NORTH FORK NOXIOUS WEED TREATMENT

ENVIRONMENTAL ASSESSMENT

Responsible Agency: USDA Forest Service

Responsible Official: Larry Dawson
Forest Supervisor
Clearwater National Forest
12730 Highway 12
Orofino, ID 83544

For Further Information: Suzanne Qualmann
1700 Highway 6
Potlatch, ID 83855
(208) 875-1131

Stewart Wilson
12730 Highway 12
Orofino, ID 83544
(208) 476-8221

The U.S. Department of Agriculture (USDA) prohibits discrimination in its programs on the basis of race, national origin, sex, religion, age, disability, political beliefs, sexual orientation, or marital or family status. (Not all prohibited bases apply to all programs. Persons with disabilities who require alternative means for communication of program information (Braille, large print, audio tape, etc.) should contact USDA's TARGET Center at 202/720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue SW, Washington, DC 20250-9410, or call 202/720-5964 (voice or TDD). USDA Forest Service is an equal opportunity provider and employer.

TABLE OF CONTENTS

Chapter 1 – Purpose and Need for Action **1**

Introduction 1

Purpose and Need for Action 2

Project Objectives 3

Table 1: Weed Management Objectives 4

Proposed Action 5

Program Management Direction 6

Project Management Direction 7

Scope of the Analysis 8

Decisions to be Made 9

Chapter 2 – Alternatives **11**

Introduction 11

Public Involvement 11

Issue Resolution 11

Issues 16

Methods Available for Noxious Weed Control 17

Alternatives Considered in Detail 19

Design Criteria Common to All Alternatives 19

Table 2. Inventory Summary of Known Noxious Weeds 22

Table 3. Known Noxious Weed Site Descriptions and Proposed Treatments 23

Alternative 1: No Action 26

Alternative 2: Mechanical, Biological and Cultural Treatments (No Chemicals) 26

Alternative 3: Mechanical, Biological, Cultural and Chemical Treatments (Proposed Action) 26

Design Criteria Specific to Alternatives 1 & 3 28

Table 4. RHCA Restrictions 29

Alternatives Considered but Dropped 29

Table 5: Comparison of Activities and Issues by Alternative 30

Chapter 3 – Affected Environment and Environmental Consequences **31**

Introduction 31

Existing Weed Infestations 31

Vegetative Community Diversity 31

Table 6. Forest Cover Types 31

Table 7. Broad scale cover types in the project area and their susceptibility to invasion by 14 weed species 33

Threatened, Endangered and Sensitive Plants (TES) 36

Soils, Water Quality and Aquatic Organisms 40

Table 8. Herbicide Characteristics in Soils 43

Table 9: Designated Uses (State Water Quality Standards) of specific waters in analysis area and their stream status (IDEQ 1998; 2002; 2003 draft; USDI-EPA 2000). 47

Table 10: Acres by Watershed 49

Table 11. Potential Movement of Herbicide to Water Sources (BPA 2004). 56

Table 12: Toxic Levels of Herbicides to Fish (Syracuse: 1999:2001:2003; CDMS 2003 www.cdms.net ; Rice 1990, BPA 2003 www.efw.bpa-gov ; USDI-EPA 1995, 1998) 57

Table 13. Watershed Characteristics and Average Annual Low Flow 59

Table 14. Maximum Annual Sprayable Acreage Using Each Herbicide with No Observable Effect (or equivalent). 60

Table 15: Levels of Herbicide Toxic to Aquatic Organisms Other than Fish 64

Air Quality 65

Human Resource and Human Health 65

Table 16: Acceptable Daily Intake (ADI) mg/kg/day 67

Recreation 69

Wildlife 70

Table 17. Terrestrial MIS/TES species: Their status, occurrence, & habitat within the North Fork Ranger District 72

Probable Environmental Effects That Cannot be Avoided 77

Possible Conflicts with Planning and Policies of Other Jurisdictions 77

Irreversible and Irretrievable Commitment of Resources 77

Appendix A – List of Preparers **A-1**

Appendix B – References **B-1**

Appendix C – Map Appendix **C-1**

Appendix D – Roadside Vegetation Treatment **D-1**

Appendix E – Proposed Annual Operating Plan **E-1**

Appendix F – Herbicide Descriptions **F-1**

Appendix G – Adaptive Strategy Flow Chart **G-1**

Appendix H – Handling of Herbicides **H-1**

Appendix I – Herbicide Application Guidelines **I-1**

Appendix J – Weed Species Characteristics **J-1**

Appendix K – Determination of Predicted Success Rates for Alternatives 2 and 3 **K-1**

Appendix L – Determination of Maximum Acres Annually Treatable **L-1**

Appendix M – Best Management Practices **M-1**

CHAPTER 1 – PURPOSE AND NEED FOR ACTION

INTRODUCTION

Noxious Weed Treatment

Invasive plants affect us all. Whether you live on a farm, in the suburbs or in a city, invasive non-native plants affect your life. They pose a serious threat to native species in natural areas. Globally, non-native species are now considered by some experts to be the second most important threat to biodiversity after habitat destruction (Randall 1996: Pimm and Gilpin 1989). This chapter defines noxious weeds, explains the need to control the spread of weeds, lists objectives for controlling the spread of weeds, and describes the noxious and undesirable weeds occurring on the North Fork Ranger District of the Clearwater National Forest.

It summarizes the actions being proposed to control noxious and undesirable weed infestations within the North Fork of the Clearwater Sub-Basin ecosystem.

Roadside Vegetation Treatment

This chapter also describes roadside vegetation treatment proposals (brushing to enhance site distance) which will be analyzed as a separate project within this document. These two projects are not connected but are discussed together because of similarities in actions being proposed.

Finally, the chapter summarizes the Clearwater National Forest's Land and Management Plan (Forest Plan, 1987) and other management direction relating to noxious weed control, defines the scope of the analysis for the proposal, and outlines the scope of the decision to be made.

Noxious Weeds Defined

In *Weeds of the West* by Whitson et al. (1992), a weed is defined as "a plant that interferes with management objectives for a given area of land at a given point in time."

Noxious weeds are those plant species that have been officially designated as such by Federal, State or County officials.

The Federal Noxious Weed Act of 1974 defines a noxious weed as "a plant which is of foreign origin, is new to, or is not widely prevalent in the United States, and can directly or indirectly injure crops or other useful plants, livestock or fish and wildlife resources of the United States, or the public health" (P.L. 93-629).

The Idaho Noxious Weed Law defines a "noxious weed" as any exotic plant species that is established or that may be introduced in the State which may render land unsuitable for agriculture, forestry, livestock, wildlife, or other beneficial uses and is further designated as either a State-wide or County-wide noxious weed (Idaho Code 24 Chapter 22).

Forest Service Manual 2080 defines noxious weeds as "those plant species designated as noxious weeds by the Secretary of Agriculture or by the responsible State official. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host to serious insects or disease, and being non-native or new to or not common to the Untied States or parts thereof."

For the purposes of this EA, weeds considered noxious are those designated as noxious in the State of Idaho. Weeds from other states including Washington, Montana, Oregon or Wyoming will also be considered. This five state region was used due to the potential for these weeds to spread to and from these areas.

Both Federal and State laws define noxious weeds primarily in terms of interference with commodity uses of the land. However, the impacts of weeds on non-commodity resources such as water quality, wildlife and natural diversity are of increasing concern.

PURPOSE AND NEED FOR ACTION

Noxious Weed Treatment

On rangeland, spotted knapweed infestations can increase soil erosion in creeks and rivers. Studies done by Montana State University indicate that total water runoff from a 30 minute rain averaged 23 percent on a grass site and 36 percent on a knapweed site. On average, water runoff was 56 percent higher and sediment losses were 192 percent higher on the knapweed dominated plots (Lacey 1989). Sediment runoff yield tripled on the knapweed plots. Why does this happen? The plant physiology and ecology of knapweeds and other invaders permit them to rapidly invade new areas and out-compete native plants for light, water and nutrients. Some of the characteristics are:

- Early maturation
- Profuse reproduction by seeds
- Long life in the soil
- Seed dormancy
- Extremely long roots
- Pricks, vines and thorns that repel animals
- Survival and seed production under adverse environmental conditions

Knapweed matures early and also has very long root systems. The density of plant roots is much lower per square yard of soil than the native plant densities so much less soil is protected. Noxious and undesirable weeds have established themselves throughout the Northwest, and the North Fork subbasin is no exception. The lack of natural predators to keep them in check allows these weeds to spread rapidly into areas where their presence is not welcome.

The North Fork Ranger District has started a partnership with other landowners adjacent to National Forest lands to help control weeds; noxious weeds do not comply with ownership boundaries and thus become everyone's problem. The inability to use herbicides on National Forest lands due to the lack of a proper analysis has hampered the effectiveness of treatments conducted on all ownerships. This is one reason for pursuing this environmental analysis. The risks are for all methods of treatment; the proper treatments and the proper mitigation items need to be determined to ensure environmental protection.

Noxious and undesirable weeds are spreading across public lands at an alarming rate. According to the recent scientific assessment of the Interior Columbia Basin, invading weeds can alter ecosystem processes including productivity, decomposition, hydrology, nutrient cycling, and natural disturbance patterns such as the frequency and intensity of wildfires (Quigley and Arbelbide 1997). Changing these processes can lead to displacement of native plant species eventually impacting wildlife and plant habitat, recreational opportunities, and scenic beauty.

The spread of weeds can primarily be attributed to human activities associated with vehicles and roads (Roche and Roche 1991), contaminated livestock feed, contaminated seed, and ineffective re-vegetation practices on disturbed lands (Callihan et al. 1991). Birds and other wildlife also contribute to weed spread. While weeds most commonly become established in recreation sites, overgrazed acreages and mining areas, we need to recognize that – as the recent scientific literature describes – weeds can appear on any site including those least disturbed. For example, in the heart of the Selway-Bitterroot Wilderness Area, estimates range upwards of 40,000 acres of spotted knapweed (Asher 1998).

Vallentine (1989) explains that some of the worst current and potential noxious plant problems are caused by weed species such as the hawkweeds, the knapweeds and common tansy. The hawkweeds and knapweeds are all found within the North Fork Clearwater River subbasin and have been expanding rapidly over the last several years.

The proposed treatment of 500-3000 acres annually over the next ten years does not reflect the enormity of the noxious weed problem on the North Fork Ranger District, or Clearwater and Idaho Counties as a whole. Not every acre was inventoried; so undoubtedly, more weeds exist than are shown here.

Once a site is infested, the weed species often becomes dominant and greatly reduces the native grass and forb communities. Several researchers have shown reductions in native species of up to 90% on sites infested with knapweed (Belcher and Wilson 1989; Willard et al. 1988; FEIS Noxious Weed Management Projects, Bonners Ferry 1995).

The degradation of public land resource values due to noxious weed infestations also has eco-

nomic impacts. A study on the impact of spotted knapweed on Montana's economy (Hirsch and Leitch 1996) found that spotted knapweed infestations in wildlands there have affected wildlife-associated recreation expenditures as well as soil and water conservation benefits. Total direct impacts of knapweed infestations in forests and wildlands on Montana's economy were estimated at $3.093 million annually, or $3.95 per infested acre. While such data for Idaho does not currently exist, similar revenue losses are probable in forestland areas with heavy knapweed infestations including such areas within the North Fork Ranger District.

State laws and County ordinances require that all landowners be responsible for control of noxious weeds on their lands. The State of Idaho, along with Clearwater and Idaho Counties, has been active in noxious weed control and eradication for a number of years. These entities have noxious weed control organizations in place.

Noxious weeds may also have human health impacts which are discussed in greater detail in Chapter 3.

As the complexity of the weed issue has grown and intensified, many individuals and government agencies realize that there is a need to better respond to the noxious weed problem.

Roadside Brush Maintenance

Forest roads are generally steeper, narrower and more meandering than those used by the general public for routine travel. This is due to topography, the environment in which such roads are located, and the desire to minimize road widths. If roadside vegetation is left uncontrolled on forest road systems, it will greatly reduce already limited sight distances and decrease available road widths.

This project also proposes to control vegetation using herbicides as a follow-up treatment to mechanical brushing. The primary reason for removing forest roadside vegetation is to aid in the safe passage of the driving public. Identification of roadside maintenance needs and preservation of existing ditches and culverts are other benefits of controlling roadside vegetation.

PROJECT OBJECTIVES

Geographically, the North Fork Clearwater River and Orofino Creek drainages are a subset of the area covered by the Clearwater Basin Weed Coordinating Committee. This committee is seeking long term solutions to the problem of noxious weeds with a broad scale approach. The landscape view places specific weeds and treatment sites in context with geographic distribution of invasive plants, susceptible habitats and management feasibility. The weed management area focus which is part of the Clearwater Basin Strategy takes each drainage and puts it in context with other drainages around it so that the proper priorities can be set.

The Goals and Objectives of the North Fork Weed Partnership mesh with the Clearwater Basin Weed Management Area and are:

- Prevent the introduction, reproduction and spread of designated weeds and invasive exotic plants into and within the North Fork Weed Partnership portion of the Clearwater River Basin.
- Reduce the extent and density of established noxious weeds to a point that natural resource damage is within acceptable limits.
- Implement the most economical and effective control methods for target weeds.
- Implement an integrated management system using all appropriate available methods or a combination of methods.
- Protect the natural condition and biodiversity of the North Fork Clearwater River system by controlling or limiting the spread of aggressive, non-native plant species that displace native vegetation.
- Eliminate new invaders (weed species no previously reported in an area) before they become established.
- Reduce known and potential weed seed sources at trail heads, campgrounds, dispersed campsites, Forest Service administrative sites, grazing allotments, existing timber sales, rock quarries, wildlife forage areas (i.e. dry sites) and along main roads and trails.
- Prevent or limit the spread of established weeds into areas containing little or no infestation.

- Protect sensitive and unique habitats including research natural areas, wetlands and sensitive plant populations.
- Cooperate with other agencies, landowners and private individuals concerned with the management of weeds in the affected ecosystems.

The following management objectives and treatment priorities will be assigned to specific species and/or infestations to provide direction regarding control activities. These objectives and priorities are intended to focus resources where they are the most effective in managing weeds across the established geographic units (watersheds).

Management Objective Definitions

Eradicate – The noxious weed species is eliminated, including all viable seed and/or vegetative propagules.

Control – Seed production is prevented through the target patch and the area coverage of the wed is decreased over time. Prevent the weed species from dominating the vegetation of the area but accept low levels of the weed.

Contain – Weeds are geographically contained and are not increasing beyond the perimeter of the infestation. Treatment within established infestations may be limited but control or eradicate the weed outside of those areas.

Reduce – The density and/or rate of spread of the weed is reduced across a geographic area.

Custodial – Specific treatment for a particular plant is deferred at this time. Infestations may be treated as a result of other weed priorities. Species that are not inherently invasive, habitats that are not susceptible to invasion, or infestations beyond current technology or that result in making control, containment or reduction inherently unlikely.

The following table identifies objectives for each weed species within the North Fork Clearwater River drainage. You will see that there can be different management objectives within the same major drainage. For example, if a weed is moving into an area where it has not previously been, the objective might be to eradicate that weed. However, if that same weed has already overcome an entire drainage, the more realistic objective would be to control the spread of the weed.

Table 1: Weed Management Objectives

Weed Species	North Fork
Knotweed, Japanese	Eradicate
Beancaper, Syrian	Eradicate
Bindweed, Field	Custodial
Broom, Scotch	Eradicate
Buffalobur	Eradicate
Bursage, Skeletonleaf	Eradicate
Cinquefoil, Sulfer	Custodial
Cress, Hoary	Eradicate
Crupina, Common	Contain
Goatgrass, Jointed	Eradicate
Hawkweed, Orange	Contain
Hawkweed, Meadow	Contain
Hemlock, Poison	Eradicate
Henbase, Black	Eradicate
Johnsongrass	Eradicate
Knapweed, Diffuse	Eradicate
Knapweed, Meadow	Eradicate
Knapweed, Russian	Eradicate
Knapweed, Spotted	Reduce
Loosestrife, Purple	Eradicate
Matgrass	Eradicate
Millium, Vernale	Eradicate
Nightshade, Silverleaf	Eradicate
Peavine, Perennial	Eradicate
Pepperwood, Perennial	Eradicate
Puncturevine	Eradicate
Ragwort, Tansy	Eradicate
Skeletonweed, Rush	Eradicate
Sowthistle, perennial	Eradicate
Spurge, Leafy	Eradicate
Spurge, Toothed	Eradicate
Starthistle, yellow	Contain
Thistle, Canada	Reduce
Thistle, Italian	Eradicate
Thistle, Musk	Eradicate
Thistle, Plumless	Eradicate
Thistle, Scotch	Eradicate
Toadflax, Dalmatian	Eradicate
Toadflax, Yellow	Eradicate
Woad, Dyers	Eradicate

PROPOSED ACTION

During 2002, inventories of weeds on portions of the North Fork Ranger District were conducted. Personnel searched suitable and likely locations including travel corridors, dispersed and developed campsites, administrative sites, grazing allotments and timber sale areas.

Based on those inventories, we are proposing to control noxious weeds within the following project area:

> All National Forest System lands within the North Fork Clearwater River and Orofino Creek drainages. This includes the Gravey Creek and upper Cayuse Creek drainages which are within the North Fork Clearwater drainage but are administered by the Powell Ranger District. The project area also includes approximately 41 miles of road right-of-way areas through other ownerships adjacent to Road 247 (Beaver Creek), Road 250 (Pierce Superior), Road 246 (Scofield Divide), Road 680 (Sheep Mountain Saddle), and Road 683 (Teepee Creek). These are cost share roads.

We propose to control noxious weeds on approximately 3000 acres annually of National Forest lands in various locations throughout the project area. The word "control" in a broad sense refers to elimination or reduction for some weed populations, and slowing the rate of spread for others. Our site-specific resource objectives and goals determine the level of control we want to achieve for specific infestations.

An Integrated Pest Management (IPM) approach will be used. This approach uses a combination of control methods which include **mechanical controls** such as hand-pulling weeds; **cultural controls** including seeding and fertilizing disturbed areas; **biological controls** through the use of parasites and pathogens; and **chemical controls** using herbicides. **No aerial applications of herbicides will occur.**

The 3000 acres proposed for treatment annually is less than 1% of the total National Forest System lands administered by the North Fork Ranger District.

In many areas the weed infestation does not involve 100% of the ground. For instance, a dispersed camping area approximately two (2) acres in size might be infested with weeds but the amount of land actually occupied by weeds would be in scattered clumps covering only a few square feet.

Twenty-eight (28) weeds species are considered for control measures. They include:

- Tansy ragwort (*Senecio jacobaea*)
- Rush skeletonweed (*Chondrilla juncea*)
- Matgrass (*Nardus Sticta*)
- Meadow hawkweed (*Hieracium pratense*)
- Orange hawkweed (*Hieracium aurantiacum*)
- Spotted knapweed (*Centaurea maculosa*)
- Russian knapweed (*Centaurea repens*)
- Dalmation toadflax (*Linaria gentisfolia spp. Dalmatica*)
- Yellow toadflax (*Linaria vulgaris*)
- Canada thistle (*Cirsium arvense*)
- St. Johns-wort (*Hypericum perforatum*)
- Ox-eye daisy (*Chrysanthemum leucanthe mum*)
- Sulfur cinquefoil (*Potentialla recta*)
- Common tansy (*Tanacetum vulgare*)
- Diffuse knapweed (*Centaurea diffusa*)
- Meadow knapweed (*Centaurea pratensis*)
- Yellow starthistle (*Centaurea solstitialis*)
- Purple loosestrife (*Lythrum salicaria*)
- Musk thistle (*Carduus nutans*)
- Houndstongue (*Cynoglossum officinale*)
- Leafy spurge (*Euphorbia esula*)
- Queen Anne's Lace (*Daucus carota*)
- Common crupina (*Crupina vulgaris*)
- Common mullein (*Verbascum thapsus*)
- Scotch thistle (*Onopordon acanthium*)
- Common teasel (*Dipsacus fullonum*)
- White top (*Cardaria draba*)
- Common burdock (*Arctium minus*)
- Texas blueweed (*Helianthus cilaris*)
- Janpanese knotweed (*Polygonium cuspida tum*)

Many of the identified sites have noxious weeds that are new to the North Fork subbasin. New weeds are defined as those that have one or more established populations but are not wide

spread. New noxious weeds on the North Fork District include: Meadow hawkweed, Orange hawkweed, and Dalmatian toadflax.

This EA also addresses control of the following five (5) undesirable weed species:

- Cornflower (*Centaurea cyanus*)
- Common chicory (*Cichoium intybus*)
- Creeping buttercup (*Rananculus repens*)
- Nightshade (*Solanum dulcamara*)
- Poison Ivy (*Rhus radicans*)

While these weeds have not been officially or legally defined as noxious, they are exotic non-native plants with the ability to out-compete native vegetation or to be dangerous to humans (nightshade).

See Appendix J for a complete description of the weeds being proposed for treatment.

Initial or first-year treatments will not likely be 100% effective for weed control since dormant seeds in existing populations germinate in following years. Therefore, follow-up treatments could be needed for up to the next ten (10) years. However, such treatments would likely be at reduced levels, especially where herbicides would be used.

