materials available at outdoor and feed/stock supply retailers.
- Develop and provide I&E package to hunting and pack-trip outfitters.

Specific Prevention Practices:

- Avoid traveling through and camping on weed infestations.
- Pack and saddle stock users should feed stock only weed-free feed for several days before initiating use of National Forest System lands.
- Inspect, brush, and clean animals, especially hooves, legs, manes, and tails, before entering public land.
- Tie or hold stock in ways that minimize soil disturbance and avoid loss of native vegetation.
- Brush and clean pets before and after using Forest System lands. Keep pets from traveling through noxious weed infestations.
- Clean boots and equipment before traveling to or camping at a new area.

FOREST RESOURCE USERS (FIREWOOD, MUSHROOMS, ETC.)

Action Items:

- Include noxious weed I&E and prevention practices on woodcutting/mushroom picking maps.
- Provide noxious weed information and prevention practices to users at time of permit purchase.

Specific Prevention Practices:

- Avoid traveling through weed infestations.
- Inspect and clean vehicles of weeds and their seeds before and after using Forest roads and trails.
- Clean boots and equipment before traveling to a new area.

HUNTERS

Action Items:

- Incorporate noxious weed information into Hunter Education courses, IDFG Check Stations, and during hunting license purchase.
- Make I&E materials available at outdoor supply retailers.
- Coordinate prevention measures with the Idaho Department of Fish and Game.

Specific Prevention Practices:

- Avoid traveling through weed infestations.
- Inspect and clean vehicles of weeds and their seeds before and after using Forest roads and trails.
- Clean boots and equipment before traveling to or camping at a new area.
- Know prevention practices for motorized/mechanized/stock users as applicable.

OTHER AUDIENCES

The following is a list of Prevention and Education measures targeted to a more general audience. While these efforts may not specifically address Forest Service personnel and Forest users, they are included in this Prevention Plan because of their inherent value. Other audiences (children, and community and volunteer groups) may benefit from noxious weed Prevention and Education.

Action Items

- Initiation of Cooperative Weed Management Areas to coordinate management efforts with state and federal initiatives.
- Completion of display board depicting species identification, the impacts of noxious weeds, and the Salmon-Challis National Forest Noxious Weed Management Plan for use at County Fairs, conferences, annual meetings, and in Forest Service offices.
- Post prevention practices and I&E materials at trailheads and developed recreation facilities, provide information to user groups, and have education material available at Forest offices and on the website.
- Survey of noxious weed I&E materials by Student Conservation Association crew.
- Variety of programs in local school systems.
- Coordinate prevention efforts with other agencies. Continue work with Federal, State, County, and other interested partners to develop additional educational materials.
- Discuss weed prevention practices at permittee and cooperator meetings, and at contractor pre-work sessions, where applicable.
- Design of a web page for noxious weed management on the Forest.
- Television and/or Radio segments dealing with weed prevention.
- Newspaper articles and layouts dealing with weed prevention.
- Development of multi-media program(s) for presentation to interested parties.

2. Internal Education and Prevention Practices

Internal education refers to the process of training employees and representatives of the agency in the various elements of IWM. Agency personnel, both permanent and seasonal, must be informed about the conditions under which weeds become established, how weeds are spread, and the effects weeds have on all resources. Implementing this knowledge can minimize weed spread because of resulting altered land management activities. Personnel should be encouraged to incorporate weed prevention and control messages into their day-to-day work priorities and appropriate public information materials.

Some particular messages to be communicated through the process of internal education are as follows:

- Prevention is part of every employee, contractor, and volunteer's job.
- Weeds can be spread by many land management activities and are detrimental to many activities on public lands.
- Integrating preventive measures into daily and authorized activities can improve the health of the land at little cost.
- Integrating prevention messages into informational materials will raise awareness at little additional cost.
- Weeds are spreading at an alarming rate--ignoring them is not an option.
- Working with partners in the weed control effort is vital to helping improve the health of the land.
- Using pilot projects and demonstration areas, education and outreach efforts will help illustrate the nature of the problem and options for dealing with it.

The Intermountain Region of the Forest Service has developed Prevention and Control Measures for noxious weeds. The objectives of the Prevention and Control Measures are to reduce the risk of spreading noxious weeds, prevent the establishment of new invaders, integrate weed management into all resource programs, and build awareness within the agency. A challenge to Forest managers is to ensure that the strategies outlined in the Prevention and Control Measures are being implemented on the ground by all agency personnel.

FOREST SERVICE MANUAL
INTERMOUNTAIN REGION (REGION 4)
OGDEN, UT

FSM 2000 – NATIONAL FOREST RESOURCE MANAGEMENT

ZERO CODE 2080 – NOXIOUS WEED MANAGEMENT

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Regional Forester

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New Document(s):	2080	10 Pages
Superseded Document(s): (Last supplement was 2000-97-1 to 2080.)	2080 (Supplement 2000-97-1)	3 Pages

Digest:

2081.2	Removes priorities that are now listed in parent text. Adds Noxious Weed prevention and mitigation measures.

2081.2 - Prevention and Control Measures

1. Recommended Practices. Stop the spread of existing noxious weeds and prevent invasion of new sites or new noxious weeds by applying prevention and control mitigation measures where applicable and appropriate. Potential practices to consider:

a. Project Design and NEPA. Incorporate noxious weed prevention into all project layout, design, and alternative evaluation.