It is highly likely that new sites will be discovered in each of the watershed ecosystems covered in this analysis. As additional infestations are discovered in the next ten years, each site will be evaluated to determine if the site fits within the scope of this EA and then prioritized for treatment. Those sites selected for control would be treated using the parameters established under the analysis conducted within this EA. Treatment of additional sites would be under an adaptive strategy.

Although private lands are not included in the proposed action – except as identified in the project area – the North Fork Ranger District has an active partnership and has considered actions, including herbicide application, on lands adjacent to the District.

PROGRAM MANAGEMENT DIRECTION

Relationship to the Forest Plan

Activities that are planned in the National Forest System involve two different levels of decisions: a general (programmatic) decision for the entire Forest, and a site-specific decision for the project area.

The programmatic decision is the Forest Plan that provides overall direction under which the Clearwater National Forest (CWF) will be managed. The CWF began implementation of its Forest Plan in September 1987. The Forest Plan Final Environmental Impact Statement (FEIS) contains a general cumulative effects analysis of anticipated actions on a landscape level for such resource values as roadless areas, wildlife populations, and water quality of major drainages. The Forest Plan also established standards that preclude or limit actions to protect the environment. These standards are used to develop mitigation measures for the proposed action and alternatives. They are also used to measure the action's effects to ensure that those actions are in compliance with the Forest Plan. The North Fork Noxious Weed Treatment Project is tiered to the CWF Forest Plan FEIS to allow the EA to focus on specific issues pertaining to the project area.

The CWF Forest Plan is fairly silent on Noxious Weeds. It lists research needs identified during development of the Forest Plan including "Determine the autecology of the noxious weeds: spotted knapweed, diffuse knapweed, leafy spurge, goatweed, Dalmatian toadflax, common toadflax, hounds tongue, common tansy, caprina (sic), musk thistle, star thistle, Canada thistle, and dyerswoad. Develop and evaluate probable biological control methods for these weeds (Forest Plan II-16)."

There is a "Noxious Weed Appendix" (Appendix N) which is a situation report from 1985 in the Forest Plan. It describes the various weed species, methods of spread, and the consequences of the problem. Loss of forage habitat for both wildlife species and domestic livestock, degradation of riparian vegetation conditions, fuels and fire hazard increases, decreased visual quality, and negative effects on adjacent landowners are all listed as consequences of the problem. Control methods listed include prevention as well as biological, chemical, mechanical and cultural controls. Listed preven-

tion items will be included in the Chapter 2 discussion of mitigation measures.

The proposed treatment sites occur in a variety of land management allocations. Land management allocations affected include Forest Plan Management Areas:

- A3 – Dispersed Recreation Unroaded Setting
- A4 – Visual Travel Corridor
- A5 – Developed Recreation
- A6 – Historic/Visual Corridors
- B2 – Recommended Wilderness
- C1 – Key Big Game Summer Range
- C3 – Key Big Game Winter Range/Unsuitable for Timber Management
- C4 – Key Big Game Winter Range/Timber Management
- C6 – Key Fishery Habitat
- C8S – Key Big Game Summer Range/Timber Management
- E1 – Timber Management
- E3 – Aerial Harvest Systems/Timber Management
- M1 – Research Natural Areas and Special Areas
- M2 – Riparian Areas

The standards for all of these Management Areas include the use of integrated pest management for protection against pests.

Northern Region Overview

The Northern Region Overview explores the situation with regard to ecosystem health and recreation which are closely tied to the Forest Service's Natural Resource Agenda. "Maintenance and restoration of watershed health is an overriding priority in future forest plans" states the Natural Resource Agenda. While the Northern Region may be known for its "wildness and natural character" the ecosystems and watershed have been significantly affected by noxious weeds and introduction of exotics, e.g. non-native fish and blister rust; past roading; timber harvest; mining; grazing; and fire suppression. The Overview identifies forest and rangeland types and watersheds that are at risk and in need of restoration (NRO page 3).

"Noxious Weeds are one of the most serious threats to ecological integrity. Very high risk of expansion. Of 2,343 exotic species, 112 have been identified as noxious by State governments. Opportunities: 1) Work with States on classifying species and in developing and implementing management strategies. 2) Education of Forest Users." (NRO page 19).

The Overview goes on to discuss three categories of weeds:

Weed Category	Opportunities
1 – Well established and widespread	Management strategies aimed at containment and suppression
2 – Recently introduced to the state and rapidly spreading	Monitor, contain, and eradicate weeds when possible.
3 – Not yet detected or found only in localized, small, scattered infestations. Species of focus are yellow starthistle, common crupina, rush skeletonweed, orange and meadow hawkweeds, dyers woad, and tansy ragwort.	Early detection and immediate action to eradicate. Analysis of potential Weed invaders Consider use of Noxious Weed SWAT Team for prevention/ eradication of particular aggressive invaders.

All of these objectives and opportunities are tied closely to project objectives. Many of the species of focus are considered category 3 on the North Fork Ranger District, which reinforces the need for swift actions.

Clearwater National Forest Subbasin Analysis Recommendations

Subbasin analysis for both watersheds (Orofino Creek and North Fork Clearwater River) on the North Fork Ranger District recommended "Control and prevention of the spread of noxious weeds should be coordinated with the Clearwater Basin Weed Coordinating Committee and Clearwater County control board. Use of an Integrated Pest Management Approach to weed control will allow the use of all available control methods (physical/mechanical, chemical, and biological). Project analysis should identify specific species, location, and appropriate approach to meet identified objectives."

Project Management Direction

The second level of planning involves the analysis and implementation of management practices designed to achieve the goals and objectives of the Forest Plan. The second level requires site-specific analysis to meet National Environmental Protection Act (NEPA) requirements for decision-making.

This EA is the site-specific decision level for implementing activities. It is not a general

management plan for the project area or a programmatic environmental assessment. It is a **site-specific** linkage between the Forest Plan and requirements established by NEPA.

This decision level involves analyzing site-specific proposals as well as disclosing their environmental effects to achieve the general guidelines of the Forest Plan. This information will be used by the Responsible Official (District Ranger, North Fork Ranger District) to make a choice for managing the project area.

Strobel (1991) and Ralphs et al. (1991) describe that a fully integrated approach is necessary in weed management because using only one management method will not work.

A variety of activities can be carried out under an IPM program because IPM provides a full range of management alternatives. Inventory, monitoring and public education are also part of IPM activities. To effectively use the program, the Forest Service must prioritize treatment activities within the framework of the overall strategy; that strategy is to contain weeds in currently infested areas and to prevent the spread of weeds to susceptible but generally un-infested area.

Supporting Documents and Analyses

The potential impacts of proposed weed treatment activities are analyzed within this Environmental Assessment. This EA will incorporate by reference the guidelines, findings and analysis described in the following documents:

- Forest Service Noxious Weed Policy, December 1996
- St. Joe Ranger District Noxious Weed Control Project Final EIS, 1999
- Palouse Noxious Weed Control EA, 2000

Those documents are available for review at the District office. Findings not covered by these documents will be addressed by this EA. In addition, this analysis will follow strategies outlined by the Federal Interagency Committee for the Management of Noxious and Exotic Weeds for preventing, controlling and managing harmful non-indigenous plant species. The President's Executive Order on Invasive Species is also incorporated into this analysis.

SCOPE OF THE ANALYSIS

Connected, Cumulative, and Similar Actions

In preparation for any analysis, a recurring issue is the extent or scope of the analysis required for a proposal. Regulations contained in 40 CFR 1508.25 address the scope of the analysis and outline several elements to be considered in the analysis of the proposed action.

These regulations recognize that separate activities can combine and interact to increase impacts significantly beyond the effects of individual actions. For example, it is possible that the herbicide runoff from one spray site would not harm aquatic organisms. However, when combined with runoff from other sites, the total impact could be significant. If impacts are found to be significant, an Environmental Impact Statement will be prepared. The Weed Partnership will allow us to cumulatively analyze the effects of weed prevention activities across ownership boundaries; however, the proposed actions analyzed in this EA are only on National Forest System lands and cost-share right-of-way areas.

As explained in 40 CFR 1508.25, these actions would be cumulative and their cumulative impacts must be addressed. The possibility of cumulative impacts to valuable resources such as water, human health, and wildlife is one reason these sites are considered in a single EA along with sites on adjacent lands.

The regulation governing the scope of analysis (40 CFR 1508.25) also refers to the combined analysis of connected actions. For example, if the dead weed plants needed to be burned to make the herbicide application more effective, then the burning would be connected.

The regulations also provide for the combined evaluation of reasonably foreseeable similar actions, such as those that share a common timing or geography. For example, it is possible that new noxious weed establishments may occur within the areas analyzed for this EA that would require future control actions. To the extent that this can be planned for, the effects of controlling new infestation are analyzed within this EA.

On January 10, 2003, Forest Supervisor Larry Dawson signed the Record of Decision for the Middle Black FEIS. That project analyzed

clopyralid as well as biological and mechanical treatments. This analysis incorporates those findings and expands the project area as well as the chemicals involved.

Alternatives

In determining the scope of the analysis, the Forest Service must consider three (3) types of alternatives: the No Action alternative, Other Reasonable Courses of Action, and Mitigation Measures not included in the proposed action. Chapter 2 considers possible alternatives for treating noxious weeds; Alternatives that have a reasonable likelihood of at least partial success are discussed in detail.

A range of mitigation measures are also discussed for the alternatives. The impacts of the No Action alternative, as well as other alternatives, are discussed in the chapters that follow.

Impacts

This analysis will study three (3) types of impacts: direct, indirect and cumulative. Cumulative effects are described above in the discussion on cumulative actions.

Direct effects are caused by the action and occur at the same time and place as the proposed action. For example, direct effects of herbicide application could include impacts on some non-target native plant species. Indirect effects caused by the action occur later in time or are removed in place. With the spread of noxious weeds, it might be reasonable to predict a change in vegetation composition with an eventual impact on native plant diversity. These and other reasonably foreseeable direct, indirect and/or cumulative impacts are analyzed in Chapter 3.

Decisions to be Made

Following a public review of the Environment Assessment, the Deciding Official (District Ranger, North Fork Ranger District) will issue a Decision Notice and Public Comment Appendix. The Decision Notice will document what actions, if any, should be taken to control weeds on the North Fork Ranger District, and whether an EIS is needed. It will also document where treatment should be applied; what type of treatment(s) should be used; and when treatment will occur.

CHAPTER 2 – ALTERNATIVES

INTRODUCTION

This chapter describes the public involvement and issue development processes used to design and develop alternatives to the proposed weed treatments. Environmental issues identified by the public and agency personnel are described. The proposed action and alternatives are described and compared. Features, or design criteria, of the alternatives are also discussed.

PUBLIC INVOLVEMENT

The public has been involved throughout the development of this EA. Public comment has helped to define issues and develop the range of alternatives for accomplishing management goals and objectives.

Initial scoping efforts for control of noxious weeds on the North Fork Ranger District began in 2003. Public comment was solicited formally with a Scoping letter distributed to approximately 300 individuals and organizations on the North Fork District NEPA mailing list in April 2003. In addition, public comment was requested through the Clearwater National Forest's quarterly schedule of proposed actions in January 2003.

ISSUE RESOLUTION

During this initial scoping effort comments were received from 12 individuals and organizations. Their comments are listed by respondent followed by a discussion of how the comments were incorporated into the analysis.

Edward Correll

General

"It is great to see the Forest Service taking an aggressive approach to weed control on the North Fork."

Control Methods

"I favor Biological long term as you can never spray all the byways that they seem to invade. One thing we forget is the weed has been here for 25-30 years but the bugs and flys have only been introduced to any extent the last 7 to 8 years so the pantry is very full."

Incorporation into the analysis: The support is appreciated. The biological control option will continue in cooperation with our existing partners. In addition, biological controls will be integrated into any adaptive strategy that we select. Alternatives 2 and 3 both employ continued use of biological controls.

Twin Rivers Back Country Horsemen

General

"Twin Rivers Back Country Horsemen heartily endorse your approach to noxious weed control on the North Fork. This is a scourge on our land that has been ignored for too long."

Incorporation into the analysis: The support is appreciated.

Three Rivers Timber, Inc

Use of Chemicals

"We fully support an aggressive program to address the serious threat of spreading noxious weed problems. This includes applying the most cost-effective treatments, especially application of approved chemicals."

Incorporation into the analysis: We appreciate the support. Throughout this analysis and the subsequent implementation of an approved action plan, we have – and will continue to – evaluate the most cost-effective treatment(s) necessary to accomplish the Management Objective for each noxious weed species identified. Use of chemicals in an integrated strategy has been evaluated in Chapter 3.

Ivan and Rose Hendren

General

"Very Good Weed Control. Wish other Forest Dist. were doing same. Very Good Plan."

Incorporation into the analysis: We appreciate the support.

George Hatley

General

"This letter is to register support for the North Fork Noxious Weed Treatment project. Knapweed is super aggressive and will dominate a large area if not controlled. The Bitterroot Valley in Montana is almost solid knapweed."

"I appreciate you attacking the problem. The last time I rode from Wilderness Gateway up the Bolder Creek trail to horse camp I was alarmed to see some knapweed plants near the trail."

Incorporation into the analysis: We appreciate the support.

Robert Mason

General

"I am writing to voice my support for the proposed action to control noxious weeds in the Clearwater Forest. I only wish it had been initi-

ated sooner when there was a better chance for success. I have watched the advance of spotted knapweed go from light infestations along roads and streams to heavy and climbing up trail and open slopes higher each year. There are numerous west and south facing slopes within the District which would easily host the dreaded Yellow Star Thistle. I shudder to think of this weed invading the beloved environment of the North Fork."

"…I am afraid that spotted knapweed is here to stay, but I wish you success in any attempt to curtail it. My chief concern is that Yellow Star not be allowed to establish itself in the North Fork District."

Education/ Prevention

"The hay and straw certification requirements are troublesome but necessary. However, these requirements alone will not stop the introduction of noxious weeds. Education on cleaning vehicle undercarriages, animal brushing before travel are at least as important. Knowledge of the target weed species by the general public is extremely vital, so that budding infestations can be recognized and reported while in early stages for quick eradication. If this had been done years ago we would not now find it necessary to drench the whole landscape in herbicides."

Incorporation into the analysis: Thank you for the support. We agree that education is an important part of the Integrated Pest Management (IPM) strategy that we will employ. We are currently hosting several weed identification classes for the public. If you would like additional information, please contact Suzanne Qualmann at 208-875-1739.

Department of Environmental Quality

Application of herbicides

"As you are aware, application of most pesticides/ herbicides directly into Water of the State is not allowed. Some herbicides are approved for this use, nevertheless, DEQ discourages this. Any non approved chemicals must not be sprayed into streams or lakes."

*"Typically during this time of year I receive a complaint or two of applicators haphazardly spraying along creeks, across creeks, etc. Please make sure either you[r] or your staff impress upon the contractor or Forest employee **not to do this**. The chemicals kill aquatic plants, periphyton and algae in the streams."*

Incorporation into the analysis: No chemicals will be sprayed directly into water. Chemicals will be used within strict guidelines outlined in the Biological Assessment as well as within the BMPs for weed management established by the Forest Service.

All applications of approved chemical agents will be handled within the guidelines set for non-aerial applications, including those restrictions related to open water and wetlands. Personnel applying such chemicals will be briefed about those restrictions and will be monitored for compliance. Restrictions in effect are listed in Appendix I.

Use of the term "certified"

"In addition, as a point of clarification, within your document it is stated "herbicides used would be certified by the EPA". From my understanding of the Federal Insecticide, Fungicide and Rodenticide Act (Title 40 of the Code of Federal Regulations Parts 150-189), EPA does not "certify" herbicides. Rather the EPA administers regulations governing pesticides and they must be applied according to approved label directions."

Incorporation into the analysis: Registered is the proper term.

Greg Danly

General

"I support all efforts to control, reduce, or eliminate the spread of noxious weeds."

Chemical controls

"While your integrated pest management strategy is commendable, I fully support and would emphasize the use of chemicals. Herbicides are easily the most immediate and effective control method available. All herbicides approved for use in Idaho have been deemed safe and appropriate when used according to label directions."

Incorporation into the analysis: Within an integrated strategy, herbicides will be used where appropriate.

Use of other resources

"Please consider utilizing other resources, such as fire crews when they are not fighting fire, to help with control efforts where weeds have left the road corridors yet could be treated with backpack sprayers. This would be especially true along pack trails."

Incorporation into the analysis: We are already using some firefighters to help out with weed control, and other volunteers will be utilized once this analysis is completed.

Brad Chin

"I have numerous questions and concerns about this project, however it is rather difficult to address specific facts and related rationale without having seen the 2002 inventory and the plan."

"1. We forest owners need to review the inventory and analyze the basis for the conclusion of project necessity."

Incorporation into the analysis: Inventory results may be reviewed in Table 2, located in Chapter 2 page 20.

"2. We'll need to know the treatment types, methods and delivery systems."

Incorporation into the analysis: This information is included in Table 3: Site Descriptions and Proposed Treatments, Chapter 2 page 21.

"3. How exactly have you concluded that wildlife habitat will be damaged without this program?"

Incorporated into the analysis: Noxious weeds out compete the native vegetation; in addition, weeds routinely provide reduced nutritional value. The impacts of weed infestations on wildlife habitat are discussed in Chapter 3, Wildlife (page 67).

"4. What are the identifiable alleged adverse affects of the noxious weeds?"

Incorporation into the analysis: See the Purpose and Need Statement in Chapter 1.

"5. What is the significance of the "less than 1% of the project area" regarding treatment?"

Incorporated into the analysis: This reference is included to provide a sense of scale for the project proposal.

"6. What is your definition of a "broad scale approach"?"

Incorporated into the analysis: A broad scale approach in the context of the Purpose and Need Statement means that this EA will consider the issues/impacts of all land owners, organizations and agencies involved in weed management within the project area. The broad scale approach referred to in the scoping letter was describing the Clearwater Basin Weed Management Area. It covers several million acres, thus it is broad scale in that sense. The area is broken down into sub-basins and working group in order to accomplish work on the ground.

"7. How did you calculate the "proper priorities" and what are they?"

Incorporation into the analysis: Priorities are established based on weed species, weed density, recency of invasion among other site specific factors. See Table 1: Weed Management Objectives located in Chapter 1, page 4.

"8. Has there been any consideration as to how the non-native vegetation arrived and is there any plan to stop further introduction?"

Incorporation into the analysis: The non-native species addressed in this EA arrived in the area over the last century. Prevention will continue to be an integral part of future efforts to reduce future infestations.

"9. Please explain how Potlatch Corporation could remotely be considered a "partner" and in conjunction, why the consideration to bring natural resource damage within "acceptable limits" when the greatest damage to our forests has been done by logging, not weeds?"

Incorporation into the analysis: Potlatch Corporation is included as a partner in this effort due to their land ownership within the sub-basin.

Your comments regarding logging are outside the scope of this analysis and are not addressed here.

Penny Keck

Use of Chemical Treatments

"I prefer the mechanical/biological. Chemicals only remove the "weed" for that specific year. Since seeds have been determined to be viable for 30 years or more in some species the removal of these weeds mechanically is more desirable. This should include the old fashion system of grubbing."

Incorporation into the analysis: The scope of this project is approximately ten (10) years and does not specifically address those potential situations where some weed seed may remain viable beyond that time frame. Grubbing, or hand pulling is an effective means for controlling individual plants or small populations (several plants) for some species and this method will be used. We will most likely rely on biological methods to control the majority of weed infestations not adjacent to roads, campsites, trail heads or other high traffic areas. These high traffic areas will constitute the majority of the chemical treatment program as will new invader populations.

"I especially do not care to see chemicals used within 150 feet of any water."

Incorporated into the analysis: Application guidelines have been established within the framework outlined in the Biological Assessment. These guidelines are shown in Table 3: RHCA Restrictions, Chapter 2, page 16.

"Alas, it is the herd mentality of throwing chemicals about for the immediate solution but not thinking how to reduce [to] noxious weeds over time. If one reduces the availability of seeds and the root structures this can reduce the weeds. This can best be accomplished by biological/ mechanical methods."

Incorporation into the analysis: Chemicals will be used according to label directions and within strict guidelines outlined in the Biological Assessment as well as within the BMPs for weed management established by the Forest Service. Please see previous answer.

Prevention measures will be implemented to help prevent/preclude the continued invasion of noxious species, but that will do little to control the problem in the short term.

The Land Council

Use of Herbicides

"What herbicides would be used? How would they be applied by hand application, spraying, etc? Have studies been conducted to determine the effects of these herbicides on wildlife and other plant species? If not, this should be done and the results included in the EA."

"The effects that herbicides may have on water quality is another cause of concern. Mitigation

measures must be applied to the fullest extent possible. Are there any fish bearing streams or channels within or adjacent to the proposed treatment areas? If so, this is a cause for concern and the possible detrimental effects should be noted. Exactly how many acres would be treated with chemicals? This number should be included in the EA."

Incorporation into the analysis: The herbicides proposed for use are 2,4-D, Clopyralid, Dicamba, Glyphosate, Metsulfuron methyl, Picloram and Triclopyr. They would be applied using ground based methods including backpack sprayers as well as ATV and truck mounted sprayers. Many studies have been conducted to determine the effects of these herbicides on wildlife. The EA will include discussion of the types of herbicides and chemical agents that will be used as well as their recommended application methods. See Appendix I: Herbicide Application Guidelines. In addition, the EA will include discussion of the mitigation measures to be applied and the threshold limits of activity. The bibliography attached to this document provides a helpful source of information.

We are also very concerned about the effects on water quality. Spray buffers and chemical restrictions will be used in riparian areas. Mitigation measures are described in Chapter 2 and in the Biological Evaluation/Assessment.

Yes, there are fish bearing streams. Effects on fisheries are discussed in detail in Chapter 3. Depending on budgets, the acres sprayed will range between 500 and 3000 acres annually. Threshold acres, the maximum acres treatable within each watershed, are also discussed in the Chapter 3 Fisheries section. Not all areas will be treated with chemical agents. When appropriate, chemical applications will be conducted within the restrictions established under the BMPs for weed management and for open water and wetlands.

Prevention

"It is important to protect the forest from invasive species. However the best way to do this is through prevention. If it weren't for the amount of timber harvest activities taking place in the forest, the noxious weed problem would not be nearly as bad. Would all vehicles be cleaned and sprayed upon arrival and exit of project area?"

Incorporation into the analysis: We fully agree that prevention is an integral part of any noxious weed management program and continue to implement practices that help slow the introduction of weed species into the North Fork Clearwater subbasin.

Current regulations require that all timber sale equipment and vehicles going off road be cleaned before and after leaving the road surface. Other suggested practices are also incorporated. Please see the Appendix M: Best Management Practices, for additional required and recommended activities.

Friends of the Clearwater

Prevention

"The best way to deal with weeds is through prevention… A comprehensive plan needs to be done that engages in serious prevention because the worst weeds are those that have yet to come into an area.

"The public and agency personnel coming into the North Fork should take all precautions feasible to limit the spread on exotic weeds. Closing roads, a goal of the agency in the area, will help lessen the spread of weeds.

"…[i]mplement the following:

"1. Require inspection of all vehicles….

"2. Prohibit stock grazing and/or use in areas that currently contain weeds until weeds are eliminated.

"3. Prohibit ORVs from trails that contain weeds and close all backcountry trails to ORV use.

"4. Require that administrative sites, campgrounds (formal and informal) be weed free within 5 years, or … close to public use until certified weed free.

"5. Quarantine all animals for a least 48 hours prior to entering the North Fork….

"6. Require pelletized feed…"

Incorporation into the analysis: We fully agree that prevention is an integral part of any noxious weed management program. We also recognize that more emphasis needs to be put on prevention and continue to implement practices that help slow the introduction of weed species into the North Fork Clearwater. Please see Appendix M: Best Management Practices for required and recommended practices, as well as other references within the EA which include discussions of these issues.

Use Alternate Methods Prior to Chemicals

"The Clearwater Forest Plan (page II-35) has a section … [that] deals with vegetation management. This standard emphasized natural, mechanical, fire and hand treatment in vegetation management. Monitoring the outcome from these treatment[s] will help measure the effectiveness of this approach. The use of herbicides is not preferred in the plan and should be used as a last resort…. Alternatives that adopt real prevention measures … should be pursued.

"Experiments could be attempted. Ranchers have had success in training livestock to select for weeds…. It may even work with wildlife."

Incorporation into the analysis: When the current Forest Plan was completed in 1987, the situation on the ground was significantly different than it is today. Within an integrated strategy, all methods of treatment can be considered. Alternative methods of weed control will be considered if proven to be viable and effective methods.

No livestock grazing occurs within the project area. Conditioning wildlife to adopt an unnatural behavior is outside the scope of this analysis.

Middle Black FEIS and ROD vs. "Weeds" EA

"The Middle Black FEIS and ROD assumes a five-year sunset on weed spraying. Is this project here a continuation, in perpetuity, of spraying? How does it differ from the Middle-Black decision since it covers much the same area.

Incorporation into the analysis: The North Fork Noxious Weeds Assessment is much larger in scope encompassing the entire North Fork Ranger District and a portion of the Powell Ranger District. The Middle Black project encompasses only a portion of the District within the North Fork Clearwater River corridor. In addition, the NF Weeds EA will supercede the Middle Black decision regarding weed management.

Lewis-Clark ATV Club

General

"[We] would like to show our support for your environmental analysis for control of noxious weeds and other invasive species on the National Forest lands within the North Fork Clearwater Ranger District."

Incorporation into the analysis: We appreciate your support.

ISSUES

Analysis of public and internal comments received thus far resulted in the following list of issues that guided the development of alternatives. Each issue is stated and is followed by a synopsis of the specific responses received from the public. A brief discussion of how each issue is addressed in the EA follows the synopsis of public comments.

1. Effects on Water Quality and Aquatic Organisms

Several commenters indicated a concern that herbicides may inadvertently be sprayed near or across streams affecting water quality and fish populations.

Much research has been done to determine the level (milligram per liter) at which 50% of a given population dies (Lethal Concentration-LC_{50}) and the time frame during which that occurs. Although LC_{50} is often used as toxicity standard, fifty percent fish mortality is unacceptable. For this reason, a better parameter to evaluate effects is the "No Observable Effect Level (NOEL) or No Observable Effect Concentration (NOEC)"."Because there are frequently no long-term test results that provide safe concentrations for all chemicals, the EPA has recommended that the 96 hour LC_{50} be divided by 20 to set a standard for concentrations to protect aquatic species when NOEL or NOEC data is not available.

The analysis has several parts. First, the project area was delineated into watersheds. Average low flow values were determined for each watershed. Available information on each proposed herbicide was reviewed to determine the $LC_{50,}$ NOEL or NOEC values for fish species in the project area. Using this information the maximum acreage treatable while remaining below the recommended No Observable Effect Level (or equivalent) was calculated for each proposed herbicide by watershed. The total acres requiring treatment with a specific herbicide was compared with the maximum acres possible to be treated in each watershed. These lower limits will be used as thresholds to help guide the proposed spray activities over the next decade.

Within the above calculations, many "worst case" assumptions were used to influence the indicators.

2. Ensure that Education/Prevention are Incorporated

Some commenters were specifically concerned about developing and/or continuing prevention education programs to slow the rate of infestation of noxious and undesirable weeds.

As part of an Integrated Pest Management (IPM) Strategy, and in cooperation with partners in the Clearwater Basin Weed Management Committee, the North Fork Ranger District will implement and enforce practices that are shown to aid in the reduction of noxious and undesirable weed infestations. See Appendix O: Best Management Practices.

Education efforts include weed identification classes, informational booths at county fairs, and public information outreach as well as briefings with contractors, volunteers, and other groups working on National Forest lands.

3. Human Risk

Some commenters were concerned about the impact on human health of weed control with herbicides.

Factors that will be used to measure this issue include quantities of herbicide proposed for use; proposed methods of herbicide application; and potential effects on project works and visitors to the project area.

4. Use of Chemicals

Several commenters were concerned about the use of herbicides in a general sense.

Due to the nature of some weed species and the size of their populations, use of herbicides may be the only practical control method in the short term. These factors will be included along with a variety of other concerns, i.e. water quality, fisheries, etc. to determine the appropriate use of chemicals.

METHODS AVAILABLE FOR NOXIOUS WEED CONTROL

Education

Perhaps the single most powerful tool in controlling noxious weed spread is education. The North Fork Weed Partnership effort has put on training sessions in weed identification for Foresters and other field going personnel from agencies and companies within the partnership boundary.

Methods available for noxious weed control vary and are largely dependent on how each weed species responds to a particular type of treatment. Treatment methods available for each weed species under consideration are listed in Appendix J: Weed Species Characteristics. Types of weed control include: mechanical, cultural, biological and chemical.

Mechanical Control

Mechanical control methods range from hand pulling and grubbing with hand tools to clipping or mowing the plants. If sufficient root mass is removed, the individual plant can be destroyed. Cutting the plants can reduce reproduction in perennial species and weaken their competitive advantage by depleting carbohydrate reserves in the root systems. Mechanical control can also include burning the plants with a propane torch.

Small infestations of some weed species can be controlled by mechanical methods while larger infestations are more difficult to control. In addition, several weed species will respond to mechanical treatment with aggressive re-sprouting from even small root fragments left in the soil. Mechanical control often must be repeated several times a year for many years to successfully eradicate weed species that are prolific seed producers.

Cultural Control

Cultural control generally involves manipulating a site to increase the competitive advantage of desirable species and decrease the competitive advantage of undesirable species. Manipulations could involve planting native and desired non-native species to shade out weeds, or covering weed-seed contaminated soil with a layer of uncontaminated soil. Seeding grass species and applying fertilizer on sites where ground cover is sparse could help to culturally control some weeds. Seeding and fertilization are most effective after existing weed populations have been treated to reduce their competitive advantage.

Biological Control

Biological control is the use of other living organisms such as insects or fungi to attack undesirable plant species. Populations of native plant species are generally kept from spreading out of control by natural limiting factors such as predators (animals, insects), diseases, and competition for nutrients and moisture. Non-native vegetation has become a problem in many parts of the West due to a lack of such limiting factors. Most experts view the introduction of biological control agents as the best long-term solution to the noxious weed problem where there are large, widespread populations of a given species. Under ideal circumstances, control agents reach a dynamic equilibrium with target weed species.

Before new biological control agents are introduced into the United States, their host-specificity is tested. The agents are place with a wide variety of plant species under "eat-or-starve" conditions to ensure that their attack is confined to a narrow range of plant species, preferably to the weed of concern.

The Nez Perce Bio-Control Center provides biological control agent release and monitoring services under contract to the Clearwater National Forest. The USDA – Animal, Plant, Health Inspection Service (APHIS) has approved the biological control agents provided by the Nez Perce Bio-Control Center for release. Additional discussion on past releases can be found later in this Chapter.

Agents being considered for further releases include:

Agent	Description
Metzneria paucipunctella	Spotted knapweed seed head moth, also attacks diffuse knapweed
Urophora affinis and Urophora quadrifasciata	Spotted knapweed banded gall fly – seed feeder
Larinus minutus	Lesser knapweed flower weevil
Agapeta zoegana	Sulfur knapweed moths – root feeders
Cyphocleonus	Knapweed root weevil

achactes	
Urophora carduii	Canada thistle stem gall fly
Tyta luctuosa	Bindweed moth
Chrysolina quadrigemina	Attacks St. Johnswort leaves (has been found fairly extensively in 1999)

The Forest has been releasing bio-control agents to control spotted knapweed (*Centaurea maculosa*) since 1996. Baseline vegetation data has been recorded in a qualitative manner; to date, monitoring has focused on the question "Are the agents established?". The full report showing all of the monitoring results for the Forest can be found in the project file. The following is a summary of the bio-control agents that have been released on the Forest, and their characteristics.

Spotted Knapweed Seed Feeders:

Metzneria paucipunctella, the spotted knapweed seed head moth primarily attacks spotted knapweed (*Centauera maculosa*) but it will also attack diffuse knapweed (*C. diffusa*). Larvae feed on developing seeds within the head. This moth produces one generation per year with adult females laying between 60 and 100 eggs beginning in mid-June. The larvae feed through the winter and pupate during May.

Urophora affinis and *U. quadrifasciata*, the banded gall fly and UV knapweed seedhead fly respectively, are both seed head flies that attack many of the *Centaurea* species. Developing larvae from galls from the receptacle tissue and feed within the gall. These flies may produce two generations per year with adult females laying up to 120 eggs beginning in early summer.

Larinus minutus, the lesser knapweed flower weevil prefers diffuse knapweed but will attack spotted knapweed. Adults feed on rosette leaves and within the flowers while the larvae consume the seeds within the heads. The weevil produces one generation per year; adults are long-lived and mate continuously for up to eleven weeks with each female laying up to 130 eggs.

Spotted Knapweed Root Feeders:

Agapeta zoegana, the sulfur knapweed moth attacks the root of spotted knapweed and to a lesser extent diffuse knapweed. The larvae mine the root tissue within the crown. This moth produces one generation per year with adults emerging from mid-June through August. Females mate within 24 hours of emerging and live about 11 days. Mating and egg laying are dependent upon temperature; ideal temperatures for mating are between 30 and 86 degrees F. and for egg laying are between 60 and 86 degrees F. – the higher the temperature, the more eggs that are laid.

Cyphocleonus achactes, the knapweed root weevil attacks primarily spotted knapweed but will attack diffuse knapweed. The larvae mine the central root tissues and form a gall used for pupation which causes considerable damage to the root. Adult emergence is dependent upon the accumulations of degrees in the soil. Data provided by USDA – APHIS (Hansen, 1999) estimates that peak adult emergence occurs when approximately 2320 degree days above 0 C. have accumulated.

Historical temperature data (taken from Moscow, Idaho by Hansen) suggests that *Cyphocleonus achates* emergence peaks mid-August and that the average first frost date is September 24; on average there are 32 days between peak emergence and first frost. This data suggests that the Clearwater drainage is suitable for survival and development of this weevil.

Canada thistle agent

Urophora cardui, the thistle stem gall fly attacks only Canada thistle (*Cirsium arvense*). Larvae tunnel into the stem and form galls which act as a nutrient sink. Galled plants often do not produce flowers above the galls and the number of new shoots formed in subsequent years are reduced. Successful release of this agent appears to be dependent upon abundant moisture (marsh and wetland areas) and cool summer temperatures.

Field Bindweed Agent

Tyta luctuosa, the bindweed moth attacks field bindweed (*Convolvulus arvensis*) and some morning glory species (*Calystegia* spp.). The larvae feed at night on leave and flowers; two generations per year are common with the second wintering over as pupae.

Chemical Control

Chemical control involves the application of herbicides to weed species at certain stages of plant growth. Herbicides kill the treated plant, but often allow remaining seeds to germinate. A description of herbicides proposed for use is included in Appendix F.

Conditions such as vegetation types, soil types, weed species composition and infestation levels may vary significantly on any given treatment site. Therefore, a combination of chemical and non-chemical methods for a site is often preferred for weed control. The selection of chemical methods for a site does not preclude the application of other methods, either concurrently or as follow-up treatments, on that site.

Control with Mixtures of Herbicides

Many control specialists treat several noxious weed species with mixtures of chemicals. There are several reasons for this. Sometimes one chemical by itself will not be effective against a certain weed species, but combining two chemicals may provide better control (Callihan 1989, Vallentine 1989, Ralphs et al. 1991, Lacey et al. 1995). Depending on the biology of the weed, the environment in which it is growing, and the size of the infestation, mixtures of two or more chemicals may be needed. This is often the case for weeds that are somewhat resistant to an individual herbicide.

Applicators can use mixtures to reduce the number of applications required to control resistant weeds. For example, a mixture of picloram and 2,4-D is used for many weed species (Monnig 1988). Both herbicides are broad leaf-selective but inhibit the plant in different ways. 2,4-D generally has a shorter half-life while picloram provides longer persistence. Together these two herbicides provide weed control that may not be accomplished by either herbicide alone. The addition of 2,4-D to picloram also reduces the amount of picloram to half of what is normally applied, therefore minimizing effects on non-target plant species.

ALTERNATIVES CONSIDERED IN DETAIL

Three alternatives were developed to address public and internal issues. These alternatives represent the range of control methods currently available for treatment of noxious and undesirable weeds. In addition to the No Action Alternative (Alternative 1), Alternative 2 involves only non-chemical treatment methods and Alternative 3 (the Proposed Action) involves the use of both chemical and non-chemical methods of treatment. The comparison of Alternatives 2 and 3 defines the issues of potential environmental and human health effects of herbicide use. The comparison also shows the differences in effectiveness.

Analysis of the No Action Alternative discloses the consequences of unchecked expansion of weeds in forest ecosystems. It does not mean, however, that no weed control activities would occur under that alternative. Some weed control activities are included in the No Action Alternative because they represent ongoing activities such as digging and bio-control releases. In addition, the No Action Alternative would allow the continued use of herbicides in administrative areas and along roadways at current levels. The alternatives are outlined below with a brief discussion of the major issues relevant to each.

Design Criteria Common to All Alternatives

Noxious Weed Prevention and Control

Prevention elements such as information signing, web site messages, internal and external education and management requirements, and partnering efforts to prevent weeds, will be part of all alternatives including no action.

Prevention measures discussed in the Best Management Practices (Appendix M) will be implemented regardless of which alternative is chosen. Certified weed-free forage and straw is now required for use on all National Forest lands in the North Fork Ranger District.

Cleaning of equipment used for forest activities would be required before operating within all areas previously treated for noxious weeds or within areas currently considered weed-free. Provision 2400-3 10.2, C 6.26 or CT 6.26 would be included in all contracts associated with those areas. Contract Provision CT6.27# will also be part of timber sales which requires purchasers treat weeds along haul routes.

To prevent the establishment and spread of noxious weeds, all ground disturbances resulting from management activities would be re-vegetated with an appropriate mix of certified noxious weed-free seed and fertilized as necessary.

Cultural control would be considered for all sites following weed treatment. After weeds have been eradicated or reduced to acceptable levels, re-vegetation with more desirable species is often necessary to prevent reinvasion by the weeds. To the extent practicable native species would be used for re-vegetation realizing that until local seed sources become more available on a cost-effective basis, non-native species with desirable characteristics would also be used.

Every newly proposed project would be evaluated for the potential of spreading noxious weeds. The weed prevention Best Management Practices (BMPs) listed in Appendix M as well as other measures to halt the spread of noxious weeds would be implemented during the project planning process.

Efforts to educate, inventory and control noxious weeds with the North Fork Weed Partnership would continue.

All noxious weed control activities would comply with state and local laws and agency guidelines.

Monitoring

Monitoring of treatment sites would be conducted. Assessment of the effectiveness of control efforts would consider the weed management objective for each site, as well as the infestation size and percent occupancy of the target weed species following treatment.

Instream monitoring would occur where fisheries concerns are the greatest. A detailed monitoring plan has been developed and is in the project file. Spray drift cards in conjunction with water samples will be used. Water samples will be taken before spray is applied, immediately after treatment, and after the first major rainstorm in that area, depending upon spray card results. The samples will be tested for the chemicals used. If levels above the No Observable Effect Concentration (NOEC) or their equivalent are found, further spraying will not occur in that watershed and application practices will be modified.

Existing inventories have indicated approximately 3000 acres of weed populations. We know there are additional populations not yet identified. Under each alternative, approximately 3000 acres could be treated annually depending on budget. Sites have been grouped into 24 watersheds for mapping purposes.

Watersheds

Table 3 and Table 13, in conjunction with the maps in Appendix C, provide the following information:

- Watershed name
- Weed species present in the watershed
- Acreages of weed infested areas in each watershed
- Weed management objectives
- Resource objectives
- Proposed methods of treatment
- Maximum Annual Sprayable Acreage Using Each Herbicide with No Observable Effect, or equivalent by watershed.

The maps in Appendix C show more detailed locations of each known site that is proposed for treatment.

Funding for a weed control program is a controlling factor in our ability to annually treat weed infestations. Optimistic forecasting for the next five (5) years indicates a funding level that could treat approximately 3000 acres annually. This required that sites be prioritized under the following criteria:

- Potential or new invaders located
- Areas identified as weed free
- Major travel routes and other areas with potential to spread weeds
- Minor travel routes and other areas

Maps in Appendix C show the relative location of all sites.

All gravel pits in the project area would be treated for noxious and undesirable weeds.

Provisions would be made for the prevention and control of weeds within new and existing special use permits as needed.

Weed control would occur at developed campgrounds, trailheads and high-use dispersed campsites following the standards and guidelines outlined in this document.

All weeds that are hand pulled or dug would be bagged and disposed of by burning at designated sites, or removal to landfills.

New noxious weed invaders, as identified by state and local agencies, would be given high priority for treatment as funding becomes available.

Additional biological control agents may become available for use. Before such agents are released, their effectiveness and impacts to other resources would be evaluated.

Public Safety

An annual operating plan outlining proposed treatments would be available to the public at the North Fork Ranger District office.

Adjacent landowners would be notified prior to treatment of noxious weeds on National Forest lands.

Traffic control and signing during weed treatment operations would be used as needed to ensure safety of workers and motorists.

Resource Protection

All treatment sites would be evaluated for Threatened, Endangered and Sensitive plants habitat suitability. Highly suitable habitat would be surveyed as necessary prior to treatment.

Riparian areas and TES populations that adjoin or overlap disturbed areas, i.e. roadsides with heavy canopies, would be surveyed and monitored prior to – and during – treatment.

Site-specific treatment guidelines would be developed for infestations within or adjacent to TES plant habitat. See Alternative 3 for specifics regarding chemical use.

Adaptive Strategy

Alternatives 1 and 3 include an adaptive strategy for future treatment of additional sites with chemicals as new infestations are discovered. Infestations known to occur in the project area but not previously quantified would be inventoried and site-specific recommendations for treatment would be made.

Priorities for treatment would be established based on weed species present, infestation size, and vulnerability of recreational, wildlife, aquatic and special vegetation resources to the infestation.

Treatment methods for each site would be selected based on weed species ecology, cost-effectiveness of the treatments, the management objective for the site (e.g. eradication or reduction of seed production), and the potential effects on other forest resources. Proposed treatments would be evaluated to determine if they fit within the scope of this EA relative to the issues analyzed.