Environmental analyses should consider noxious weed risk in evaluating project location and design, and in the development of alternatives and mitigating measures, including any or all of the following, as determined to be appropriate by the Forest Officer in charge:

(1) The presence of existing noxious weeds within the project site by species and magnitude.

(2) The susceptibility of the habitat type to noxious weed invasion.

(3) The risk for invasion or spread of noxious weeds that could be caused by the project.

(4) The evaluation of alternative sites, which are noxious weed-free and/or low risk, for project implementation.

(5) The evaluation of alternative implementation methods where they exist, which would reduce risk of invasion or spread of noxious weeds.

(6) The inclusion of other mitigation measures (practices) designed to minimize risk of invasion or spread of noxious weeds.

(7) The evaluation of direct, indirect, and cumulative effects of the project to noxious weed species and populations.

b. Ground Disturbing Activities. Project implementation for ground-disturbing operations within noxious weed infested areas, as deemed appropriate, should include provisions for monitoring and inspecting as determined through the analysis process.

(1) Comply with mitigation measures for ground disturbing operations within noxious weed infested areas which are generally recommended by the Forest or District Weed Management Specialist and approved by the responsible Forest Officer.

(2) Select noxious weed-free project construction staging areas.

(3) Maintain as much microhabitat for desirable vegetation as feasible in areas that will have ground disturbance to help suppress noxious weeds. Minimize the removal of trees and other roadside vegetation during construction, reconstruction, and maintenance, particularly on southerly aspects, except when removal is required for public safety.

(4) Re-establish vegetation (native where practical) on bare ground caused by ground-disturbing activities to minimize noxious weed spread. Guidelines to consider include:

(a) Revegetate disturbed soil in a manner that optimizes plant establishment for that specific site, unless ongoing disturbance at the site will prevent noxious weed establishment or spread. Monitor and re-treat as needed until site is successfully revegetated according to project standards.

Exceptions to this mitigation measure should require monitoring and treatment of invading noxious weeds. Exceptions include:

Grading and blading of travel ways, borrow ditches, rights-of-way, and drainage ways on system roads that are routinely maintained.

Areas where management objectives would be adversely affected by seeding grass species, that is: reforestation plantations.

(b) Weed seed free topsoil should be stockpiled and replaced on disturbed areas such as road embankments, cuts, fills, and shoulders; gravel pits; skid trails; landings; staging areas; and so forth, where practical.

(c) Replant as soon as practical after the disturbance activity to take advantage of the seedbed and to establish desirable species before the arrival of invading noxious weeds. Use local seeding recommendations. To avoid weed contaminated seed, each lot shall be tested by a certified seed laboratory against the State Noxious Weed List and documentation of seed inspection test provided for.

(d) Use local seeding guidelines for detailed procedures and appropriate mixes. If the risk for invasion by noxious weeds is high, use aggressive, early season species. If the risk is low, use a more diverse mixture of native species that may take longer to establish. Include natives, pioneer species, and/or nurse crops. Select for low nutrient demanding species to reduce the need for fertilization. Monitor seeded sites. Spot re-seed as needed.

(5) Restoration practices for disturbed areas should be based on local prescriptions.

(6) Use certified weed-seed free straw and mulch on road stabilization and erosion control projects.

(7) Eliminate the movement of existing and new noxious weed species caused by moving infested gravel and fill material.

(a) Consider the potential for moving noxious weeds when establishing new material sources on sites where noxious weeds are present, and take necessary corrective action.

(b) Active gravel and borrow sources should be inspected and determined to be noxious weed free before use. A source supporting noxious weeds should be considered for closure until it is weed free.

c. Roads and Road Work. Minimize roadside sources of noxious weed seed that could be transported to other areas, and maximize effectiveness of weed control.

(1) Ranger District noxious weed prevention and control programs should include a monitoring plan for annual inspection of system roads and rights-of-way for invasion of noxious weeds. If noxious weeds become established, inventory and schedule for treatment.

(2) Schedule and coordinate blading or pulling of noxious weed-infested roadsides or ditches with the Forest or District Weed Management Specialist to ensure that appropriate mitigation measures are applied. Coordinate with a weed management specialist before blading or pulling roadsides and ditches infested with noxious weeds that are on the routine maintenance schedule.

(3) When necessary to blade noxious weed infested roadsides or ditches, schedule work for spring or early summer prior to the seed-set stage or later in the fall after seeds have fallen. Minimize surface disturbance and isolate bladed material to the infested site. (Also see item b. Ground Disturbing Activities above).

d. Reclamation/Restoration. Reduce noxious weed establishment in obliteration/reclamation projects. Treat noxious weeds in obliteration and reclamation projects before roads are made undriveable. Monitor and retreat as necessary. (Also see item b. Ground Disturbing Activities above).

e. Public Use. Minimize transport and establishment of noxious weeds on National Forest System lands by considering these preventive measures:

(1) Treat noxious weeds at trailheads, boat launches, outfitter and public campsites, airstrips, and roads leading to trailheads.

(2) Close infestations of noxious weeds to camping until noxious weeds have been eradicated.

(3) Inspect campgrounds, trailheads, and similar areas that are open to public vehicle use and consider as high-risk areas. Inspect annually for invasion of noxious weeds. Include established infestations in strategies for eradication.