In addition, monitoring of treatment sites would be conducted. Assessment of the effectiveness of control efforts would consider the weed management objective for each site, as well as the infestation size and percent occupancy of the target weed species following treatment. See Appendix G for a flow chart which illustrates the decision process to be followed in applying the adaptive strategy.

Table 2. Inventory Summary of Known Noxious Weeds

	Species								
		Spotted Knapweed (Centaurea macu-losa)	Yellow Star Thistle (Centaurea solsti-tialis)	Canada Thistle (Cir-sium arvense)	Orange Hawkweed (Hieracium auvan-tiacum)	Meadow Hawkweed (Hieracium pre-tense)	Dalmation Toadflax (Linaria gentisfolia)	Unspecified/ uni-dentified	**Proposed Acres To be Treated**
Watershed Name	cendif	cenmac	censol	cirarv	hieaur	hiepra	lingen		**Grand Total**
Beaver Creek		15				6			**21**
Cayuse Creek	0	96		3		68			**167**
Isabella Creek		13	0		0	0			**14**
Lake Creek							0	213	**213**
Long Creek		9							**9**
Lower Kelly Creek		47					0		**47**
Moose Creek		239							**239**
Orogrande Creek		44			0	0		78	**122**
Quartz Creek		5							**5**
Skull Creek		5							**5**
NF Clearwater to Beaver		4							**4**
NF Clearwater to Washington		1249		4		17			**1270**
NF Clearwater to Kelly		434				0	0	266	**701**
NF Clearwater to Long		43				0			**43**
NF Clearwater to Headwaters		0							**0**
Upper Kelly Creek		3							**3**
Weitas Creek					0			173	**174**
Grand Totals	**0**	**2208**	**0**	**7**	**0**	**91**	**0**	**731**	**3038**

Watersheds: Alder Creek, Bear Creek, Minnesaka Creek, Fourth of July Creek, Lower and Upper Orofino Creek, and Washington Creek currently do not have known noxious weed concentrations at this time. If noxious weed species are found in the future they would be treated following the strategy identified in this document. Resource Concerns for these watersheds include: Alder: 303d list; Bear Creek: none; Minnesaka Creek: none; Fourth of July Creek: none; Lower and Upper Orofino Creek: 303d list; and Washington Creek: 303d list.

Table 3. Known Noxious Weed Site Descriptions and Proposed Treatments

Watershed	Weed Species	Acres / Decade	Treatment Objective	Resource Concerns	Proposed Treatment Alternative 1	Proposed Treatment Alternative 2	Proposed Treatment Alternative 3
Beaver Creek	Spotted Knapweed Meadow Hawkweed	15 6	Reduce Contain	303d list	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)
Cayuse Creek	Spotted Knapweed Canada Thistle Meadow Hawkweed	96 3 68	Reduce Reduce Contain	Cayuse Airstrip, dispersed camping, outfitter camp, 303d list	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)
Isabella Creek	Spotted Knapweed	13	Reduce	Trailheads, roadless recreation, 303d list	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)
Lake Creek	Unspecified Species	213		303d list	Mechanical Biological Chemical (Clopyralid)		
Long Creek	Spotted Knapweed	9	Reduce		Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)
Lower Kelly Creek	Spotted Knapweed	47	Reduce	Blue ribbon trout fishing, dispersed camping	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)

Watershed	Weed Species	Acres / Decade	Treatment Objective	Resource Concerns	Proposed Treatment Alternative 1	Proposed Treatment Alternative 2	Proposed Treatment Alternative 3
Moose Creek	Spotted Knapweed	239	Reduce	Mining activities, historic sites, 303d list	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)
Orogrande Creek	Spotted Knapweed Unspecified Species	44 78	Reduce	Dispersed camping, 303d list	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)
Quartz Creek	Spotted Knapweed	5	Reduce	303d list	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)
Skull Creek	Spotted Knapweed	5	Reduce	303d list	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)
NF Clearwater to Beaver	Spotted Knapweed	4	Reduce	West coast disjunct plant species 303d list	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)
NF Clearwater to Washington Creek	Spotted Knapweed Canada Thistle Meadow Hawkweed	1249 4 17	Reduce Reduce Contain	303d list	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)

Watershed	Weed Species	Acres / Decade	Treatment Objective	Resource Concerns	Proposed Treatment Alternative 1	Proposed Treatment Alternative 2	Proposed Treatment Alternative 3
NF Clearwater to Kelly Creek	Spotted Knapweed Unspecified Species	434 266	Reduce	Roadless recreation, 303d list	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)
NF Clearwater to Long Creek	Spotted Knapweed	43	Reduce	Roadless recreation, 303d list	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)
NF Clearwater to Headwaters	None Identified			Semi-roadless, primitive, 303d list	Mechanical Biological Chemical (Clopyralid)		
Upper Kelly Creek	Spotted Knapweed	3	Controll	Roadless recreation	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)
Weitas Creek	Unspecified Species			Roadless recreation, 303d list	Mechanical Biological Chemical (Clopyralid)	Mechanical Biological	Mechanical Biological Chemical (Curtail®, 2,4-D Amine®, Rodeo®, Accord®, Tordon®)

Alternative 1: No Action

This alternative would not result in a change in current noxious weed control activities within the project area. This alternative would continue current levels and methods of treatment which include those activities approved in the Middle-Black Environmental Impact Statement.

The District would continue to annually treat up to 1500 acres with chemical control in the Middle Black project area and at administrative sites. Chemicals proposed for weed treatment were limited to Clopyralid products with the Middle Black analysis. This analysis proposes using additional chemicals to allow treatment of additional weed species (See alternative 3). Mowing would continue on approximately 100 acres in areas where annual weeds could be effectively treated.

Priority treatment areas would be new invasions and weed free areas.

Aggressive control of weed infestations outside of the Middle-Black Analysis project area would not occur. There would be no adaptive strategy to plan for eradication of new invaders or to adjust treatment needs if site conditions in existing infestations change outside of the Middle Black project area.

New noxious weed invaders would be treated as they are detected and as funding permits.

Under this alternative, most noxious weed species would be considered an established part of the ecosystem outside of the Middle Black project area.

The Middle-Black Analysis Environmental Impact Statement project area is within this Environmental Assessment project area. NF Clearwater River to Washington, Kelly and Long watersheds are equal to the Middle-Black EIS project area.

Alternative 2: Mechanical, Biological and Cultural Treatments (No Chemicals)

This alternative would use an integrated approach to control noxious and undesirable weeds. Treatments such as hand-pulling would be supplemented with cultural methods such as seeding, fertilizing and planting.

No herbicide would be used on any National Forest acres on the North Fork District, including those acres already approved under Middle Black analysis. Alternative 2 provides a baseline for comparing the effects of chemicals on the environment predicted under implementation of Alternatives 1 and 3. Initial treatment methods proposed for each site under this alternative are listed in Table 3.

Biological Control

Release of biological agents (parasites, predators or pathogens) that have shown promise in reducing weed infestations would be relied on heavily for weed control.

New biological control agents would be released on approximately 50 acres per year. Follow-up monitoring, with additional biological control releases as needed, would be conducted to ensure the biological agent establishes over the entire infestation.

Cultural Control

Cultural control alone is not planned. Seeding and fertilizing would occur on those sites where mechanical control was successful and on bare areas adjacent to treated areas.

Mechanical Control

Mowing would be used on approximately 100 acres annually. Some weeds would be hand-pulled and disposed of as specified in the design criteria.

Biological and Cultural Control

A combination of biological and cultural control treatments may be used as a follow-up treatment on some sites based upon site-specific evaluation.

The "no chemical" Alternative 2 also provides a baseline for analyzing the possible impacts of the active control alternatives.

Alternative 3: Mechanical, Biological, Cultural and Chemical Treatments (Proposed Action)

Alternative 3 is the Proposed Action as described in Chapter 1. This fully integrated approach would initially rely more heavily on herbicides and biological control to significantly reduce weed populations in some cases and to eradicate populations in other cases. Subse-

quent treatment would rely progressively less on these methods as larger populations are reduced.

This alternative was developed in response to the integrated weed management issue. Site specific control objectives were determined, and integrated management for each site was prescribed. Integrated management often requires a combination of several control methods to reach the objective. This alternative uses all control methods available to reach the site objective including mechanical, cultural, biological and chemical.

Initial treatment methods proposed for each site under this alternative are listed in Table 3. The herbicides listed for each site are those that are effective against the identified target weeds. One or more combinations of the listed herbicides would be used, depending upon their site-specific effectiveness. Follow-up manual, biological and/or chemical treatments will be necessary on some sites.

Optimistic forecasting for the next five (5) years indicates that approximately 3,000 acres could be treated annually. This alternative shifts control efforts from long-term biological control and monitoring, to immediate control on primary travel routes and recreation sites.

Herbicide Control

The use of herbicides alone would occur on approximately 300 acres per year. Five herbicides (dicamba, clopyralid, picloram, metsulfuron methyl, and 2,4-D amine) would be considered for application on various sites.

The use of each herbicide would depend on the weed species, level of infestation, location, other resource concerns, and applicability of the herbicide.

The application of herbicides would follow the Alternative 3 design criteria as well as the guidelines contained in Appendices I and H. Application would be with a backpack sprayer, hand-held sprayer, manual dispersal of pellets, or with a truck or ATV mounted power spray unit. **There would be no aerial application of herbicides.**

Mechanical Control

This treatment would used annually on approximately 100 acres per year.

Biological Control

Biological control alone is proposed to be used on approximately 50 acres annually. As will Alternative 2, follow-up monitoring and additional releases of biological agents as needed, would be conducted to ensure the biological agents establish over the entire infestation.

Biological and Cultural Control

A combination of biological and cultural control treatments may be used as a follow-up treatment on some sites based upon site-specific evaluation.

Mechanical and Cultural Control

This combination of treatments (seeding and fertilizing) will used on those areas where hand pulling is successful.

Cultural Control

At this time, we do not propose to use this treatment method alone. If would be used if determined to be effective in combination with either chemical, and/or manual control, based upon a site-specific evaluation.

Roadside Vegetation Treatment

Areas with rapid growing roadside vegetation would be treated with herbicides to extend the cycle between mechanical removal activities. This would help control brush and help increase sight distance. In other words, mechanical removal would be followed up with an application of herbicide, if necessary, during the second year after the mechanical brushing. In many circumstances, only problem areas will need to be addressed. This application for roadside vegetation treatment would be applied in problem areas on approximately 64 miles of road annually. See Appendix D for further details on estimated miles of treatment by sub-watershed.

Adaptive Strategy

All design criteria pertinent to Alternative 3 would apply to new treatment sites as well as to follow-up treatments on all sites within the watersheds listed. In addition, any herbicide use proposed on new treatment sites, or as follow-up treatments on the sites must meet the requirements of parameters established by the interdisciplinary team.

The parameters require that the combined treatments in any watershed result in a concentration of herbicide in surface water lower than the No Observable Effect Concentration (NOEC) rate for each give treatment year within each individual watershed. Where the NOEC for a specific herbicide is not available, the LC_{50} (LC_{50} refers to the concentration that is lethal to 50 percent of a given fish species exposed at that level for 96 hours) divided by 20 will be used as a standard for maximum treatment acres. The maximum number of acres that could be treated with a given herbicide in each watershed each year is displayed in Appendix L. The methodology used in the determination of maximum treatment acres can be found in the project file.

If any proposed herbicide application would exceed the established parameters, treatment would be deferred – or an alternative weed control method would be employed. When a combination of herbicides is proposed for use, the maximum herbicide treatment acres for a given watershed would be those for the most restrictive herbicide.

Design Criteria Specific to Alternatives 1 & 3

Herbicide Use – General

EPA would be consulted annually for new information about herbicides and surfactants proposed for use. Recommendations would be followed to ensure the safest and most effective use.

If future development of herbicides results in products that promise to be more effective, their use would be evaluated for impacts to resources analyzed in this EA.

All herbicide use would comply with applicable laws and guidelines.

Herbicide use – Public Safety

Treatment areas would be posted prior to and following herbicide applications within areas of special concern. In addition, information on where and when spraying and other treatments would occur would be available to the public at the Ranger District office.

Application of registered herbicides to treat noxious weeds would be performed by or directly supervised by a State licensed applicator.

The guidelines for safe application for individual herbicides as outlined on label requirements and also by State and Federal laws would be followed.

Procedures for mixing, loading and disposal of herbicides as outlined in Appendix H would be followed.

Procedures for a spill plan for hazardous materials as outlined in Appendix H would be followed.

All herbicide applications would be ground-based; there would be no aerial application of herbicides.

Permittees would be notified in advance of treatments on their permit sites and advised of herbicide label requirements regarding use of treated lands.

Resource Protection

Any application of herbicides would adhere to FSH 2509.22 – Soil and Water Conservation Practices Handbook, 13.07 thru 13.13.

Mixing of herbicides would occur at least 100 feet from surface water or well heads (Appendix H).

A spill kit would be available in the immediate vicinity of all herbicide mixing and spray operations (Appendix H).

Herbicides would only be applied when wind speeds are less than 6 miles per hour or as specified on the label, whichever is less (Appendix H).

Herbicides would not be applied if precipitation is expected within 4 to 6 hours (Appendix H, I, M).

Do not use picloram where there are coarse, sandy soils. Use of picloram would be allowed only once every two years, to reduce accumulation in the soil. Reduce application rate to a maximum of 1.0 pounds/acre of Picloram with spot treatment of no more that 50% of an acre (USDI-EPA 1995a).

No application 2,4 –D amine (ester formulation) or triclopyr-BEE is allowed.

Limit annually application of herbicide chemicals to below the Lethal Concentration (LC_{50}), or No Observed Effect Level/Concentration

(NOEL/NOEC) as determined by watershed (Table 13).

Only non-ionic surfactants would be allowed for use with the aquatically approved herbicides. Only non-ionic surfactants such as Spreader Sticker, LI 700 or Ortho 77 and with an LC_{50} value greater than 2348 ppm would be used within 150 feet of perennial flowing streams, rivers or wetlands (Appendix I).

Table 4. RHCA Restrictions

Distance from live water	Application Activity
0 feet	Chemicals will not be used over water, including water standing or running in ditchlines.
<15 feet	Chemicals will not be used over water. Spot spraying of individual plants with aquatically approved chemicals (gyphosate-Rodeo).
15 – 100 feet	Focused spraying of target species – may include area spraying when weed populations warrant (large patches of weeds, multiple patches in close proximity) Mixtures of chemicals may be used including those listed above and: gyphosate-Roundup, dicamba, 2,4 – D amine, triclopyr-TEA.
>100 feet	All appropriate ground application methods – includes spot spraying, focused spraying, or broadcast spraying as weed population warrant. All chemicals listed above as well as picloram and clopyralid.
All distances	Reseed with native mix (certified weed free), or mix which will help prevent invasion of weeds

To prevent potential effects on Threatened, Endangered or Sensitive (TES) plants the following TES Plant restrictions would apply. Distances are to any known TES plant occurrence (Appendix I).

- < 25 feet - No chemical spraying. Only mechanical treatment.
- 25-50 feet - Only backpack chemical spraying with focused spraying of target species. Mechanical treatments allowed.
- 50 Feet – All methods of chemical or mechanical allowed. Vehicle-based spraying devices allowed.

ALTERNATIVES CONSIDERED BUT DROPPED

No other alternatives were considered as no other issues were raised.

Table 5: Comparison of Activities and Issues by Alternative

Attribute	Alternative 1 No Action	Alternative 2 Integrated with No Chemicals	Alternative 3 Integrated with Chemicals
Acres Noxious Weed Bio-control Release per Year	50	50	50
Acres Noxious Weed/Roadside Veg Chemical Treatment per Year	Up to 1500 acres per year (Admin sites and Middle Black Project area)	0	Up to 3000 acres per year
Acres Noxious Weed Mechanical/Cultural Treatment per Year	100	100	100
Approximate Total Acres Noxious Weed Treatment per Year	1650	150	3150
Miles Chemical Roadside Follow-Up per Year	0	0	64 (these miles are included in 3000 acre figure shown above)
Effects on Water Quality and Aquatic Organisms			
Maximum Acres Treatable with picloram while remaining under NOEC[1]	Picloram not analyzed	0	4,921
Vegetative and Biological Community Diversity – Effect on Non-target Species			
Impacts on Non-Noxious and Desired plant species	0 miles of road will be sprayed for road-side brush per decade	0 miles of road will be sprayed for road-side brush per decade	644 miles of road will be brushed per decade or 64 miles annually. This equates to approximately 320 acres per year on non-noxious plants that could be affected
Impacts on Desired Plant Species	Desired plant species would decline in the long term as noxious weeds increased, especially outside of Middle Black area	Long term decline at a faster rate than Alternative 1	Potential short term impacts to individuals; long term benefits to desired plant species by reducing noxious weeds
Effects on Wildlife	Potential long term decline in forage habitat	Potential long term decline in forage habitat at a faster rate than Alternative 1	Higher likelihood of maintaining long term forage habitat
Potential Effects on Human Health from the Application of Herbicides			
Effects on Weed Control Workers	No Change	Slight risk of skin and eye irritations, cuts, sprains and bruises	Same as Alternative 2. Risk from herbicides would be insignificant
Effects on visitors or nearby residents	No Change	No effect	Same as Alternative 2. Risk from herbicides would be insignificant

[1] No Observable Effect Concentration – In this case, Picloram Acres are shown. In reality, very little picloram will be used; clopyralid will be the common herbicide used. Picloram is chosen here to provide consistency with the worst case scenario.

CHAPTER 3 – AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

INTRODUCTION

This chapter describes the baseline (existing) conditions of the physical, biological and human resources which could be affected by the proposed action and discloses the potential environmental consequences of the proposed action within the scope of each of the alternatives.

Analysis of Alternative 1 describes the predicted effects of maintaining current levels of noxious weed management within the project area. This includes continuation of ongoing chemical treatment of weeds in the Middle Black project area. Analysis of Alternative 2 outlines potential effects of using mechanical and biological control agents. The Alternative 3 analysis explains predicted effects of treating noxious weeds with herbicides in addition to using mechanical and biological controls. Alternative 3 is similar to Alternative 1, but allows for chemical treatment District wide instead of limiting chemical treatment to the Middle Black project area. Alternative 2 provides a base line for comparing the effects of chemicals on the environment predicted under implementation of Alternatives 1 and 3.

The environmental consequences form the scientific and analytical basis for comparison of the alternatives (40 CFR 1502.16). They emphasize measures to mitigate adverse impacts through compliance with Forest Plan standards and summarize monitoring programs required by NEPA (40 CFR 1502.2©) and NFMA (36 CFR 219.11(d)).

Each resource is discussed in the following order: affected environment, environmental consequences, direct and indirect effects, and cumulative effects for each alternative and a summary of the effects by resource.

Cumulative effects for each alternative will consider the effects of other projects near or within the project.

North Fork Clearwater River and Orofino Creek Subbasins

The project area is located within the North Fork Clearwater River subbasin and the Orofino Creek watershed.

The analysis area for *cumulative* effects covers approximately 1 million acres. Included in those acres are National Forest lands on North Fork Ranger District and a small portion of the Powell Ranger District of the Clearwater National Forest and adjacent intermingled State and private ownership. Actions on adjacent ownership are included in the cumulative effects analysis. Effects of *direct and indirect* activities will be assessed on National Forest lands.

The project area is located within Clearwater and Idaho counties. A vicinity map of the area can be found in Appendix C.

EXISTING WEED INFESTATIONS

Affected Environment – Weed Populations

During 2002, the North Fork Ranger District conducted inventories on portions of the project area. Nez Perce Tribal Bio-control personnel as well as district personnel have searched suitable and likely locations including travel corridors, dispersed and developed campsites, administrative sites and timber sale areas. Based on the level of infestation and the weed species present as well as resource values at risk, various treatment methods were recommended. The sites were then prioritized for treatment. **Table 3: Site Descriptions and Proposed Treatments** (Chapter 2) shows the weed species present and weed management objectives, for each of the sub-watersheds. Results of the weed surveys can be found in the project file.

Approximately 3000 acres of weed infestations have been documented on National Forest lands. The most prevalent species are spotted knapweed, St. Johns-wort, meadow hawkweed, orange hawkweed, Dalmatian toadflax, yellow toadflax, bull thistle, and Canada thistle. Smaller populations of diffuse knapweed have also been detected.

A recent weed inventory conducted in partnership with the Nez Perce Tribe Biocontrol Center found these weeds present in the project area.

Weed Species	## of Acres
Diffuse knapweed	0
Spotted knapweed	2208
Yellow Starthistle	0
Canada Thistle	7
Orange Hawkweed	0
Yellow Hawkweed	91
Dalmation Toadflax	0
Unknown	731
Total	3038

Additional infestations of the above species are known or suspected to occur throughout the project area, but have not been quantified.

Other weed species such as leafy spurge, musk thistle, and purple loosestrife are suspected to occur on National Forest lands within the project area but have not been quantified. Yellow star thistle is also known to occur.

The characteristics of each weed species and available control methods can be found in Appendix J.

Future surveys will reveal additional weed populations. Treatment methods for those sites will be determined by evaluating site and weed species characteristics and applying the criteria established in the adaptive strategy described in Chapter 2 and illustrated in Appendix G. Future surveys will also help us find new invaders.