(4) Remove seed sources that could be picked up by passing vehicles to limit seed transport. (Also see item b. Ground Disturbing Activities above).

f. Noxious weed awareness and prevention efforts.

(1) Use education programs to increase noxious weed awareness and prevent noxious weed spread by Forest users.

(2) Post and enforce the statewide Noxious Weed Hay, Straw, and Mulch Closure Order.

(3) Post pictures and descriptions of noxious weeds at National Forest System trailheads and at roadsides in noxious weed areas to inform recreationists of noxious weed presence and dangers of spreading.

(4) Post prevention practices at National Forest System trailheads and at roadsides in noxious weed areas. Recommended prevention practices include:

(a) Pack and saddle stock should be fed only weed-seed free feed for several days prior to traveling off roads in the Forest and should be brushed to remove any noxious weed seed.

(b) Stock should be tied and held in the backcountry in such a way as to minimize soil disturbance and avoid loss of native/desirable vegetation.

(c) Motorized trail users should inspect and clean their vehicles of noxious weeds and their seeds prior to using National Forest System lands.

(5) Post notices in publicly accessible noxious weed treatment areas where and when there is a likelihood of contact with herbicide-treated- vegetation.

g. Archeological Excavations. Reduce noxious weed establishment and spread at archeological excavations. Archeological excavation areas are considered as high-risk ground disturbing areas and should be inspected for invasion of noxious weeds. If noxious weeds become established, they should be inventoried and scheduled for treatment. (Also see item b. Ground Disturbing Activities above).

h. Wildlife and Fisheries. Ensure noxious weed prevention and control are considered in management of wildlife and fisheries. Forest noxious weed prevention and control programs should include a monitoring plan for inventory and annual inspection of areas where wildlife concentrate in the winter and spring, which results in overuse and/or soil scarification. Inventory and schedule for treatment noxious weeds when found. (Also see item b. Ground Disturbing Activities above).

i. Domestic Grazing Activities. Ensure noxious weed prevention and control are considered in management of all grazing allotments. Consider the following:

(1) Annual Operating Instructions for every grazing allotment should include noxious weed prevention monitoring and reporting direction, and provisions for annual inspection of areas where livestock concentrate, which results in overuse and/or soil scarification. If noxious weeds become established, they should be inventoried and scheduled for treatment.

(2) For each grazing allotment containing noxious weed infestations, include direction in the Annual Operating Instructions (AOI) for prevention and control of noxious weeds. Items to be addressed in the AOI might include: season of use, exclusion, minimizing ground disturbance, noxious weed seed transportation, maintaining healthy vegetation, control methods, revegetation, monitoring, reporting, and education.

Include ways to minimize ground disturbance and bare soil caused by livestock operations (for example: salt licks, watering sites, yarding/loafing areas, corrals, and other heavy use areas) in Allotment Management Plans (AMPs) and/or Annual Operating Instructions.

Minimize transport of noxious weed seed into and within allotments by considering the following:

(a) Avoid driving, walking, riding, and/or herding through noxious weed infestations.

(b) Entry units grazed by livestock transported onto the Forest from noxious weed-infested areas should be inspected annually for new noxious weeds. If noxious weeds become established, they should be inventoried and scheduled for treatment.

(5) Maintain healthy desirable vegetation that is resistant to noxious weed establishment by considering the following:

(a) Manage forage utilization to maintain the vigor of desirable plant species as described in the Allotment Management Plan.

(b) Minimize and/or exclude grazing on restoration areas until vegetation is well established.

(6) Promote noxious weed awareness and prevention efforts among livestock permittees by considering the following:

(a) Use education programs and/or Annual Operating Instruction direction to increase noxious weed awareness and prevent noxious weed spread by permittees' livestock and/or management activities.

(b) Encourage permittees who are certified herbicide applicators to participate in allotment and Cooperative Weed Management Area noxious weed control programs. (Also see item b. Ground Disturbing Activities above).

j. Forest Management. Minimize the creation of sites suitable for noxious weed establishment during timber harvest by considering the following:

(1) Avoid driving, walking, skidding, landing, and/or hauling through noxious weeds.

(2) Minimize soil disturbance during forest management operations by considering winter skidding; broadcast burning over pile burning; smaller slash piles and burning under conditions that minimize heat transfer to the soil; minimizing fire line construction; seeding skid trails, landings, and other disturbed sites.

(3) Monitor for noxious weeds after sale activity and treat noxious weeds as needed.

(4) Where logging activity on planned or existing timber sales may contribute to the encroachment of noxious weeds, use Sale Area Improvement and K-V collections to control or prevent the encroachment of noxious weeds within sale areas as provided for in FSM

2477. Enter planned expenditure of K-V funds for noxious weed control on Development and Budget System Plan. (Also see item b. Ground Disturbing Activities above).

k. Mining, Mineral, Oil and Gas. Minimize noxious weed establishment in mining operations and reclamation by considering the following:

(1) Retain sufficient bonding until an appropriate percent of the potential vegetation ground cover, as determined by the responsible Forest Officer, for the site is reestablished.