Dynamics of Weed Invasions

According to Cousens and Mortimer *Dynamics of Weed Populations* (1995), weeds generally invade a region (such as the Upper Columbia River Basin) through a three-phase process:

Introduction – As a result of dispersal, seeds or plant fragments arrive at a site beyond their previous geographic range and establish populations of adult plants. Potential new invaders such as yellow starthistle could become a serious problem if allowed to advance beyond the introduction phase.

Colonization – The plants in the founding population reproduce and increase in number to form a self-perpetuating colony. Houndstongue is an example of a weed species in the colonization phase within the North Fork Clearwater River basin.

Naturalization – The species establishes new self-perpetuating populations, undergoes widespread dispersal and becomes incorporated within the native flora. For example, spotted knapweed, yellow hawkweed, common tansy and St. Johns-wort have become naturalized within the Upper Columbia River Basin and in many areas of the North Fork Clearwater subbasin.

Invasion and range expansion by a weed involves all three phases. Typically, plant invasions do not occur along a single front. Instead, new outbreaks initiated by long distance dispersal become the centers for shorter distance dispersal that eventually fills the gaps between them.

The rate at which weed populations expand can be very difficult to determine, and may be exponential (a constant proportional rate of increase) or two-phased (sudden range expansion followed by a period of little increase).

It is typically only when the naturalization phase is reached that a species is likely to be considered a nuisance and classified as a weed. Weed control efforts are then focused on limiting further spread of naturalized weeds into previously uninfested areas. Eradication is usually the goal for species considered to be new invaders at a more localized level.

Thus, while a weed species may be considered naturalized within the Upper Columbia River Basin, that same species may still be in the introduction or colonization phase for the project area.

Methods of Weed Spread

Forest roads and trails serve as corridors for the dispersal of many weed species. Roche and Roche (1991) discuss the historical perspective of meadow hawkweed invasion in the Pacific Northwest and cite many older studies documenting the influence of road systems. Weed seeds and plant parts are moved along road systems by vehicles and people, allowing the establishment of weeds into previously uninfested areas. Many of the road systems within the project area contain infestations of such species as spotted knapweed, hawkweeds, and St. Johns-wort. As corridors, road systems

allow weeds to invade areas where ground disturbance has taken place (i.e. timber harvest units, gravel pits, etc.).

Weeds are also transported by wildlife and domestic livestock. Weed seeds consumed by animals or attached to their fur are carried off road and trail corridors into the forest. Recreationists play a large part in weed spread; hiking, mountain biking, using ATVs and motorcycles, and horseback riding all contribute to the spread of weeds. Some weed seeds are dispersed by the wind, while other are transported to new sites by streams and rivers. In this manner, weeds have been able to occupy undisturbed habitats far removed from road or trail systems.

Past Weed Control Efforts

With the exception of experimental bio-control releases, some mowing and the spraying of administrative sites, there has not been a strong weed management program within the project area, until the implementation of the Middle Black project. Early results look positive for treatments to control spotted knapweed along roadsides in the Middle Black project area.

State and County Weed Control Activities

The State of Idaho and Clearwater and Idaho Counties have noxious weed control programs. The State of Idaho is responsible for directing noxious weed activities; each county has noxious weed control board which is responsible for controlling weeds along county roads, for providing information to residents and other agencies about weed control methods, and for providing technical assistance for weed management on private lands.

County weed control agencies actively treat weed infestations along roads within their jurisdiction. In addition, the boards assist with the Certified Weed Free Hay Program, enforcement of the noxious weed control law, and identification of new weed invaders.

Environmental Consequences– Weed Populations

All Alternatives

All alternatives propose the use of biocontrol agents, many of which are limited in their availability. Estimates for acres of biocontrol releases were based on realistic availability predictions. If additional biocontrol agents become available, they will be used.

Alternative 1: No Action

Herbicides would be available for treatment of new weed invaders but their use would be restricted to administrative sites and the Middle Black project area. Alternative 1 would be minimally effective in controlling existing populations. Outside of Middle Black project area large infestations of orange and meadow hawkweed would not be treated because of the excessive cost and the unlikely prospect of success with currently available methods. These large populations would continue to spread throughout the project area along road corridors and stream channels. They would continue to serve as a significant source of noxious weed seed infestations into the surrounding landscape.

The limited release of biological control agents into large infestations of spotted knapweed and St. Johns-wort would lessen the rate of spread in some areas, but likely would not result in significant control of most infestations.

Without a comprehensive weed treatment and monitoring plan or an adaptive strategy for the area, most treatment efforts would not be as successful as they could.

The long-term effect of implementation of Alternative 1 would be that as weed infestations become larger and more widespread outside of Middle Black project area, the cost of control would increase while the chance of success would diminish. New invaders that are not effectively killed with Clopyralid, such as the toadflaxes and rush skeletonweed, would continue to expand. New invaders not successfully treated would likely become naturalized into the ecosystem and once established, would be difficult if not impossible to eradicate.

Alternative 2: Mechanical, Biological and Cultural Treatments

Alternative 2 would have the effect of controlling some weed populations but many infestations would continue to spread. Large infestations of spotted knapweed and St. Johns-wort would be treated by a combination of biological agents.

Within some locations, mechanical and cultural control could eliminate infestations of knapweed (Lacey et al. 1995), Houndstongue and St. Johns-wort. Houndstongue can be eradicated if plants are pulled the first year since flowering occurs in the second year. Small infestations of knapweed and St. Johns-wort can be eradicated if a sufficient portion of the taproot and lateral roots are removed. However, all three species are prolific seed producers; seed reserves in the soil can remain viable for more than ten years. Disturbed soil around pulled plants would provide a seedbed for the germination of weed seeds. Therefore, hand-pulling would have to continue over many years to be highly effective. Re-vegetation of areas disturbed during mechanical control activities would enhance the effectiveness of these control methods.

Mechanical control methods would have limited success in smaller infestations of meadow and orange hawkweed and Dalmatian toadflax. Hand-pulling may actually stimulate growth and spread by providing a disturbed seed bed, and by fragmenting rhizomes that are left in the soil. Biological control agents are being developed for the hawkweeds and will be utilized as soon as they become available.

Mechanical control is typically unsuccessful in treating Canada thistle infestations. This species has an extensive root system and sends out new shoots from numerous buds on lateral roots. Canada thistle infestations would not be eradicated with mechanical or cultural treatments. The infestations would continue to fill in through vegetative reproduction in spite of a rigorous hand-pulling program. There would be a high risk that Canada thistle would continue to spread vegetatively.

With full implementation of this Alternative, most weed populations would not be brought under control – either due to infestation size or individual species biology. Monitoring of past mechanical and biological methods in the Priest Lake Ranger District Noxious Weed Control EIS (1997, pp III-2,3) indicates that these methods alone have not been successful in controlling populations. While cultural treatments in conjunction with mechanical and biological methods increase the likelihood of success, most weed populations would not be eradicated.

The long-term effect of implementation of Alternative 2 would be a reduction of some weed species considered to be naturalized within the ecosystem. Biological control of spotted knapweed and St. Johns-wort would help to reduce the size of some infestations. However, changes in population size and distribution would not be noticeable for many years. Infestations of those species and Canada thistle, sulfur cinquefoil and Dalmatian toadflax along roads and trails would continue to provide a seed source for their continued spread.

Orange and meadow hawkweed would continue to increase, and would become more difficult to control as populations increase in size and distribution. In addition, new invaders not successfully treated would likely become naturalized within the ecosystem and, once established, would become difficult if not impossible to eradicate.

Where weed infestations are successfully eradicated, follow-up treatments and monitoring of infestation sites combined with re-vegetation activities using desired plant species would reduce the likelihood of re-infestation.

Alternative 3: Mechanical, Biological, Cultural and Chemical Treatments

The use of herbicides along with mechanical and biological methods would not result in the total elimination of noxious weeds from the project area. However, this Alternative would effectively reduce the size and rate of spread of infestations.

Mechanical control would be used only at those sites where effective weed control is predicted (i.e. small infestations of specific weed species). Therefore, this control method would be more successful under Alternative 3 than under Alternative 2 because the combination of the two treatments – mechanical and chemical – can be more effective. The effectiveness of cultural and biological control methods would be same as under Alternative 2.

Initial use of herbicides in some populations would likely require less follow-up treatment.

Herbicide use in orange and meadow hawkweed infestations would offer a much greater chance of success than other control methods. The combination of chemical and biological control of spotted knapweed, St. Johns-wort, Canada thistle, sulfur cinquefoil and Dalmatian toadflax would reduce their occurrence along roads and trails. By effectively reducing weed population along travel corridors, the incidence of weed spread would diminish.

Follow-up treatments and monitoring of treated infestations combined with re-vegetation using desired plant species would reduce the likelihood of re-infestation.

Based on the extent of each infestation and the weed species present at each site, it is estimated that weed infestations would be eradicated or greatly reduced on 70% of the proposed treatment acreage (St. Joe Noxious Weed EIS). At other sites, the risk of weed spread to uninfested areas would be significantly decreased.

VEGETATIVE COMMUNITY DIVERSITY

Affected Environment – Vegetative Community Diversity

The Clearwater Subbasin ecosystems have some of the most productive and biologically diverse forest lands in the entire Interior Columbia River Basin. Vegetative communities range from dry or semi-dry associations, moist forest associations, wetlands, and cold-wet sub-alpine associations.

Table 6 displays the forest cover type composition of the proposed project area.

Table 6. Forest Cover Types

Forest Cover Type	% of Project Area
Birch/Alder/Ash	0.1
Douglas-fir	14.7
Englemann Spruce	3.1
Grand fir	17.5
Lodgepole Pine	10.7
Mountain Hemlock	10.0
No Data	5.8
Non-stocked	2.9
Ponderosa Pine	0.5
Quaking Aspen	0.2
Subalpine fir	6.1
Western Larch	0.5
Western Redcedar	7.4
Western White Pine	0.5
Non National Forest	19.9

While the productive and diverse Moist Forest Potential Vegetation Group (western hemlock, western redcedar and grand fir cover types) makes up only a small portion (18%) of the Interior Columbia River Basin, it makes up a larger portion (25%) of the North Fork Ranger District and the project area.

The drier Ponderosa pine and Douglas-fir forest cover types occur on 15% of the lands within the project area, while the higher elevation subalpine fir cover type occupies 16% of the project area.

The lodgepole pine forest type currently occupies 10% of the area. Because of the large stand replacement wildfires in the early part of the 1900s, this cover type occupies portions of the Moist Forest Potential Vegetation Group within the drainage.

The long-lived early seral white pine and larch forest types cover an additional 1% of the District.

Englemann spruce grows over a wide range of areas with abundant soil moisture. Spruce is found primarily in riparian areas and in subalpine fir habitat types on northern aspects.

Common understory shrubs on drier sites include kinnikinnick, creeping Oregon grape, snowberry, ocean spray, and ninebark. Moister Douglas-fir sites support twinflower, Oregon grape, kinnikinnick, red-osier dogwood, and western aster.

River and stream bottoms are well vegetated with conifers and deciduous trees and shrubs. Associated hardwood tree species include cottonwood, birch and some aspen. Alder and willow are also common riparian area shrubs.

Noxious and undesirable weed species have been found on national Forest lands in many of these cover types. Dry communities (Ponderosa Pine/Douglas-fir cover types) as described above are inherently vulnerable to invasions by spotted knapweed, St. Johns-wort, and common tansy (Lacey et al. 1995, Whitson et al. 1992).

The moister cedar/hemlock cover types in the lower elevations are susceptible to invasion by hawkweeds, skeleton weed, and tansy ragwort following soil disturbance and reduction of normal canopy cover (Rice and Toney 1997).

The recent scientific assessment of the Interior Columbia River Basin found that herbaceous and shrub wetland vegetation types in the Upper Columbia River Basin (including riparian habitats) have declined in area from historical conditions – in part due to invasion by certain weed species (Quigley and Arbelbide 1997). Wetland habitat in the North Fork Clearwater Subbasin is susceptible to decline from encroaching weeds.

The rangelands and dry forest types within the Clearwater ecosystem and surrounding region were described in the above assessment as having low ecological integrity – again in part due to noxious weed invasions (Quigley, Haynes et al. 1996).

Table 7, adapted from the recent scientific assessment of the Interior Columbia River Basin, displays the susceptibility of the Clearwater Sub-basin ecosystem's major vegetative community types to invasion by several weed species of concern. Susceptibility to invasion depends upon the weed's aggressiveness and the suitability of the community type as habitat for that weed.

Of the cover types within the basin, grasslands (including fescue-bunchgrass), herbaceous wetlands, and drier open-canopied forest (such as interior Douglas-fir and Ponderosa Pine types) are the most susceptible native habitats to weed invasion.

Lower elevations portions of the moist western redcedar/hemlock forest types are also at risk to invasion by hawkweeds, skeleton weed, and tansy ragwort (Rice and Toney 1997). The higher elevation forest of these cover types are less susceptible to weed invasion.

Table 7. Broad scale cover types in the project area and their susceptibility to invasion by 14 weed species

(Adapted from *An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins*, Vol. II Table 3.174, June 1997).

Vegetation Cover Type	Musk Thistle	Diffuse Knap-weed	Spotted Knap-weed	Yellow Star-thistle	Rush Skeleton-weed	Ox-Eye Daisy	Canada Thistle	Bull Thistle	Leafy Spurge	Orange Hawk-weed	Meadow Hawk-weed	Dalma-tian Toadflax	Purple Loose-strife	Sulfur Cinque-foil
Cottonwood/ Willow	M	M	H	M	M	H	H	M	H	M	H	M	M	M
Engelmann Spruce – Subalpine Fir	H	M	M	M	M	H	H	H	M	M	M	M	M	M
Fescue - Bunchgrass	H	H	H	H	M	M	H	H	H	L	L	H	L	M
Grand Fir	M	M	M	M	M	M	M	M	M	M	U	M	M	M
Herbaceous Wetlands	M		H	H	L	H	H	M	M	H	M	M	H	H
Interior Douglas-fir	H	M	H	M	M	M	H	H	M	M	M	M	L	H
Interior Ponderosa Pine	M	H	H	M	M	M	M	M	M	L	L	M	L	H
Lodgepole Pine	M	M	M	M	M	M	M	M	M	M	L	M	L	M
Mixed-Conifer Woodlands	M	M	H	M	M	U	H	M	M	L	L	M	L	H
Native Forb	M	M	M	M	M	M	M	M	M	L	L	M	M	H
Shrub Or Herb/ Tree Regeneration	M	M	M	M	H	M	M	M	M	M	L	M	L	H
Shrub Wet-lands	H	M	H	M	L	M	H	H	M	M	M	M	H	M
Western Larch	M	M	M	M	M	M	H	M	M	M	M	M	L	M
W. Redcedar/ W. Hemlock	H	M	M	M	M	H	H	H	M	M	M	M	M	M
Wheatgrass Bunchgrass	M	H	H	H	M	M	H	M	M	L	L	H		H

H = High susceptibility to invasions – Weed species invades the cover type successfully and becomes dominant or co-dominant even in the absence of intense or frequent disturbance.

M = Moderate susceptibility to invasion – Weed species is a "colonizer," and invades the cover type successfully following high intensity or frequent disturbance which impacts the soil surface or removes the normal canopy.

L = Low susceptibility to invasion – Weed species does not establish because the cover type does not provide suitable habitat.

U = Unknown susceptibility to invasion – Ecological requirements of the weed species are not know, or there was a lack of distribution records for the weed species, or the extent of the cover type in the project are might be so minor as to prevent or restrict the probability of obtaining distribution records.

Environmental Consequences– Vegetative Community Diversity

Alternative 1: No Action

This alternative would have no direct effects on vegetative communities outside of the Middle Black project area since weed control activities would not change from current levels.

There would be no immediately apparent impact on vegetative community diversity outside of the Middle Black project area. However, given the moderate to high susceptibility of most vegetative communities within the ecosystem to invasion by the weed species of concern (see Table 7), it would be expected that existing weed populations would continue to spread into new areas – in many cases, with or without disturbance. Weed species that are resistant to treatment with Clopyralid would become especially troublesome.

Outside of the Middle Black project area Orange and meadow hawkweed infestations would continue to invade moist forest and wetland habitats, displacing less competitive native species. Spotted and diffuse knapweed, St. John's wort, Dalmatian toadflax and Canada thistle would also increase in density and distributions. Houndstongue would spread rapidly and future control of this species would be very difficult and costly.

As noxious weeds spread, the negative indirect impact on native plant communities would become increasingly apparent. Corridors such as trails and roadsides would become increasingly infested with noxious weeds. Noxious and undesirable weeds would be likely to dominate many vulnerable habitats.

Planty-Tabacchi et al. (1996) found that the diverse habitats and shifting dynamics of riparian zones make them uniquely susceptible to weed invasions. The researchers also determined that the richest plant communities along a river system were the most vulnerable to invasion by weeds.

Several researchers have demonstrated that the actual number of native species, as well as their total biomass, would decrease in locations infested by noxious weeds. Belcher and Wilson (1989) found seven to eleven other species in locations free of leafy spurge, but only four other species within areas infested by leafy spurge. Tyser and Key (1988) reported significant reductions in species diversity in knapweed-infested fescue grasslands surveyed within Glacier National Park.

The long-term effect of implementation of Alternative 1 would be that, as weed infestations become larger and more widespread, some native species could be eliminated from their habitats, and native plant species diversity in many areas would decline. Most noxious and undesirable weeds would – in effect – be considered as naturalized within the ecosystem.

Alternative 2: Mechanical, Biological and Cultural Treatments

Only modest success in controlling weed infestations could be expected with full implementation of this alternative.

No direct effects to vegetative communities within the ecosystem would occur and there would be no immediate apparent impact on vegetative community diversity. Through a diligent program of mechanical and cultural control, some sites would have native plant diversity maintained or restored. In addition, control of weed species at these sites would reduce or eliminate their spread to other areas. However, vegetative diversity in many sites would decline as weed populations expand.

The long-term effect of Alternative 2 would be similar to that of the No Action Alternative in areas outside of the Middle Black project; however, it would take longer – perhaps years – for the decline in vegetative community diversity to become apparent.

Alternative 3: Mechanical, Biological, Cultural and Chemical Treatments

The effects of mechanical, cultural and biological treatments on vegetative community diversity would be similar to those discussed under Alternative 2. The higher predicted effectiveness of mechanical control combined with chemical follow-up when necessary under this alternative would provide greater long-term protection of vegetative community diversity.

Implementation of this Alternative would not produce immediately apparent impacts to vegetative community diversity. However, full implementation of this Alternative could help reverse the trend toward noxious weed dominance.

A fully integrated approach to noxious weed treatment would be the most effective weed control method (Bechinski 1992 and Everett 1994). Therefore, this alternative, combined with an aggressive prevention and education program, would provide greatest long-term protection of vegetative community integrity.

As discussed under Alternative 1, the failure to control noxious weeds on most of the identified treatment sites would increase the probability that noxious weeds would spread to new sites. Likewise, the risk of weed spread would remain high at sites in which weeds are only partially controlled (for example, through mechanical treatment of hawkweeds as described in Alternative 2). The probability of spread is compounded as weeds colonize new sites which then become new seed sources for even greater population expansion. Under Alternative 2, and to a lesser extent, Alternative 1 weed populations would continue to increase.

The impacts of herbicides on vegetative biodiversity tend to be much more easily confined to the site of the application. Although herbicides would directly affect some non-target plant species at the site of the application, the long-term effect on native plant communities would be beneficial.

Herbicides such as picloram and 2,4-D are often perceived as greatly reducing the diversity of plant species on a treated site. For example, picloram is thought to create a grass monoculture at the expense of broadleaf species. This is somewhat overstated. Two studies have been conducted in western Montana to measure the impact of herbicide application on native species. Willard et al. (1988) measured the impact of picloram on native grasses and broadleaf species. With the control of noxious weeds, grass species generally showed marked increases. Some broadleaf species such as arnica and yarrow were greatly reduced. Generally, members of the Asteraceae (composite family), Fabaceae (legume), Polygonaceae (buckwheat), and Apiaceae (parsley family) were affected by picloram. Members of the Brassicaceae (mustard family), Liaceae (lily family), and Scrophylariaceae (figwort family) were less affected by the herbicide.

In a more extensive study, Rice et al. (1992) compared the impacts of the herbicides 2,4-D, picloram and clopyralid to the impact of knapweed invasion on species number and diversity. The knapweed sites were in the initial stages of infestation, thus the diversity on these sites had not suffered as much as in studies cited above by Tyser and Key (1988). Although the untreated knapweed plots in Rice's study started with slightly higher numbers of species and diversity, within two years the species number and diversity were virtually identical on all plots. Initially, the impact to species was greater on sites sprayed with picloram than on sites sprayed with clopyralid.

Clopyralid affects members of only three plant families – the composites, the legumes, and the buckwheats. Thus, this herbicide can be sprayed near tree, shrub and forb species that may be affected by picloram.

On-site impacts to vegetation not withstanding, herbicide application as proposed would have the benefit of reducing sources of further weed spread to currently uninfested areas. Although herbicide application would have small and transitory impacts on some non-target vegetation, it would prevent much more serious long-term effects on many susceptible communities within the ecosystem.