(2) Mining and mineral exploration areas are considered as high-risk areas and should be inspected for invasion of noxious weeds. If noxious weeds become established, they should be inventoried and scheduled for treatment. (Also see item b. Ground Disturbing Activities above).

l. Soil and Watershed Improvement. Integrate noxious weed prevention and management in all soil and watershed, and stream restoration projects. Forest noxious weed prevention and control programs should include a monitoring plan for early detection of noxious weed spread or establishment in riparian areas, particularly from existing infestations and previously eradicated sites. New infestations should be treated for eradication before they become well established. (Also see item b. Ground Disturbing Activities above).

m. Special Use Permits and Easements. Reduce noxious weed establishment and spread in special use permits and easements by considering the following:

(1) Holders of special use permits and easements are responsible for the prevention and control of noxious weeds on the area authorized when prescribed by the Forest Service.

(2) Require noxious weed prevention and control requirements in Operating and Maintenance Plans when authorized activities present a high risk for invasion by noxious weeds or the location of the activity is vulnerable to invasion by noxious weeds.

n. Wildfire and Prescribed Fire Operations. Mitigate and reduce noxious weed spread during wildfire and prescribed fire operations by considering the following:

(1) Increase noxious weed awareness among fire personnel. Include noxious weed risk factors and noxious weed prevention considerations in the Resource Coordinator duties on Incident Overhead Teams and Fire Rehabilitation Teams.

(2) Where practical and timely, establish fire camps, vehicle and crew staging areas, helibases, helispots, cargo and net loading areas, and airstrips in noxious weed-free areas.

(3) Assign a local Weed Specialist Resource Advisor to the Incident Command Team when the wildfire or control operation occurs in or near a noxious weed area.

(4) When noxious weed infested areas are used for fire operations, implement appropriate mitigation measures, as determined by the Weed Specialist Resource Advisor. Identify high-risk noxious weed infestations in areas of fire operations, and avoid when possible.

(5) All vehicles sent off Forest for fire assistance in noxious weed areas should be cleaned before returning to home units.

(6) Emphasize Minimal Impact Suppression Tactics (MIST) to reduce soil and vegetation disturbance. Minimize fire and dozer line.

(7) Avoid or minimize all types of travel through noxious weed areas.

(8) Avoid ignition and burning in noxious weed areas, unless it is part of a noxious weed control strategy.

(9) Avoid ignition and burning in areas with a high risk for invasion of noxious weeds.

(10) Unplanned burning of noxious weed areas might require post treatment of noxious weed infestations.

(11) Utilize noxious weed-free helibases and helispots for aerial ignition projects.

(12) Minimize fireline and soil disturbance and:

(a) Encourage desirable vegetation during fire rehabilitation activities.

(b) Seed the entire burn, all cat lines, and severely disturbed areas when there is a high risk of noxious weed spread or invasion, and such action is recommended by the local Weed Specialist Resource Advisor and approved by the Responsible Forest Officer. Hand seed catlines and severely disturbed areas.

(c) Prioritize treatment of noxious weeds on fire access roads as part of rehabilitation plan to reduce noxious weed spread into burned areas.

(13) Apply for restoration funding for noxious weed infestations as determined by Burned Area Rehabilitation teams. (Also see item b. Ground Disturbing Activities above).

o. Noxious Weed Program Continuity. Ensure continuity in noxious weed management programs. Each Forest should have access to a Weed Specialist who is trained and proficient in noxious weed management.

2. Closure Orders. Product certification shall be accepted from any State Department of Agriculture, County Agriculture Officer, or their authorized agents, on National Forest System lands for the certified hay, feed, straw, and mulch closure orders. Pelletized feed does not fall under the hay products closure orders.

2083 - INFORMATION COLLECTION AND REPORTING

Inventory noxious weeds and plot their location on a map(s). Update the inventory as needed. Coordinate information with local/county weed boards. Inventory information can be supplemental to post-treatment evaluation as described in FSM 2155.1. The inventory and summary shall be by weed species and acreage infested. Do not duplicate the acreage count where more than one weed species occurs on the same site.

Order Number: 04-00-097

UNITED STATES DEPARTMENT OF AGRICULTURE
FOREST SERVICE
INTERMOUNTAIN REGION
ALL NATIONAL FORESTS

Weed Free Hay Order

PROHIBITIONS:

Pursuant to 36 CFR 261.50 (a) and (b), and 36 CFR 261.58(t), a Regional Forester may prohibit possessing, storing, or transporting any part of a tree or other plant, as specified in the Order. By this Order, the following acts are prohibited on the area, roads, and trails as described in this order, all within National Forest System Lands within the Intermountain Region until further notice:

1. Possessing, storing, or transporting, non-pelletized hay, straw or mulch on National Forest System Lands without having each individual bale or container tagged or marked as weed free, or having original and current evidence of weed free certification documentation present. All markings must meet the State and/or County standards for certification as weed free.

EXEMPTIONS:

Pursuant to 36 CFR 261.50 (e) the following persons are exempt from this order:

1. Persons with a permit specifically authorizing them from the effect of this Order.
2. Any member of an organized rescue force in the performance of an official duty.

AREA DESCRIBED:

All National Forest System Lands within the boundaries of the Intermountain Region that include the Ashley, Boise, Bridger-Teton, Caribou-Targhee, Dixie, Fishlake, Humboldt-Toiyabe, Manti-Lasal, Payette, Salmon-Challis, Sawtooth, Uinta and Wasatch-Cache National Forests.

PURPOSE:

The above prohibition is necessary to prevent the spread of noxious weeds into a vulnerable ecosystem on National Forest System lands.