Roadside Brush Control

The intent of this proposal is to treat the areas with rapid growing roadside vegetation with herbicides to extend the cycle time between mechanical removal efforts. In many circumstances, only problem segments of roads need to be addressed. Where spot removal by mechanical means is inefficient, expensive or not practical, herbicide treatment of those areas would be more sensible allowing many more miles of roadside to be maintained to the proper standards.

Roadside spraying to control brush would occur on approximately 64 miles of road per year under Alternative 3. This would affect many of the herbs, forbs and shrubs that are currently rooted there; but many of the roots would remain leading to re-sprouting of the plants. The visual effects would be noticeable within the first several weeks and diminish rapidly after that.

This proposal would follow up mechanical removal with an herbicide application in the second year. The herbicide treatment would kill the fastest growing broadleaf brush species that rapidly appear after mechanical removal.

Presently, less than 60 miles of project area roads have mechanical removal of roadside vegetation annually.

THREATENED, ENDANGERED AND SENSITIVE PLANTS (TES)

Affected Environment – TES Plants

A Threatened species, as determined by the U.S. Fish and Wildlife Service (USFWS), is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

Sensitive species are determined by the Northern Regional Forest as those species for which population viability is a concern, as indicated by a current or predicted downward trend in population numbers or in habitat capability which would reduce the species' existing distribution.

The majority of sensitive plant species occur in wet western redcedar riparian communities and in moist upland mature cedar/hemlock. Others occur in dry xeric openings in Ponderosa pine and Douglas fir communities, meadows and grasslands, broadleaf forests, high elevation subalpine riparian areas, and openings. **Table 6: Forest Cover Types** on page 33 displays the forest cover type composition in the North Fork subbasin.

Of the estimated 800 plant species currently either known or suspected to occur within the subbasin, 32 have currently been identified as species of concern (TES). The majority of these species (28) occur in wet riparian communities or moist, mid-late seral western redcedar communities. Table 6 shows that these cover types make up a relatively small percentage of the project area.

Methodology

Assessment of the TES plants and their suitable habitat occurrence was accomplished through review of Idaho Conservation Data Center Element Occurrence Records, timber stand examination records, aerial photographs and topographical maps of the area as well as previous plant surveys.

Threatened/Endangered Plant Species

There are no listed threatened or endangered plant species on the Clearwater National Forest.

Sensitive Plant Species

There are 32 sensitive plant species known or suspected to occur on the Clearwater National Forest. Approximately 20 are known or suspected to occur within or near the project area.

Sensitive plant species can be assigned to one or more forest cover types based on similar general habitat requirements. Table 6 lists the general cover types within the North Fork Clearwater and Orofino Creek drainages. Though cover types do not necessarily represent the forest habitat type or potential vegetation of a site, they do represent the ecological factors of a site. Such factors include moisture, light, temperature and others that dictate the distribution of particular plant species. The large majority of sensitive plant species will occur in wet western redcedar riparian areas or moist western redcedar and hemlock forests.

The treatment sites, by nature, are commonly disturbed sites not generally conducive to potential sensitive plant occurrence. In many cases, the habitat has been altered enough that it is not considered high potential habitat for sensitive plants. Typical examples of such areas include: open – or recently closed – roads, rockpits, administrative sites, campgrounds and high use trailheads.

If sensitive plants are found within treatment areas, the guidelines listed on the next page under Effects Common to All Alternatives would be followed.

Environmental Consequences– TES Plants

The effects from the control of noxious weeds on TES plant species are assessed by evaluating the potential for adverse impacts on: habitat, known occurrences, and population viability of these species.

Within forest covers, deerfern (*Blechnum spicant*) is generally found in riparian areas and wet cedar/hemlock habitats. No populations have been identified within treatment areas.

Effects Common to All Alternatives

Biological control methods should have no effect on TES plant species or their habitat. Insects have been intensively tested for specificity to target weed species.

To insure the protection of TES plant populations, the following measures would be implemented:

- All treatment sites would be evaluated for TES plant habitat suitability. Highly suitable habitat would be surveyed as necessary prior to treatment.
- Site-specific treatment guidelines would be developed for weed infestations within or adjacent to known TES plant populations.
- No spraying with vehicle-based spraying devices would be done within 50 feet of any known TES plant occurrence.
- No chemical spraying would be done within 25 feet of any known TES plant occurrence. Only mechanical treatment would be used within 25 feet of TES plants.

Protection measures range from not treating the site, to implementing buffers, to monitoring effects. Chosen site-specific measures used would be commensurate with the type of treatment (i.e. mechanical, biological or chemical) and the threat to the species and/or population.

Alternative 1: No Action

Direct and Indirect Effects

There should be no direct impact to sensitive plant populations or suitable sensitive plant habitat with effective mitigation measures in place. Effects to sensitive plants from Clopyralid inside the Middle Black project area would be the same as Alternative 3. Although there are sensitive plant populations within and/or adjacent to some of the treatment sites, there would be no direct impact to those populations.

Given the known occurrences of TES plant populations, existing high potential habitat conditions, and the existing and anticipated spread of noxious weeds, it is unlikely that the No Action Alternative would adversely impact TES plant habitat or populations. Alternative 1 is also not expected to significantly reduce TES plant population viability or cause a trend towards Federal listing of any sensitive species.

Cumulative Effects

In the long term, the No Action Alternative could lead to a decrease in the amount of potential habitat for sensitive plant species. As discussed in the Wildlife section, the effects of noxious weeds on forest succession are uncertain. However, the existing weed populations would most likely continue to spread, increasing competition with native plant species and decreasing diversity and abundance.

Meadow and orange hawkweeds have been observed in moist forest habitats. Existing populations would be likely to continue to spread into these areas, especially outside of the Middle Black project area. Populations of the hawkweeds, Canada thistle and other weeds would likely spread in riparian areas throughout the project area as these areas serve as natural travel and linkage corridors.

Most of the sensitive plants known to occur within the project area are associated with moist forest and riparian habitats. Therefore, if noxious weed populations continue to grow and spread into these habitats, a long-term cumulative reduction in sensitive plant habitat capability would be expected.

Assuming adverse noxious weed effects on succession, this could negatively affect the potential for sensitive plant species to colonize potential habitat. As noxious weeds continue to spread, the amount of present or potential habitat for sensitive plant species could decrease and the possibility of adversely affecting the population viability of sensitive plant species could increase.

Alternative 2: Mechanical, Biological and Cultural Treatments

Direct and Indirect Effects

There would be no direct impacts to identified sensitive plant occurrences during weed treatment on the large majority of treatment sites. For the few sites where weeds occur within the extent of the sensitive plant population, it is possible some trampling of sensitive plants could occur during hand pulling of weeds. Care would be taken to limit this as much as possible. The effects on a few individual plants are not expected to affect population viability.

Future treatment sites would be assessed for suitable TES plant habitat and would be surveyed prior to treatment as needed. Treatment of additional infestations under the adaptive strategy may necessitate a short-term loss of isolated individuals, primarily from marginal habitats, to protect the integrity of some weed-free habitats and core populations of sensitive plants. Impacts to individuals would not be expected to cause a loss of population or species viability, or lead to Federal listing of any sensitive plant species.

Mechanical control of orange and meadow hawkweeds might be successful, provided that treatment efforts removed the entire root mass. Removal of the entire root mass would require repeated, labor intensive treatments.

Biological control of knapweeds and Dalmatian toadflax is not expected to impact any known sensitive plants directly or indirectly. The biological agents have been tested for host specificity and have a very narrow selection range.

Cumulative Effects

In the long-term, biological control methods could benefit TES plant species and their habitat by controlling the spread of target weed species into weed free areas, and eventually reducing weed populations on the sites.

If fully implemented, this Alternative would slow the rate of spread of some weed populations. However, because many infestations would not be controlled or eliminated, suitable TES plant habitat would likely be reduced. Thus, the opportunities for expansion of vulnerable TES plant populations into suitable habitat could eventually be reduced.

Alternative 3: Mechanical, Biological, Cultural and Chemical Treatments

Direct and Indirect Effects

Although there are sensitive plant populations within and/or adjacent to some of the treatment sites, there would be no direct impacts to those populations. A 25 foot no herbicide buffer would be implemented surrounding known plant locations; there should be no drifting of spray outside of the treatment areas. Herbicide use is not likely to cause any adverse affects to these known nearby plant populations and, therefore, to their population viability.

The potential for adverse effects from mechanical and biological treatment is the same as discussed under Alternative 2.

Removal of competitive weed species could improve habitat for colonization by sensitive species. If colonization occurs, any future treatments should again be preceded by sensitive plant surveys to reevaluate the need for re-treatment.

Cumulative Effects

In the long-term, treatment of noxious weeds with chemicals could reduce the total weed population and improve habitat for potential colonization by sensitive plant species.

Roadside treatments could help prevent the spread of weeds to more natural habitats off road, thereby protecting the diversity of native plants in those areas.

Herbicide treatment on future sites under the adaptive strategy could result in the direct loss of sensitive plant individuals – particularly, those at the periphery of established populations. Loss of individuals in not expected to reduce population viability or lead to Federal listing of any sensitive plant species. As with mechanical and cultural control, site-specific treatment criteria would be designed to protect the viability of known sensitive plant populations. Herbicide spot-applications, under conditions outlined in the design criteria, would allow effective weed control with little or no impact to sensitive plant populations or habitat.

All known sensitive plant populations would be buffered from herbicide application. Future treatment sites would be assessed for suitability as TES plant habitat, and would be surveyed as needed prior to treatment. Recommended buffers and treatment criteria for riparian and aquatic sites would prevent indirect effects to sensitive plants or suitable habitat in these areas.

Successfully eliminating or controlling a majority of weed populations would protect and enhance suitable habitat for sensitive plants.

Forest Plan Consistency

The Clearwater National Forest Plan directs that the habitat of sensitive plant species be managed to prevent further declines in populations that could lead to Federal listing under

the Endangered Species Act. Alternative 1, 2 and 3 would be consistent with Forest Plan direction.

SOILS, WATER QUALITY AND AQUATIC ORGANISMS

Soil conditions can lead to indirect effects on other resources such as the water retention or percolation capacity at a particular site. Because this can influence the hydrology and consequently the fishery in a watershed, these resources are discussed in the same section.

Affected Environment – Soils

The analysis area includes the Forest Service managed portion of tributaries to the North Fork Clearwater River upstream of the upper pool of Dworshak Reservoir, and Orofino Creek – a tributary to the Clearwater River (approximately 776,039 acres).

Due to the nature of interactions of soil characteristics and herbicides, soils are an important part of our analysis. Of particular importance are percent of organic matter in the soil, available water holding capacity of the soil, and soil permeability. These three characteristics and the chemical properties of a give herbicide determine both the availability of the herbicide for uptake by plants and its tendency to move through the soil.

When incorporated into the soil, a portion of herbicide dissolves in the soil water and a portion is taken into soil particles – primarily fine particles and organic matter. The amount of herbicide absorbed, or attached, to soil particles depends on the characteristics of the chemical and the amount of organic matter and fine material in the soil. Any herbicide that remains in water is available for uptake by plant roots. However, if the water moves off-site or out of the rooting zone, it takes some of the dissolved herbicide with it. Most undisturbed soils in North Idaho have a surface layer from 2 to 5 inches thick. The lower part of this litter layer is highly decomposed and would have a high likelihood of herbicide absorption. Below the organic litter layer, volcanic ash occurs as the surface layer of mineral soil. The ash layer varies from 7 to 16 inches thick. The top part of the ash is rich in organic matter; the entire ash layer has a very high water holding and herbicide-nutrient holding capacity. The risk of herbicide movement through undisturbed forest soils into ground water is low in most places.

Based on soil characteristics, sites can be classified as either infiltration-dominated or runoff dominated. Infiltration-dominated sites include coarse-textured or gravelly soils such as those in the analysis area. On these soils, water infiltrates at a rate fast enough that runoff does not normally occur. While extremely rare precipitation events may result in some runoff, by far the predominant manner in which water moves is via infiltration. In the process, toxins on the soil surface may be carried by water (rainfall, snowmelt, etc.) as it percolates down through the soil profile.

Runoff-dominated sites, by comparison, occur where soils are very fine-textured or clayey. Percolation or infiltration of water into the soil profile is slow causing the water to run off in a normal precipitation event producing overland flow. Some of the proposed treatment sites are near streams or drainage ditches and on or near bedrock and very rocky soils that would need to be treated as run-off dominated soils.

Approximately 40 percent of the lands in the project area are located on infiltration-dominated sites with the remaining 60 percent on run-off dominated sites.

Two basic categories of vegetation types are associated with proposed treatment sites: riparian areas and upland areas. High water tables are common near stream channels; as one moves away from the stream channel, the chance of encountering a high water table diminishes.

Some of the proposed treatment sites are located in upland areas. These areas do not have the hydrologic regimes and the resulting moisture to support vegetation associated with riparian areas. However, these sites are commonly located along roads or trails, which often lead to or drain into riparian areas.

Environmental Consequences – Soils

Alternative A: No Action

Direct Effects

The direct, indirect and cumulative effects on soils from use of Clopyralid for areas inside the Middle Black project would be the same as Alternative 3.

There is evidence that soil stability is lowered and erosion rates higher on noxious weed-infested ground than on native grassland sites (Lacey 1989). The decrease in native bunchgrass density results in an increase in the amount of soil exposed to the erosive forces of wind and water. Potentially, erosion losses would result in a decrease in the long-term productivity of the site. The effect of weeds on soil stability and productivity would likely be relatively minor and occur over extended periods of time.

There are minor direct effects of this Alternative on soil physical properties or productivity from cultural treatments on approximately 100 acres annually. Seeding and fertilization of disturbed sites would improve plant growth of desired species, therefore increasing ground cover and reducing soil erosion.

Indirect Effects

Mechanical treatment on approximately 100 acres annually could result in localized soil disturbance. An increase in sediment to streams from mechanical treatments along road cuts and fills and within riparian areas is possible, but the increase would likely be detectable for several reasons. First, disturbed areas would be reseeded with desirable species after treatment, reducing erosion as roots become established. Second, not all sediment reaching ditch lines would be transported directly to the streams. Finally, project related soil disturbance would be minimal and localized in comparison to the entire watershed.

Up to 1,500 acres of chemical treatment are ongoing at administrative sites and treatment sites within the Middle-Black project area. The effects on soil productivity and risks of this chemical use are lower than Alternative 3, but higher than Alternative 2.

Indirect and Cumulative Effects

Indirect and cumulative effects to the soil resource include the risk of spread to new areas that would potentially result in decreases in soil stability in a much larger area that those currently affected.

Other activities occurring in this analysis area include: timber harvest, grazing, mining, prescribed burning, recreation, road construction, re-construction, maintenance and decommissioning. These activities will continue occur over the next ten years. The amount of each activity is undetermined at this time. The Forest will follow national direction to prevent the spread of noxious weeds for each of these activities. Management of individual activities to prevent the introduction and spread of noxious weeds is designed to reduce the amount and extent of noxious weeds across the analysis area overtime.

Other projects that include the application of herbicides will be included to determine the maximum allowable acres to be treated annually. This will include other land managers in each watershed. The North Fork Ranger District will monitor herbicide application, similar to what has been completed on other Districts (USDA-FS 2001-Potlatch). See Table 14 or Appendix L for the maximum allowable acres to be treated, by herbicide and watershed.

Alternative 2: Mechanical, Biological and Cultural Treatments

Direct Effects

There are no direct effects of this Alternative on soil physical properties or productivity from biological treatments annually (approximately 50 acres) or chemical treatments (0 acres).

Minor direct effects from cultural treatments are the same as Alternative 1.

Indirect Effects

Indirect effects from mechanical treatments are the same as Alternative 1.

Cumulative Effects

Treatment of approximately 150 acres annually through mechanical, biological, cultural treatments would not result in cumulative effects to soil physical properties or productivity. The duration and extent of soil disturbance would be minor.

Other activities occurring in this analysis area include: timber harvest, grazing, mining, prescribed burning, recreation, road construction, re-construction, maintenance and decommissioning. These activities will continue occur over the next ten years. The amount of each activity is undetermined at this time. The Forest will follow national direction to prevent the spread of noxious weeds for each of these activities. Management of individual activities to prevent the introduction and spread of noxious

weeds is designed to reduce the amount and extent of noxious weeds across the analysis area overtime.

Other projects that include the application of herbicides will be included to determine the maximum allowable acres to be treated annually. This will include other land managers in each watershed. The North Fork Ranger District will monitor herbicide application to ensure that threshold levels for herbicides are not exceeded. See Table 14 for the maximum allowable acres to be treated by herbicide and watershed.

Alternative 3: Mechanical, Biological, Cultural and Chemical Treatments

The effects of mechanical, biological and cultural treatments are the same as Alternative 1 on soil physical properties or productivity. The following discussion focuses on chemical treatments proposed with this alternative.

Direct Effects

There are no direct effects of this alternative on soil physical properties or productivity from chemical treatments.

Indirect Effects

Indirect effects include changes to vegetation from the treatment of chemicals. Indicators of Indirect effects include the herbicide chemical half-life and sorption in soils.

Indirect effects would include an upward beneficial trend in soil stability. Herbicides encourage grasses by the selective pressure on broadleaf species. Since grasses have better soil-binding characteristics than the target broadleaf species, herbicide treatment would result in higher soil stability on the treated sites.

Herbicides used for weed control, even in steeper terrains, cause little erosion and maintain good hydrologic conditions. The soil is not disturbed by herbicides and usually a good litter layer remains or is increased due to the litter provided from successfully treated noxious weeds. A good litter layer mitigates raindrop impacts, promotes infiltration and reduces erosion.

All the herbicides analyzed here have some soil activity; that is, they dissolve to some extent in water and can be absorbed fairly readily from soil moisture by susceptible plants. These herbicides can move with water as it moves through soil. Although these herbicides are all water soluble and soil active to some extent, they vary significantly in persistence in the environment (Table 11). Persistence can be a benefit in restoration efforts because it provides more time for some native grasses and broadleaf plant species to establish themselves prior to re-invasion by noxious weeds. Target weed species all produce many seeds that remain viable in the soil for long periods.

Long-term control requires either multiple applications of low-persistence chemicals or less frequent applications of more persistent herbicides. The critical element to consider is whether a more persistent chemical such as picloram can be held on the site to do the job it is intended to do.

Since these chemicals can move with water, we must consider the permeability and water-holding capacity of the soil on a site. These properties determine how much water moves through the soil into ground or surface water after rainfall. If the soil retains a large quantity of water in its upper horizons for later use by plants, the water and partially dissolved herbicide would have little opportunity to move. In contrast, if a soil is highly permeable and has little water-holding capacity, moisture passes through the soil rapidly and carries some of the herbicide with it.

Soil adsorption coefficient (Koc) can be used as an index of the herbicide mobility. The larger the Koc the more strongly the herbicide is held to soil organic matter and the less likely it will leach. Of the herbicides proposed for treatment Glyphosate is the least likely to leach with a Koc of 24.000 and Dicamba is the highest at 2 (Table 8).

Soil half-life is the period of time it takes for one-half of the amount of herbicide in the soil to degrade (Table 8). Each half-life that passes reduces the amount of herbicide present in the soil by one-half. Half-life can vary due to soil microbial populations, soil moisture, soil temperature and other factors. Non-persistent herbicide would have a half-life of 30 days or less. Persistence herbicides have a half-life of greater than 100 days. On average, all proposed herbicides have a moderate persistence. Metsulfuron methyl has the highest half-life (120 days) and 2,4-D amine has the lowest (10 days) (BPA 2004; www.efw.bpa.gov). However,

Picloram had the longest reported half-life up to 513 days and did not degraded overtime (USDI-EPA 1995a).

Clopyralid and dicamba are similar to picloram, with a low adsorption coefficient and a moderate half-life.

Table 8. Herbicide Characteristics in Soils

Chemical Evaluated	Soil Half Life (Days)	Sorption Coefficient (soil Koc)	Soil Adsorption Coefficient
Clopyralid	40	6	Low
Dicamba	90	2	Very Low
Glyphosate Rodeo	47	24,000	Very High
Glyphosate Roundup	47	24,000	Very High
Metsulfuron Methyl	120	35	Moderate
Picloram	90-513	16	Moderate
Triclopyr - TEA	46	20	Moderate
Triclopyr - BEE	46	780	High
2,4-D Amine	10	100	Moderate

Research on a grassland site in Missoula County found no picloram below 20 inches soil depth (Watson et al. 1989). The minimum detection limit in this study was 10 parts per billion. On a forested site with coarser soils and precipitation rates more comparable to sites analyzed here, this study found picloram levels ranging from 206 to 366 parts per billion in the upper 5 inches of soil after an application of 1 pound of picloram per acre. A maximum concentration of 24 parts per billion was detected at soil depths between 30 and 40 inches. No picloram was measured in shallow groundwater wells with a detection limit of 0.5 parts per billion.

Results reported by Rice et al. (1992) confirm that 2,4-D and clopyralid are less persistent than picloram. Clopyralid was not detected at any time below 10 inches soil depth and, after 30 days, 2,4-D was not detected below 2 inches soil depth. Picloram was detected in the 10 to 20 inch soil strata within 30 days of spraying, but was not detected below 10 inches soil depth one to two years after application. The herbicides were not detected because they had decomposed and had not migrated off-site. Detection limit in this study was about 10 parts per billion.