Salmon — Challis
National Forest
FEB 14 2003
RECEIVED

IMPLEMENTATION:

1. This Order will be in effect when signed and shall remain in effect until further notice.
2. Any violation of this prohibition is punishable by a fine of not more than $5,000 for an individual or $10,000, for an organization, and/or imprisonment for not more than six (6) months. [Title 16 USC 551, Title 18 USC 3571(b)(6), Title 18 USC 3581 (b)(7)].
3. This Order supersedes any previous orders prohibiting the same, or similar, acts in the above-described areas.

Done at Ogden, Utah this 14th day of February, 2003.

JACK G. TROYER
Regional Forester
Intermountain Region

Order Number: 04-00-097

Appendix B: *Noxious Weed Watch and EDRR List*

Table B1. Salmon-Challis National Forest Watch List

Common Name	Scientific Name	Occurs in Butte County	Occurs in Custer County	Occurs in Lemhi County	Occurs in Adjacent Counties	States in which Listed as Noxious
Buffalobur	*Solanum rostratum*	Yes	No	No	Yes	ID, OR, WA
Common Burdock	*Arctium minus*	Yes	?	Yes	Yes	WY, CO
Common Crupina	*Crupina vulgaris*	No	No	No	Yes	ID, MT, CO, NV, OR, WA
Curlyleaf Pondweed	*Potamgeton crispus*	No	No	No	Yes	ID, WA
Dame's Rocket	*Hesperis matronalis*	?	?	Yes	Yes	CO
Diffuse Knapweed	*Centaurea diffusa*	Yes	Yes	Yes	Yes	ID, MT, WY, CO, UT, NV, OR, WA
Dyer's Woad	*Isatis tinctoria*	Yes	Yes	Yes	Yes	ID, MT, WY, UT, NV, OR
Eurasian Water Milfoil	*Myriophyllum spicatum*	No	No	No	Yes	ID, MT, CO, NV, OR, WA
Field bindweed	*Convolvulus arvensis*	Yes	Yes	Yes	Yes	ID, MT, WY, UT, OR, WA
Hieracium complex	*Hieracium spp.*	No	No	No	Yes	ID, MT, CO, OR, WA
Johnsongrass	*Sorghum halepense*	No	No	No	Yes	ID, UT, NV, OR, WA
Jointed Goatgrass	*Aegilops cylindrica*	No	No	No	Yes	ID, CO, OR, WA
Matgrass	*Nardus stricta*	No	Yes	No	Yes	ID, OR
Meadow Knapweed	*Centaurea debeauxii*	No	No	No	Yes	ID, CO, OR
Mediterranean Sage	*Salvia aethiopis*	No	No	No	Yes	ID, CO, NV, OR, WA
Millet	*Milium vernale*	No	No	No	Yes	ID
Perennial Sowthistle	*Sonchus arvensis*	No	No	Yes	Yes	ID, WY, CO, NV
Plumeless Thistle	*Carduus acanthoides*	Yes	No	No	Yes	ID, WY, CO, OR, WA
Poison Hemlock	*Conium maculatum*	Yes	No	No	Yes	ID, NV, OR, WA
Purple Loosestrife	*Lythrum salicaria*	No	Yes	Yes	Yes	ID, MT, WY, CO, UT, NV, OR, WA
Russian Knapweed	*Acroptilon repens*	Yes	Yes	Yes	Yes	ID, MT, WY, CO, UT, NV, OR, WA
Scotch Broom	*Cytisus scoparius*	No	No	No	Yes	ID, MT, OR, WA
Scotch Thistle	*Onopordium acanthum*	Yes	Yes	Yes	Yes	ID, WY, CO, UT, NV, OR, WA
Small Bugloss	*Anchusa arvensis*	No	No	No	Yes	ID, WA
Syrian Beancaper	*Zygophyllum fabago*	Yes	No	No	Yes	ID, NV, OR, WA
Tall Buttercup	*Ranunculus acris*	No	Yes	Yes	Yes	MT
Tansy Ragwort	*Senecio jacobaea*	No	Yes	No	Yes	ID, MT, CO, OR, WA
Vipers Bugloss	*Echium vulgare*	No	Yes	No	Yes	ID, MT, WA
White Bryony	*Bryonia alba*	Yes	Yes	No	Yes	ID, WA
Yellow Flag Iris	*Iris pseudacoris*	No	No	No	Yes	MT, OR, WA

Common Name	Scientific Name	Occurs in Butte County	Occurs in Custer County	Occurs in Lemhi County	Occurs in Adjacent Counties	States in which Listed as Noxious
Yellow Starthistle	*Centauria solstitialis*	No	No	No	Yes	ID, MT, CO, UT, NV, OR, WA