Additional studies of the movement and persistence of herbicides in soil at several sites in western Montana are ongoing. These studies include comparisons of picloram, 2,4-D, and clopyralid. Picloram has been shown to be mobile under field conditions. In Montana picloram was applied at half the maximum label rate (1 pound/acre), and was detectable 790 days after application in the 48 to 60 inch soil layer (soil with 2.2% organic matter; USDI-EPA 1995).

In the EPA Re-registration Eligibility Decision (RED) for Picloram, the agency was concerned with ground water contamination and risk to endangered species. Data currently available to the EPA indicated that picloram has been detected in groundwater in 10 states with concentrations up to 30 parts per billion. Once in groundwater the chemical is unlikely to degrade even over a period of several years (USDI-EPA 1995a, 1995b). The levels detected were below the lethal concentrations for rainbow or cutthroat trout (Table 12).

These indicators show relatively little risk of deep leaching of most of the proposed herbicides, except Picloram, Clopyralid and Dicamba.

Based on the persistence in soil, soil half-life, potential for movement in to water, and the possibility of repeat application; Picloram, Clopyralid and Dicamba, are expected to have a short term effect to soil productivity and water quality.

Best Management Practices (BMPs) and mitigation measures that will be applied to minimize the effects to soil and water resources, from Picloram, Clopyralid or Dicamba, are listed in Chapter 2 and summarized here. BMPs that mitigate these effects include:

- No direct application to water or areas with high water tables. No application within 100 feet of streams or water picloram or clorpyalid and 15 feet for Dicamba. See also Table 4 for distance limits for all herbicides.
- Limited application by wind speed and weather considerations.

- Reduce application rate to a maximum of 1.0 pounds/acre of Picloram with spot treatment of no more that 50% of an acre (USDI-EPA 1995a).
- Use of picloram would be allowed only once every two years, to reduce accumulation in the soil (USDI-EPA 1995a).
- Limited application of herbicide chemicals to below the Lethal Concentration (LC50), or No Observed Effect Level/Concentration (NOEL/NOEC) as determined by watershed annually (Table 14 or Appendix L).
- Controlled mixing, storage and transportation of all herbicides.
- No application of 2,4-D amine (ester formulation) or triclopyr-BEE.

Cumulative Effects

This alternative would result in indirect effects to soil productivity in the short term. With the application of Best Management Practices and mitigation measures no cumulative effects are expected.

Other activities occurring in this analysis area include: timber harvest, grazing, mining, prescribed burning, recreation, road construction, re-construction, maintenance and decommissioning. These activities will continue to occur over the next ten years. The amount of each activity is undetermined at this time. The Forest will follow national direction to prevent the spread of noxious weeds for each of these activities. Management of individual activities to prevent the introduction and spread of noxious weeds is designed to reduce the amount and extent of noxious weeds across the analysis area overtime.

Other projects that include the application of herbicides will be included to determine the maximum allowable acres to be treated annually. This will include other land managers in each watershed. The North Fork Ranger District will monitor herbicide application, similar to what has been completed on other Districts (USDA-FS 2001-Potlatch). See Table 13 for the maximum allowable acres to be treated by herbicide and watershed.

Affected Environment – Water Quality

The analysis area includes tributaries to the North Fork Clearwater River upstream of the upper pool of Dworshak Reservoir and Orofino Creek a tributary to the Clearwater River (1,058,368 acres).

Laws and Regulations

Clean Water Act – Section 313 of the clean Water Act requires Federal agencies to comply with all Federal, State, interstate and local requirements, administrative authority, and process and sanctions with respect to control and abatement of water pollution. Executive Orders 12088 and 11990 also require the Forest Service to meet the requirements of these Acts. Therefore, all State and Federal laws and regulations applicable to water quality would be applied. These include 36 CFR 219.97, the Clean Water Act, the Clearwater National Forest Plan, PACFISH and INFISH Riparian Management Objectives (RMOs) and Riparian Habitat Conservation Areas (RHCAs), and Idaho Forest Practices Act.

36 CFR 219.97 sets forth the following requirements:

- Conserving the soil and water resource;
- Protecting streams, stream banks, and wetlands;
- Providing for adequate fish habitat; and
- Giving special attention to riparian areas, considering topography, vegetation type, soils, climate, and management objectives.

State Water Quality Standards and Criteria Necessary to Protect Beneficial Uses – The *Water Quality Standards and Wastewater Treatment Requirements* for the State of Idaho designates the North Fork Clearwater River and Orofino Creek with the following beneficial uses: domestic water supply, cold water biota, primary and secondary contact recreation, salmonid spawning and outstanding resource waters.

Domestic Water Supplies – There are no state designated small public water supplies in the analysis area.

Municipal Watersheds – There are no state designated municipal watersheds in the analysis area.

Water Quality Limited Streams – The Idaho list of 303(d) Water Quality Limited Streams includes many streams in the analysis area (USDI-EPA 2000; IDEQ 2002; IDEQ 2003 draft). Table X displays a summary of the streams in the project area, the beneficial uses and stream status on 303d lists.

The water quality standards listed in *Water Quality Standards and Wastewater Treatment Requirements* for the State of Idaho are to be applied to all streams within the project area to maintain beneficial uses (IDEQ 2004).

Hazardous materials: Surface waters of the state shall be free from hazardous materials in concentrations found to be of public health significance or to impair designated beneficial uses. (IDAPA 16.01.02200, 01)

Toxic Substances: Surface waters of the state shall be free from toxic substances in concentrations that impair designated beneficial uses. (IDAPA 06.01.02200, 02)

Domestic water supplies: Waters designated for domestic water supplies are to exhibit the following characteristics – All toxic substance criteria set forth in 40 CFR 131.36(b)(1), Column D1 revised as of December 22, 1992, is incorporated by reference. (IDAPA 16.01.02250, 03.a.i)

Hazardous and deleterious material storage: Hazardous and deleterious materials must not be stored, disposed of, or accumulated adjacent to or in the immediate vicinity of state waters unless adequate measure and controls are provide to insure that those materials will not enter state waters as a result of runoff, wind, storage facility failure, accidents in operation, or unauthorized third party activities. This includes, but is not limited to, trash, rubbish, garbage, oil, gasoline, chemicals, sawdust, and accumulations of manure. (IDAPA 16.01.02800, 01)

Forest Plan Standards – In addition to state and federal laws, the Clearwater National Forest Plan would be followed (pages II-27 through II-29).

Standard 8A: Maintain the integrity and equilibrium of all stream systems in the forest.

Standard 8B: Manage water quality and stream conditions to assure that the National Forest management activities do not cause permanent or long term damage to existing or specified beneficial uses.

Standard 8C: Apply Best Management Practices (BMPs) to project activities to ensure water quality standards are met or exceeded (this also addresses Standard 8K).

Best Management Practices are site specific control mechanisms for non-point source pollutants, to enable the achievement of water quality standards. BMPs include but are not limited to structural and non-structural controls, and operation and maintenance procedures. BMPs can be applied before, during and after management activities to reduce or eliminate the introduction of pollutants into receiving waters. BMPs would be implemented as outlined in Appendix M: Best Management Practices.

The following are approved BMPs related to herbicide application activities:

- Idaho Forest Practice rules (see Appendix M) as adopted by the Board of Land Commissioners
- Forest Service Soil and Water Conservation Practices Handbook, FSH 2509.22 13.07-13 (See Appendix M)

The Forest will utilize the following process in order to ensure compliance with State water quality standards:

- BMP selection and design would be based on site-specific conditions; technical, economic and institutional feasibility; and the designated beneficial uses of the streams.
- Apply BMPs
- Monitor BMPs to ensure they are being implemented and are effective in protecting designated beneficial uses.
- Evaluate BMP monitoring results.
- Feed the results back into current and future activities and BMP design.

Standard 8D: Manage **all** waters in the Forest under a basic standard (Appendix K, Section B of the Forest Plan: USDA-FS 1987).

Standard 8E: All watershed systems are considered for the fishery resource. This standard applies to sediment criteria.

Standard 8F: Monitor, analyze, and evaluate water quality within critical reaches of speci-

fied streams which are generally third or fourth order streams with watersheds ranging from 4 to 40 square miles. A list of specific streams and their standards is in Appendix K, Section C. This standard refers to sediment criteria.

Table 9: Designated Uses (State Water Quality Standards) of specific waters in analysis area and their stream status (IDEQ 1998; 2002; 2003 draft; USDI-EPA 2000).

Subbasin	Stream Name (or tributary)	Domestic Water Supply	Cold Water Biota	Salmonid Spawning	Primary Contact Recreation	Secondary Contact Recreation	Special Resource Water	303 listed
Clearwater 17060306	Clearwater River - North Fork Confluence to Mouth	✓	✓	✓	✓		✓	Yes
	Orofino Creek		✓	✓		✓		Yes
Lower North Fork Clearwater 17060308	North Fork Clearwater Dworshak Reservoir Dam to Mouth	✓	✓	✓	✓		✓	Yes
	Dworshak Reservoir	✓	✓	✓	✓		✓	Yes
	North Fork Clearwater - Aquarius CG to Dworshak Reservoir	✓	✓	✓	✓		✓	No
	Alder Creek		✓	✓		✓		Yes
	Bear Creek		✓	✓		✓		No
	Beaver Creek		✓	✓		✓		Yes
	Isabella Creek		✓	✓		✓		Yes
	Minnesaka Creek		✓	✓		✓		No
Upper North Fork Clearwater 17060307	North Fork Clearwater Source to Aquarius CG	✓	✓	✓	✓		✓	Yes
	Cold Spring Creek Cool Creek Deception Gulch Sneak Creek		✓	✓		✓		Yes
	Cayuse Creek Gravey Creek Marten Creek		✓	✓		✓		Yes
	Fourth of July Creek		✓	✓		✓		No
	Kelly Creek		✓	✓		✓		No
	Lake Creek		✓	✓		✓		Yes
	Long Creek		✓	✓		✓		No
	Moose Creek China Creek Swamp Creek Laundry Creek Osier Creek		✓	✓		✓		Yes
	Orogrande Creek Hem Creek Sylvan Creek Tamarack Creek		✓	✓		✓		Yes
	Quartz Creek Grizzly Creek		✓	✓		✓		Yes
	Skull Creek		✓	✓		✓		Yes
	Washington Creek Tumble Creek		✓	✓		✓		Yes
	Weitas Creek		✓	✓		✓		Yes

Standard 8G: Design, schedule, and implement management practices at the project level that:

- Will maintain water quality and stream conditions that are not likely to cause sustained damage to the biological potential of fish habitat
- Will not reduce fish habitat productivity in the short term below the assigned standards
- Will maintain water quality in a condition that is not likely to inhibit recovery of the fish habitat for more than the stated duration; and
- Will require a watershed cumulative effects feasibility analysis of projects involving significant vegetation removal prior to including them on implementation schedules to ensure that the project – considered with other activities – will not increase water yields or sediment beyond acceptable limits. Also requires that this analysis identify any opportunities for mitigating adverse effects on water-related beneficial uses, including capital investments for fish habitat or watershed improvement.

Standard 14.b: Protection, Insect and Disease

Practice and encourage the use of integrated pest management methods which provide protection of Forest resources with the least hazard to human, wildlife, and the environment. The goal is optimum pest management that considers environmental hazards and economic efficiency.

Use silvicultural methods and schedule cultural practices which reduce the development and/or perpetuation of pest problems.

Favor the use of fire, hand treatment, natural control, or mechanical methods where feasible and economical when considering vegetation management.

An amendment to the Forest Plan was made in 1995 to incorporate the Inland Native Fish Strategy (commonly called INFISH) and Interim Strategies for Managing Anadromous Fish-producing Watersheds in Eastern Oregon and Washington, Idaho and portions of California (commonly called PACFISH). Those strategies have several objectives that relate to water quality and fisheries habitat potential. Some of the most important goals and objectives that might be affected by noxious weed treatment are summarized below:

- Stream temperature: seven-day moving average – maximum temperature below 59°F (15°C) within migration and rearing habitats and below 48°F (9°C) within spawning habitats.
- Bank stability (non-forested systems): >80 percent stable.
- Lower bank angle (non-forested systems) > 75 percent of banks with <90 degree angle (i.e. undercut).
- Riparian Habitat Conservation Areas (RHCAs) are portions of watershed where riparian-dependant resources receive primary emphasis. Any management activities within these areas must be designed to further riparian management objectives.
  - Category 1 – Fish-bearing streams: 300 feet slope distance from the edge of all fish-bearing streams
  - Category 2 – Permanently flowing non-fish-bearing streams: 150 feet slope distance from the edges of the active stream channel
  - Category 3 – Ponds, lakes, reservoirs, and wetlands greater than 1 acre: 150 feet slope distance from the edge of the feature
  - Category 4 – Seasonally flowing intermittent streams, wetlands less than 1 acre, and landslides/landslide prone areas: 50 feet slope distance in non-key watersheds, 100 feet for key watersheds
- Standards and guidelines for various activities are applied to projects and activities in areas inside and outside of RHCAs that would degrade them.
- RA-3. Apply herbicides, pesticides and other toxicants, and other chemicals in a manner that does not retard or prevent attainment of Riparian Management Objectives and avoids adverse effects on listed anadromous fish (PACFISH) or inland native fish (INFISH).
- RA-4. Prohibit storage of fuels and other toxicants within RHCAs. Prohibit refueling within RHCAs.
- RA-5. Locate water drafting sites to avoid adverse effects to inland native fish and in-stream flows, and in a manner that does not retard or prevent attainment of Riparian Management Objectives.

Analysis Area

The project area is located in three subbasins in the Clearwater River: Upper and Lower North Fork Clearwater River that flows into Dworshak Reservoir and spills into the Clearwater River, and the Orofino Creek watershed that flows into the Clearwater River at Orofino, Idaho.

The valleys of these two watersheds are typical intermountain valleys. The valleys range from less than one-quarter mile to one mile in width. In some areas narrow, steep canyons are also common. Elevations on the valley floors range from 1100 feet at Orofino where both watersheds enter the Clearwater River to 7612 feet in the headwaters of the North Fork Clearwater River. The surrounding mountains rise to elevations in excess of 7000 feet.

The climate is primarily affected by maritime weather patterns. Annual precipitation varies from 25 to 80 inches. Snow accumulations in the higher elevations can linger into the summer months. Several landforms exist over these subbasins including: alluvial deposits, low relief rolling hills, colluvial midslopes, breaklands, frost churned ridges, alpine glaciated ridges and trough, and mass wasted areas.

Several landtypes within the project area have soils that contain a large percentage of volcanic ash and decomposed granite.

Watershed Boundaries

The project area is located in the North Fork Clearwater River and Orofino Creek. The proposed activities would take place in three subbasins. Table 10 lists the affected subbasins, watershed number, watershed name and size of each. Maps of these subbasins and watersheds can be found in Appendix C.

Table 10: Acres by Watershed

Subbasin	Watershed Number	Watershed Name	Watershed (acres)	Watershed (sq. miles)	True Watershed
Clearwater 17060306	170603060502	Lower Orofino	68,399	107	N
	170603060501	Upper Orofino	27,972		Y
Lower North Fork Clearwater 17060308	170603080601	Alder Creek	15459	24	Y
	17060308030101	Bear Creek	3,817	6	Y
	170603080101	Beaver Creek	39,812	62	Y
	170603080103	Isabella Creek	19,774	31	Y
	170603080102	NF Clearwater to Beaver	50,077	78	N
	17060308030102	Minnesaka Creek	3,572	6	Y
Upper North Fork Clearwater 17060307	1706030703	Cayuse Creek	107,851	169	Y
	170603070502	Fourth of July Creek	28,491	45	Y
	170603070105	Lake Creek	22,057	34	Y
	170603070103	Long Creek	17,981	28	Y
	170603070203	Lower Kelly Creek	30,424	48	N
	1706030704	Moose Creek	46,619	73	Y
	1706030707	Orogrande Creek	58,820	92	
	170603070902	Quartz Creek	27,936	44	Y
	170603071001	Skull Creek	55,859	87	Y
	170603070201	Upper Kelly Creek	56,885	89	Y
	170603070101	NF Clearwater to Headwaters	50,342	79	Y
	170603070501	NF Clearwater to Kelly	55,391	87	N
	170603070104	NF Clearwater to Long	38,625	60	N
	170603070801	NF Clearwater to Washington	62,177	97	N
	170603070802	Washington Creek	30,232	47	Y
	1706030706	Weitas Creek	139,796	218	Y
	TOTAL		**1,058,368**	**1,654**	

Affected Environment – Fisheries

Fish species composition and densities have changed significantly within the mainstem Clearwater River over the last 100 years. The construction of the Lewiston Dam in 1927 and the operation (1927-1973) with inadequate adult fish passage in the initial years virtually eliminated or destroyed the chinook salmon (*Oncorhynchus tshawytscha*) runs and severely reduced the steelhead trout (*Oncorhynchus mykiss*) runs into the Clearwater River subbasin (Murphy and Metsker 1962, Mallet 1974, Nez Perce Tribe and Idaho Department of Fish and Game 1990, Murphy and Johnson 1990). The salmon affected included the fall Chinook salmon that spawned and reared in the lower mainstem Clearwater River. The construction of the eight dams on the lower mainstem Snake and Columbia rivers between 1936 and 1975 has also reduced the anadromous fish production within the Clearwater River subbasin including fall Chinook salmon in the mainstem Clearwater River.

The construction of Dworshak Dam on the North Fork Clearwater River in 1974 eliminated anadromous fish production within 26 percent of the Clearwater River subbasin and most likely affected downstream rearing of salmonids in the mainstem Clearwater River. Resident salmonids and non-salmonids have most likely decreased and increased respectively as result of the dams and increased water temperatures within the mainstem.

The North Fork Weed Treatment project area includes USFS lands within the upper North Fork Clearwater River subbasin (Dworshak reservoir upstream) and the upper Orofino Creek drainage.

North Fork Clearwater River Drainage

The historical assessment of the fish populations within the North Fork Clearwater River subbasin and additional information on current conditions was summarized in USDA Forest Service (1999). Information presented below for each of the major salmonid species are excerpts from USDA Forest Service (1999). Within the North Fork Clearwater River drainage, westslope cutthroat trout (*Salmo clarki lewisi*), a sensitive species, is the primary indicator species for most streams. Where bull trout (*Salvelinus confluentus*) spawning and rearing is documented, bull trout replaces westslope cutthroat trout as the indicator species due to more constrained habitat requirements. Other fish species found within the analysis area include rainbow trout (Oncorhynchus mykiss), mountain whitefish (*Prosopium williamsoni*) and sculpin (*Cottus spp.*). Species introduced into the North Fork drainage include kokanee salmon (*Oncorhynchus nerka)*, smallmouth bass (*Micropterus dolomieui*), and brook trout (*Salvelinus fontinalis*).

Fall Chinook Salmon: The National Marine Fisheries Service (NMFS) Federal Register (issued December 28, 1993) identified a reach of the mainstem Clearwater River as critical habitat for Snake River fall Chinook salmon. Critical habitat for the fall run chinook includes only the mainstem of the Clearwater River up to the Idaho/Clearwater county line below the town of Greer, Idaho. Consequently, no critical habitat for this species occurs within the Clearwater National Forest. Under the ESA, the Forest Service must assess cumulative impacts from federally authorized or funded projects on the Clearwater National Forest to fall populations in the lower Clearwater River.

The proposed noxious weed treatment activities within the North Fork Clearwater River drainage are located 60-100 miles upstream of Dworshak Dam; the dam is a complete migration barrier to anadromous and inland fish.

Spring Chinook Salmon: Spring chinook salmon are not listed under ESA within the Clearwater River basin, but spring chinook salmon production (naturally and hatchery supplemented) occurs in the mainstem Clearwater River drainage. Spring chinook salmon rear within the lower two miles of the North Fork Clearwater River downstream of Dworshak Dam. The proposed noxious weed treatment activities within the North Fork Clearwater River drainage are located 60-100 miles upstream of Dworshak Dam; the dam is a complete migration barrier to anadromous and inland fish.

Steelhead Trout: On October 17, 1997, steelhead trout were listed as a threatened species within the Snake River under ESA. Steelhead trout (primarily hatchery origin) rear within the lower two miles of the North Fork Clearwater River downstream of Dworshak Dam. Present distribution includes the Salmon River and Clearwater River subbasins. The proposed restoration activities within the North Fork

Clearwater River drainage are located 60-100 miles upstream of Dworshak Dam; the dam is a complete migration barrier to anadromous and inland fish.

Bull Trout: Historically, adult bull trout routinely used the North Fork Clearwater River in the winter and early spring and ascended the river as temperature increased in the spring for summer rearing and fall spawning activities. Current data suggests that bull trout populations are depressed in the mainstem North Fork and its fish bearing streams. Presently, bull trout occur throughout the North Fork Clearwater River subbasin, however, recent fish population data shows the major populations to be located within the upper North Fork Clearwater River drainage (upstream Long Creek), Lake Creek, Swamp/Osier (Moose Creek), upper Kelly Creek, and upper Weitas Creek drainages. Small resident populations and/or fluvial populations may occur within the major fish bearing streams in the analysis area, but surveys have only documented individuals in Rock, Elizabeth, Hidden and Stolen creeks; no major spawning and early rearing areas have been identified. There is a potential for bull trout adults or subadults to occur in any accessible tributary, since fluvial adult and subadult bull trout are very nomadic. They may use streams in the analysis area or any of their accessible tributaries as foraging or refuge habitat.