Table B2. Idaho Statewide EDRR List

Common Name	Scientific Name	NRCS Plant Code
Brazilian Elodea	*Egeria densa*	EDGE
Common/European Frogbit	*Hydrcharis morsus-ranae*	HYMO6
Fanwort	*Cobomba caroliniana*	CACA
Feathered Mosquito Fern	*Azolla pinnata*	AZPI
Giant Hogweed	*Heracleum mantegazzianum*	HEMA17
Giant Salvinia	*Salvinia molesta*	SAMO5
Hydrilla	*Hydrilla verticillata*	HYVE3
Policeman's Helmet	*Impatiens glandulifera*	IMGL
Squarrose Knapweed	*Centaurea triumfetti*	CETR8/CIVIS2
Syrian Beancaper	*Zygophyllum fabago*	ZYFA
Tall Hawkweed	*Hieracium piloselloides*	HIPI2
Variable-Leaf-Milfoil	*Myriophyllum heterophyllum*	MYHE2
Water Chestnut	*Trapa natans*	TRNA
Yellow Devil Hawkweed	*Hieracium glomeratum*	HIGL3
Yellow Floating Heart	*Nymphoides peltata*	NYPE

Table B3. Idaho Statewide Control List

Common Name	Scientific Name	NRCS Plant Code
Black Henbane	*Hyoscyamus niger*	HYNI
Bohemian Knotweed	*Polygonum bohemicum*	POBO10
Buffalobur	*Solanum rostratum*	SORO
Common Crupina	*Crupina vulgaris*	CRVU2
Common Reed (Phragmites)	*Phragmites australis*	PHAU7
Dyer's Woad	*Isatis Tinctoria*	ISTI
Eurasian Watermilfoil	*Myriophyllum spicatum*	MYSP2
Giant Knotweed	*Polygonum sachalinense*	POSA4
Japanese Knotweed	*Polygonum cuspidatum*	POCU6
Johnsongrass	*Sorghum halepense*	SOHA
Matgrass	*Nardus stricta*	NAST3
Meadow Knapweed	*Centaurea debeauxii*	CEDE5
Mediterranean Sage	*Salvia aethiopis*	SAAE
Musk Thistle	*Carduus nutans*	CANU4
Orange Hawkweed	*Hieracium aurantiacum*	HIAU
Parrotfeather Milfoil	*Myriophyllum aquaticum*	MYAQ2
Perennial Sowthistle	*Sonchus arvensis*	SOAR2

Common Name	Scientific Name	NRCS Plant Code
Russian Knapweed	*Acroptilon repens*	ACRE3
Scotch Broom	*Cytisus scoparius*	CYSC4
Small Bugloss	*Anchusa arvensis*	ANAR16
Vipers Bugloss	*Echium vulgare*	ECVU
Yellow Hawkweed	*Hieracium caespitosum*	HICA10

Table B4. Idaho Statewide Containment List

Common Name	Scientific Name	NRCS Plant Code
Canada Thistle	*Cirsium arvense*	CIAR4
Curlyleaf Pondweed	*Potamogeton crispus*	POCR3
Dalmatian Toadflax	*Linaria dalmatica ssp. dalmatica*	LIDAD
Diffuse Knapweed	*Centaurea diffusa*	CEDI3
Field Bindweed	*Convolvulus arvensis*	COAR4
Flowering Rush	*Butomus umbelltus*	BUUM
Hoary Alyssum	*Berteroa incana*	BEIN2
Houndstongue	*Cynoglossum officinale*	CYOF
Jointed Goatgrass	*Aegilpos cylindrica*	AECY
Leafy Spurge	*Euphorbia esula*	EUES
Milium	*Milium vernale*	MIVE3
Oxeye Daisy	*Leucanthemum vulgare*	LEVU
Perennial Pepperweed	*Lepidium latifolium*	LELA2
Plumeless Thistle	*Carduus acanthoides*	CAAC
Poison Hemlock	*Conium maculatum*	COMA2
Puncturevine	*Tribulus terrestris*	TRTE
Purple Loosestrife	*Lythrum salicaria*	LYSA2
Rush Skeletonweed	*Chondrilla juncea*	CHJU
Saltcedar	*Tamarix sp.*	TAMAR2
Scotch Thistle	*Onopordum acanthium*	ONAC
Spotted Knapweed	*Centaurea stoebe*	CEMA4/CEBI2/CESTM
Tansy Ragwort	*Senecio jacobaea*	SEJA
White Bryony	*Bryonia alba*	BRAL4
Whitetop	*Cardaria draba*	CADR
Yellow Flag Iris	*Iris pseudacorus*	IRPS
Yellow Starthistle	*Centaurea solstitialis*	CESO3
Yellow Toadflax	*Linaria vulgaris*	LIVU2

APPENDIX C: ADJUVANTS

SPRAY ADJUVANTS

Postemergence herbicide effectiveness depends on spray droplet retention and herbicide absorption by weed foliage. Adjuvants and spray water quality influence postemergent herbicide efficacy.[1]

Adjuvants

Adjuvants are specially designed chemical solutions that are added to an herbicide solution to improve the performance of the total spray mixture. Adjuvants are not regulated by the EPA in the same way that pesticides are. The EPA does not register or approve the labeling of spray adjuvants, although the California Department of Pesticide Regulation (DPR) does require the registration of those adjuvants that are considered to increase the action of the pesticide with which it is used. Field testing is generally completed by the adjuvant manufacturer.[2] Labels accompanying adjuvants describe their properties and prescribe use rates. Information on types of adjuvants to use can also be found on herbicide labels and in publications by university extension services.[3]

"Activator" adjuvants enhance activity of an herbicide's active ingredient, while "special purpose or utility modifier" adjuvants offset common problems occurring during application, including poor water quality or foam produced during agitation of the spray mixture.[4] Many adjuvants have properties that place them on a continuum between these two definitions and function both as activators and utility modifiers. Adjuvants used on the SCNF are identified in Table C2.

Special purpose or utility adjuvants are used to offset or correct certain conditions associated with mixing and application such as impurities in the spray solution, extreme pH levels, and drift. These adjuvants include acidifiers, buffering agents, water conditioners, anti-foaming agents, compatibility agents, and drift control agents. Acidifiers enhance absorption of weak acid type herbicides. Drift reduction agents will generally increase the average droplet size. Defoamers reduce foaming that occurs during agitation of the spray mixture. Colorants or dyes help applicators determine what area was treated. This helps to prevent skips and overlaps. They reduce the chance of human exposure to recently treated vegetation.[5]

Surfactants (surface active agents) are a broad category of activator adjuvants designed to improve or facilitate the dispersing/emulsifying, absorbing, spreading, sticking and/or pest-penetrating properties of the spray mixture. Pure water will stand as a droplet, with a small area of contact with the waxy leaf surface. Water droplets containing a surfactant will spread in a thin layer over a waxy leaf surface.[6]

Because postemergence herbicide effectiveness is greatly influenced by plant factors such as age, size and the growing conditions encountered before application, herbicide performance can vary. A way to minimize the variations in postemergence herbicide performance is to use an adjuvant or surfactant in the spray solution. Adjuvants, specifically surfactants, generally improve the effectiveness of

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[1] Custer NF Weeds EIS, J-1
[2] Bakke 2007: 2
[3] Including but not limited to: Idaho's Noxious Weeds 2011 Control Guidelines, North Dakota Weed Control Handbook, and Pacific Northwest Weed Management Handbook.
[4] Bakke 2007: 2
[5] Bakke 2007: 5
[6] Bakke 2007: 2

postemergence herbicides. Typically, surfactants are not added to herbicides that are soil applied (pre-emergence).[7] Surfactants used on the SCNF include non-ionic surfactants, methylated or ethylated vegetable oils, nitrogen sources, and organo-silicone/silicone surfactants.

Non-ionic surfactants are all-purpose surfactants comprised of linear or nonyl-phenol alcohols and/or fatty acids. This class of surfactant reduces surface tension and improves spreading, sticking and herbicide uptake.[8] Often, non-ionic surfactants will have additional additive properties, as described on their label.

Methylated or Ethylated vegetable oils are produced by reacting fatty acids from seed oils (corn, soybean, sunflower, and canola) with an alcohol to form esters. The methyl or ethyl esters produced by this reaction are combined with surfactants/emulsifiers to form esterified seed oil. These surfactants reduce surface tension and improve herbicide uptake by improving herbicide distribution on the leaf surface.[9] Adverse environmental conditions such as low humidity, hot weather, lack of rain, drought-stressed weeds, or weeds not actively growing due to some environmental stress favor the use of MSO. The North Dakota State University Weed Control Guide suggests that these oils are more effective than non-ionic surfactants as an adjuvant to postemergence herbicides. [10]

Nitrogen sources typically consist of premixed combinations of various forms of nitrogen and surfactants. They generally are used with herbicides recommending the addition of ammonium sulfate or 28 percent nitrogen. These surfactants reduce surface tension and improve leaf surface spreading.[11] They are used primarily with broadleaf herbicides. Fertilizers containing ammonium nitrogen have increased the effectiveness of herbicides like glyphosate, and 2, 4-D amine. Fertilizer applied with other herbicides may reduce weed control or cause crop injury. Some fertilizers enhance non-target plant growth to stimulate competition from weed species re-establishing. Fertilizers should be used with herbicides only as indicated on the label or where experience has proven acceptability. [12]

Organo-silicones and silicone surfactants are two types of nonionic surfactants. Organo-silicone surfactants drastically reduce surface tension to the point where the herbicide droplets thin and coalesce to form a thin layer on the leaf surface (known as "superspreading"). In addition, this class of surfactant provides improved effectiveness through maximum rainfastness.[13]

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[7] ND Weed Control Guide 2011: 72
[8] Custer NF Weeds EIS J-1
[9] Custer NF Weeds EIS J-1
[10] ND Weed Control Guide 2011: 72
[11] Miller and Westra 1998
[12] Custer NF Weeds EIS, J-1
[13] TNC 8.11

Table C1. Adjuvant Type by Herbicide

Herbicide (Examples of common brands)	Recommended[14] adjuvant types
2,4-D (many brands)	NIS, fertilizer, COC
Aminopyralid (Milestone)	NIS
Chlorsulfuron (Escort)	NIS, seed oil, organo-silicone
Clopyralid (Transline)	NIS, COC
Dicamba (Banvel)	Any as allowed by label
Glyphosate (RoundUp Original)	None needed (contains surfactant)
Glyphosate (Rodeo)	NIS
Imazapic (Plateau)	NIS, seed oil, NIS, organo-silicone
Metsulfuron methyl (Telar)	NIS, seed oil, organo-silicone
Picloram (Tordon 22K)	None needed but can add as per surfactant manufacturer's label

[14] Recommended by Idaho Noxious Weed Guidelines 2011, PNW, and product labels.

Table C2: Adjuvant Type, Class, Product, and Product Manufacturer[15]

Adjuvant Type	Category	Product Name[16]	Product Manufacturer	Principal Functioning Agents	Use Range	Comments
Activator	Non-ionic surfactant (NIS)	Activator 90	Loveland	Alkylphenol ethoxylate, alcohol ethoxylate and tall oil fatty acid	0.125-0.5%	Low foam, biodegradable, non-flammable
		R-11	Wilbur-Ellis	Alkylphenol ethoxylate, butyl alcohol, dimethylpolysiloxane	0.063-1%	Spreader, activator
		Spreader 90	Loveland	Alkylpolyethoxy ethers and ethoxylated derivatives	8-64 oz/100 gal	
		Super Spread 90	Wilbur-Ellis	Alkyl aryl polyoxyethylene glycols and free fatty acids	0.25-0.5%	Spreader
Activator	Basic Blend *and* Methylated or Ethylated Vegetable Oil *and* Nonionic Surfactant *and* Nitrogen Source	Renegade	Wilbur-Ellis	Modified vegetable oil, ammonium solution, nonionic surfactant	1-2.5%	Unique blend, high load of Nitrogen
Activator	Methylated or Ethylated Vegetable Oil	MSO with Leci-Tech	Loveland	Methylated seed oils plus emulsifying surfactants	1-2 pt/A	
Activator	Methylated or Ethylated Vegetable Oil *and* Organo-Silicone Surfactant	Syl-tac	Wilbur-Ellis	Organosilicone/ modified vegetable seed oil	0.125-0.375%	
		Phase	Loveland	Methylated seed oil plus organosilicone surfactant	0.125-0.5%	
Activator *and* Utility Modifier	Nonionic Surfactant *and* Buffering Agent or Acidifier	Super Spread 7000	Wilbur-Ellis	Alkyl aryl polyoxyethylene,ethoxylated alcohols, aliphatic polycarboxylate	0.25-4 pt/100 gal	

[15] From http://www.herbicide-adjuvants.com/. Accessed 12/14/2011.

[16] Products currently stocked by the SCNF. For information on the process for adding adjuvants to the list, see <section on adaptive management>.

Adjuvant Type	Category	Product Name[16]	Product Manufacturer	Principal Functioning Agents	Use Range	Comments
Utility Modifier	Colorant	Hi-Light Bullseye	Becker-Underwood Milliken Chemical	Proprietary blue colorant Proprietary blue colorant	6-32 oz/100 gal 0.5 oz/gal	
Utility Modifier	Water Conditioning Agent *and* Buffering Agent or Acidifier	Bronc Max	Wilbur-Ellis	AMS/ammonium alkyl aryl sulfonates, polycarboxiylic acid	0.125-1%	AMS replacement
Utility Modifier	Water Conditioning Agent	Choice Weather Master	Loveland	Blend of salts of polyacrylic, hydroxy carboxylic, propionic acids, phosphate ester, ammonium sulfate	0.25-0.5%	AMS, water conditioner

Toxicity of Adjuvants

"Normal" environmental exposure levels of surfactants and emulsifiers to humans, however, would appear to be negligible based on the extremely high dosages that are typically necessary to cause toxic responses in mammals (Parr 1982).[17] Testing of LD50s on a range of wildlife shows that while some adjuvants are toxic to wildlife at small concentrations, others are considered "practically nontoxic."

LC50 Classification[18]

<1 mg/l HT (Highly Toxic)

1-10 mg/l MT (Moderately Toxic)

10-100 mg/l ST (Slightly Toxic)

100, 1,000 mg/l PN (Practically Nontoxic)

>1,000 mg/l IH (Insignificant Hazard)

Table C3. Standard Acute Aquatic Species Toxicity Testing Results[19]

Name	Rainbow Trout 96-hour LC_{50}	Bluegill 96-hour LC_{50}	Daphnia 48-hour EC_{50}	Toxicity Level (done by MM)
Ethoxylated fatty amines				
Alkylphenol ethoxylate-based wetter/spreaders				
R-11®	3.8 – 6 mg/L NOEC 1 mg/L	4.2 mg/L NOEC 1 mg/L	5.7 - 19 mg/L NOEC (population size) 0.25 mg/L	Moderately toxic to fish
Activator 90	NA 1.4[20]	Guppy (*Poecilia reticulata*?) 12.7 mg/L, NOEC 5.8 mg/L	5.2 mg/L (24 hour) NOEC 1 mg/L	MT[21]
Silicone-based wetter/spreaders				

[17] TNC Weed Control Methods Handbook 8.8

[18] Categories from http://www.mass.gov/agr/pesticides/aquatic/docs/Adjuvants.pdf

[19] Bakke 2007: 38

[20] http://www.mass.gov/agr/pesticides/aquatic/

Name	Rainbow Trout 96-hour LC_{50}	Bluegill 96-hour LC_{50}	Daphnia 48-hour EC_{50}	Toxicity Level (done by MM)
Sylgard® 309	NA	Fathead minnow >4.6 mg/L	22.9 to >41 mg/L (zero population growth con'c = 18 mg/L)	
Dyne-Amic®	NA	26.9 mg/L	NA	ST
Sticker/Spreaders				
Oils				
MSO®	NA	NA	NA	
Hasten®	74 mg/L	NA	>50 mg/L	Slightly toxic to trout
Blends of vegetable oils and silicone-based surfactants				
Syl-tac™	>5 mg/L	NA	>5 mg/L	MT-ST
Phase™	NA	NA	NA	