Westslope Cutthroat Trout: The North Fork Clearwater River subbasin and its fish bearing tributaries support fluvial, adfluvial and resident populations of westslope cutthroat trout. While adfluvial populations are restricted to Fish Lake (Lake Creek drainage and possibly certain populations within Dworshak Reservoir), fluvial and resident populations are scattered throughout the subbasin. Besides rearing in the mainstem North Fork Clearwater River, fluvial westslope cutthroat trout most likely spawn and reside for part of the year in the major tributaries. Fluvial fish are those that rear in larger streams for a few years, migrate down into the mainstem North Fork and return to their natal streams to spawn. Fluvial trout spawners in the North Fork Clearwater River ranged from 12 to over 24 inches while resident spawners are usually less than 12 inches. Resident fish that spawn and rear yearlong in the same streams inhabit most of the tributaries within the analysis area, especially upstream of migration barriers to migratory fish. Densities of westslope cutthroat trout observed streams within the upper North Fork Clearwater River drainage mostly exhibit strong populations.

Orofino Creek Drainage

Fish population assemblages within the Orofino Creek drainage were assessed during two surveys by the Nez Perce Tribe (Kucera et al. 1983 and Johnson 1985). During the 1982 survey, Kucera et al. (1983) found steelhead trout, bull trout, kokanee salmon, bridgelip sucker (*Catostomus columbianus*), longnose dace (*Rhinichthys cataractae*) and piute sculpin (*Cottus beldingi*) at their only sample site downstream of Orofino Falls. The report noted that fish population sampling only collected one bull trout and one kokanee salmon. Johnson (1985) surveyed the entire Orofino Creek drainage in 1983 and found rainbow trout, brook trout, longnose dace, speckled dace (*Rhinichthys osculus*), and piute sculpin in the upper Orofino Creek drainage (within USFS lands). Huntington et al.(1988) found that brook trout were the dominant salmonid species in the mainstem Orofino Creek and its tributaries in the upper Orofino Creek drainage (upstream of the town of Pierce, Idaho). Rainbow trout were also present throughout the upper Orofino Creek drainage, but their numbers were lower than the downstream of Pierce.

Fall Chinook Salmon: No historical records or current documentation of fall chinook salmon spawning or rearing within the Orofino Creek watershed are available. The mouth of the Lolo Creek on the mainstem of the Clearwater River is the upstream boundary of designated critical habitat for fall chinook. Current data suggests that fall Chinook salmon may have a historic distribution only up to the Lochsa River. The majority if not all of the fall chinook salmon spawning documented over the last 13 years has occurred within the designated critical habitat reaches of the Clearwater River, mostly downstream of the North Fork Clearwater River. Some limited spawning has been observed in the reach around Orofino Creek, the area near the Lolo Creek confluence and upstream of the critical habitat near the confluence of the South Fork Clearwater River. These are assumed sporadic and not considered viable/natural sustaining populations (due to natural constraints regarding rearing habitat, water temperatures during incubation and early rearing).

Spawning ground surveys conducted by the Nez Perce Tribe from 1988-2003 have found up to 544 redds in the lower mainstem Clearwater River (Nez Perce Tribe 2003, 2004). Redd counts have ranged from four redds in 1990 and 1992 to 524 and 571 redds in 2002 and 2003 respectively (Nez Perce Tribe 2003, 2004). The majority of redds were located downstream of the North Fork Clearwater River; less than five percent in any one year were located upstream of the North Fork Clearwater River confluence. Increased spawning success over the past ten years has been attributed to supplementation efforts in the subbasin.

Spring Chinook Salmon: Spring chinook salmon are not listed under ESA within the Clearwater River basin, but spring chinook salmon production (naturally and hatchery supplemented) occurs in the mainstem Clearwater River drainage. No spring chinook salmon are known to spawn and/or rear within the Orofino Creek drainage; project area located approximately 26 kilometers (10 miles) upstream of Orofino Falls, a migration barrier to spring chinook salmon. Habitat downstream of Orofino Falls is rated as marginal, but most likely not usable, for spring Chinook salmon production.

Steelhead Trout: Present distribution includes the Salmon River and Clearwater River subbasins. The proposed road noxious weed treatment activities within the upper Orofino Creek drainage are located over 16 kilometers (ten miles) upstream of Orofino Creek Falls; the Falls are a complete migration barrier to anadromous and inland fish. No recent documentation of steelhead trout in upper Orofino Creek is known. Steelhead trout rearing conditions in lower Orofino Creek are rated as poor due to high water temperatures and overall poor habitat conditions. Steelhead trout spawning and rearing have been documented in Whiskey Creek, a tributary downstream of Orofino Creek Falls.

Bull Trout: Historical range of bull trout in the Snake River basin approximated that of Chinook salmon (Rieman and McIntyre 1993); available evidence indicates bull trout range is about half what it used to be. Habitat alterations and losses that adversely affected chinook also reduced bull trout populations. Present distribution includes the Salmon River and Clearwater River subbasins. No recent documentation of bull trout in upper Orofino Creek is known. Bull trout rearing conditions in lower Orofino Creek are rated as poor due to high water temperatures and overall poor habitat conditions. It is highly probable that if streams in the Orofino Creek drainage ever had bull trout, either habitat degradation or hybridization with introduced brook trout, eliminated bull trout.

Westslope Cutthroat Trout: These salmonids have not been documented in the upper Orofino Creek drainage. Data is inclusive of the species of resident fish (if any) were present above Orofino Falls; while anadromous fish may have been excluded in the upper Orofino Creek drainage, westslope cutthroat trout may have been present. Habitat downstream of Orofino Falls is very rated as poor and most likely not usable by westslope cutthroat trout. Existing recovery efforts for westslope cutthroat trout in the Orofino Creek drainage are considered a low priority due to habitat conditions, high water temperatures and strong brook trout populations.

Habitat Conditions

North Fork Clearwater River Drainage

An overview of the existing habitat conditions within the North Fork Clearwater River drainage is described in the *BHROWS Assessment* (USDA Forest Service 1999). Some pertinent information is presented in this section.

The presence and abundance of fish species within the analysis area is primarily a function of the small, steep, deeply entrenched nature of most of the streams. This type of stream morphology associated historical major wildland fires is very conducive to change especially regarding streamflows and, stream channel and riparian conditions. Major fire events have resulted in modifications to water temperatures, substrate conditions, quantity and quality of summer and winter rearing habitats and spawning habitat conditions. Between 1910 and 2003, approximately 70 percent of the analysis area has been impacted by major fire events. These modifications may be positive (increased acting debris) or negative (increased water temperatures).

Besides limitations due to steep channel gradients, migration barriers and small stream channels, fish populations within the analysis area primarily respond to the water temperatures,

substrate and riparian conditions of a particular stream. As stream conditions are altered to levels reflecting sub-optimal conditions for salmonids, fish populations will usually respond via reductions in spawning success and lower juvenile and sub-adult densities rearing in the affected stream segments.

Stream Temperatures: High summer water temperatures within the mainstem North Fork Clearwater River and various tributaries most likely limits salmonid production to some unknown extent. Alterations of riparian conditions, via the removal of existing vegetation and/or delaying successional processes, may also affect spawning and rearing habitats. Changes in riparian vegetative conditions may reduce streamside shade which leads to increases in summer water temperatures. Changes vegetative stages may also lead to reductions in acting woody debris recruitment which will eventually decrease the quantity and quality of pools (summer and winter rearing habitat) and gravel depositional areas (spawning habitat). Ongoing and proposed projects have incorporated mitigation measures to avoid or minimize impacts to riparian areas. Avoidance measures such as maintaining INFISH riparian buffers during vegetative management projects and designing specific mitigation measures for prescribed fires should maintain positive recovery trends.

Substrate Conditions: The amount of fine sediment in spawning areas and pools influences the quantity and quality of spawning and winter rearing habitat; both of which are limiting in the majority of the streams within the analysis area. While substrate conditions within the mainstem North Fork Clearwater River could present limitations if major sediment depositions occurred in the future, substrate conditions within the tributaries are the critical concern at this time.

Roads: The construction and existence of roads and the associated timber harvest activities have also influenced stream conditions in some watersheds. Due to the extensive road network on portions of Clearwater National Forest lands, many perennial streams are crossed by arterial or collector roads. These roads greatly affect the quality and continuity of aquatic ecosystems. North Fork Clearwater River tributaries depend on debris slides and torrents for the recruitment of instream material such as wood and gravel that provide for aquatic habitat development. This material is also critical in the reduction of stream energy. Roads, culverts and even bridges act like dams constricting flow through a single narrow outlet and preventing transportation of material down the channel. These constriction points also cause deposition and channel widening at the culvert inlet. The channels below culvert outlets are typically downcut and scoured by the high velocity water caused by the constriction.

Road crossings: The road crossings also increase the likelihood of more destructive, unnatural debris torrents due to the erosion of fill material at each road crossing. The additional sediment also causes unnatural sediment depositions within these smaller fish bearing streams as well as the lower gradient larger streams. In most cases, the additional sediment material deposited within the lower gradient streams exceeds the natural capacity to transport the material efficiently; this results in degraded substrate conditions for extended time periods. Currently, all proposed projects have incorporated road decommissioning projects that have been identified within the specific analysis areas.

Roads and stream crossing structures have also been shown to function as barriers to the upstream movement and dispersal for many fish and wildlife species. Culvert outlets not in contact with stream bottoms do not allow access nor do undersized culverts which constrict flows creating high velocity barriers and eliminating substrate from culvert bottoms. These barriers can isolate small aquatic populations, limiting or preventing genetic exchange between populations, and preventing the recolonization of historic or recovering habitats.

Additionally, many culverts are in need of repair or replacement to reduce the risk of road fill failure. Historically, most culverts were sized to pass 25 to 50 year storm events. In many cases, this sizing is not adequate to handle large flood events or debris torrents. Culverts sized for a 100-year storm event (as required by INFISH provisions of the Forest Plan) mimic the active stream channel width and are able to more easily pass the water and debris associated with a large event. Currently, all proposed projects have incorporated fish passage restoration measures to remove or replace

culverts that have been identified within the specific analysis areas.

Water Quality: Besides elevated sediment conditions (i.e. suspended, surface fines) and elevated summer water temperatures in various drainages, water quality conditions on USFS lands within the North Fork Clearwater River are considered natural and in an excellent condition. No incidents of biological or chemical pollution that have the potential to affect the aquatic resources are known.

Orofino Creek Drainage

Information regarding the current habitat conditions for the Orofino Creek drainage are primarily limited to a 1987 survey that was completed to determine the biological feasibility of rearing spring chinook salmon and steelhead trout upstream of Orofino Falls (Huntington et al. 1988).

The anadromous portion of Orofino Creek includes the lower five miles of the mainstem Orofino Creek and one major tributary, Whiskey Creek. Huntington et al. (1988) noted that the lower mainstem of Orofino Creek provided fair to good quality habitat in terms of good instream cover, low cobble embeddedness, and fair quality pools; high summer water temperatures, minimal spawning gravel and few holding pools for adult anadromous fish. These conditions have most likely changed over the past 15 years (especially downstream of Orofino Falls) due the high spring runoff events, especially the February 1996 event which changed channel conditions and forced local government agencies to undertake major channel and bank stabilization projects.

Upstream of Orofino Falls (non-anadromous portion), Huntington et al. (1988) concluded that (1) the potential anadromous habitat upstream of Orofino Falls is rated as poor to good quality for the spawning and rearing of steelhead trout and salmon, (2) poor adult passage and holding conditions are present upstream of Orofino Falls, (3) low summer flows, high summer temperatures and poor riparian conditions have reduced the habitat quality within the mainstem Orofino Creek, and (4) the presence of strong brook trout populations within the headwater streams may limit anadromous fish production.

Environmental Consequences – Water Quality and Fisheries

The following analysis focuses on the toxic characteristic of each herbicide proposed for use, the concentration of herbicides to which aquatic biota (fish and invertebrates) are exposed, and the impacts to water quality from the alternatives. Differences in treatment were used to contrast effects on habitat between alternatives and to determine the potential impacts to fish, macro-invertebrates and water quality. Effects analysis was based upon field reviews, watershed conditions, riparian zone conditions, professional consultation, literature reviews, and the professional judgment of the project hydrologist and fisheries biologist.

Alternative 1: No Action

Direct and Indirect Effects

The direct, indirect and cumulative effects on water quality and fisheries from use of Clopyralid for areas inside the Middle Black project would be the same as Alternative 3.

Mechanical treatment along road cuts and fills and within riparian areas could result in an increase in sediment to streams on approximately 100 acres. However, this increase would likely be undetectable because project-related soil disturbance would be kept to a minimum and localized in comparison to the entire watershed.

Release of biological control agents, approximately 50 acres annually, would have no direct effect on surface water quality and aquatic organisms. The agents would not compete with aquatic insect species since their food base is very specific, nor would they provide more than an incidental food source for fish.

There would be a slight indirect effect on sediment yield from future spread of weeds associated with this alternative. Even under the worst-case noxious weed infestation scenario, it is unlike that increases in sediment yield to streams would be sufficient to affect water quality or fisheries.

Cultural treatments such as seeding, transplanting and fertilizing would not affect water quality or fisheries. Fertilizers would be applied according to Forest Service and manufacturer guidelines and runoff nutrient concentrations would not be sufficient to enrich streams.

Seeding and transplanting activities would involve only limited soil disturbance.

Up to 1,500 acres of chemical treatment are ongoing at administrative sites and within the Middle-Black project area. The effects on water quality and risks of this chemical use are lower than under Alternative 3, but higher than under Alternative 2.

As discussed previously, without treatment it becomes increasingly likely that noxious weeds will become more widely established within the project area. There are no direct effects with this alternative. An indirect effect of noxious weed invasion could be increased water runoff and sediment yield from infested sites. Lacey et al. (1989) has shown an almost three-fold increase in sediment yield from knapweed sites compared to an uninfested bunchgrass site. This study showed runoff from the knapweed site increased by about 50 percent.

At the present time, most infested sites are along road clearings. Noxious weeds are probably having little effect on sediment yield in comparison to other road-related activities (road use, maintenance, etc.). Impacts from the future spread of weeds would depend on the slope, soil characteristics, precipitation patterns, and distance to water from the infested sites. Even under the worst-case noxious weed infestation scenario, it is unlikely that increases in sediment yield into streams would be sufficient to affect water quality or fisheries.

Indirect and Cumulative Effects

Indirect and cumulative effects to the water quality include the risk of spread to new areas that would potentially result in decreases in soil stability in a much larger area that those currently affected.

Cumulative effects to water quality and aquatic organisms include the risk of spread to new areas that would potentially result in decreases in soil stability in a much larger area that those currently affected.

Other activities occurring in this analysis area include: timber harvest, grazing, mining, prescribed burning, recreation, road construction, re-construction, maintenance and decommissioning. These activities will continue occur over the next ten years. The amount of each activity is undetermined at this time. The Forest will follow national direction to prevent the spread of noxious weeds for each of these activities. Management of individual activities to prevent the introduction and spread of noxious weeds is designed to reduce the amount and extent of noxious weeds across the analysis area overtime.

Other projects that include the application of herbicides will be included to determine the maximum allowable acres to be treated annually. This will include other land managers in each watershed. The North Fork Ranger District will monitor herbicide application, similar to what has been completed on other Districts (USDA-FS 2001-Potlatch). See Table 13 for the maximum allowable acres to be treated by herbicide and watershed.

Alternative 2: Mechanical, Biological and Cultural Treatments

Direct Effects

There are no direct effects of this Alternative on water quality or aquatic organisms from biological treatments annually (approximately 50 acres) or chemical treatments (0 acres).

Minor direct effects from cultural treatments are the same as Alternative 1.

Indirect Effects

Indirect effects from mechanical treatments are the same as Alternative 1.

Cumulative Effects

Treatment of approximately 50 acres annually through mechanical, biological, cultural treatments would not result in cumulative effects to water quality or aquatic organisms. The duration and extent of soil disturbance and possible runoff would be minor.

Other activities occurring in this analysis area include: timber harvest, grazing, mining, prescribed burning, recreation, road construction, re-construction, maintenance and decommissioning. These activities will continue occur over the next ten years. The amount of each activity is undetermined at this time. The Forest will follow national direction to prevent the spread of noxious weeds for each of these activities. Management of individual activities to prevent the introduction and spread of noxious weeds is designed to reduce the amount and

extent of noxious weeds across the analysis area overtime.

Other projects that include the application of herbicides will be included to determine the maximum allowable acres to be treated annually. This will include other land managers in each watershed. The North Fork Ranger District will monitor herbicide application, similar to what has been completed on other Districts (USDA-FS 2001-Potlatch). See Table 13 for the maximum allowable acres to be treated by herbicide and watershed.

Alternative 3: Mechanical, Biological, Cultural and Chemical Treatments

Effects to water quality and aquatic organisms from mechanical, biological and cultural treatments would be the same as those discussed in Alternative 1. The following discussion focuses on chemical herbicide treatments proposed with this alternative.

Direct and Indirect Effects

There are four routes chemicals could enter water: direct application, through drift from areas treated that are near water, binding to the soil that washes off terrestrial sites or leaching through the soil.

Direct application to surface water is most likely to introduce significant quantities of chemicals to surface waters. This would have the most pronounced effects on water quality or aquatic organisms.

Indirect application to surface waters would include drift, overland flow and leaching. Drift from nearby spraying is similar to direct application but concentrations would be lower and the probability of impact reduced. Overland flow on bare soils could delivery herbicides to nearby waters. Leaching of herbicides through the soil profile is the least likely route for herbicides to enter water. Herbicides can be broken down as they move through the soil profile. But it is dependent upon the chemicals.

Most herbicide water contamination results from point sources such as spills, leaks, storage and improper handling or equipment or chemicals. These incidents can be avoided though proper storage, handling, cleaning and transport of herbicides and equipment.

Table 11 displays a comparison of herbicide chemicals and their potential to move into waters. Table 8 in the Soils Section also shows herbicide characteristics that influence chemical movement and degradation.

Discussion about the potential movement of herbicides from soils is also discussed in detail in the Soils Section.

Table 11. Potential Movement of Herbicide to Water Sources (BPA 2004).

Chemical Evaluated	Herbicide Movement Rating	Into Surface Water	Into Ground Water
Clopyralid	Very High	High	High
Dicamba	Very High	High	High
Glyphosate Rodeo	Very Low	Low	Low
Glyphosate Roundup	Very Low	Low	Low
Metsulfuron Methyl	High	High	Low
Picloram	Very High	High	High
Triclopyr -TEA	Low	Low	High
Triclopyr -BEE	Moderate	Moderate	Low
2,4-D	Moderate	Moderate	Moderate

The potential effect of herbicide treatment on water quality and aquatic organisms is a concern. Careful analysis of herbicide spraying projects and their effects are an important consideration for fisheries and water quality protection. The potential impact of herbicides on fish and other aquatic organisms is a function of two factors: 1) the toxic characteristics of the compound, and 2) the concentration to which the organism is exposed. These factors are used to determine the risk analysis for water quality and aquatic organisms.

Three methods are references in comparing toxicity to fish and other aquatic organisms: Lethal Concentration (LC_{50}), No Observed Effect Level (NOEL) or No Observed Effect Concentration (NOEC). Although the LC_{50} is frequently used as a toxicity standard, fifty percent fish mortality is generally not acceptable. For this reason a better parameter of NOEL or NOEC was used when it was available to evaluate effects.

The herbicides proposed for use are characterized by relatively low aquatic toxicity. The effects of herbicides on fish can be quantified using the 96-hour LC_{50}. The 96-hour LC_{50} refers to the concentration that is lethal to 50 percent

of the fish exposed at that level for 96 hours. The lower the LC_{50}, the more toxic the compound. The 96-hour LC_{50} for the herbicides proposed for use (plus the parent compound of 2,4-D amine) is provided in Table 12. For example, NOEL for picloram on cutthroat trout is 0.29 milligrams per liter (1mg/l = 1 part per million (ppm)). Because there are frequently no long-term test results that provide safe concentrations (NOEL), the EPA has recommended that to set a standard for concentrations to protect endangered aquatic species, divide the 96-hour LC_{50} by 20. Table 12 and 13 includes those concentrations, which are used as a benchmark to measure the significance of possible impacts.

The No Observed Effect Level (NOEL) or No Observed Effect Concentration (NOEC) was used in place of the LC_{50} when it was available from studies. These levels represent a conservative approach to evaluating the active ingredients of the proposed herbicides within each watershed.

No Observed Effect Level/Concentration is the highest concentration of toxicant to which organisms are exposed in a full life-cycle or partial life-cycle test that causes no observable effect on survival, growth or reproduction of the test population. This would mean there is no significant difference between the test solution and the control, as determined by hypothesis testing.

Table 12: Toxic Levels of Herbicides to Fish (Syracuse: 1999:2001:2003; CDMS 2003 www.cdms.net ; Rice 1990, BPA 2003 www.efw.bpa-gov ; USDI-EPA 1995, 1998)

Herbicide (test species)	96-hour LC_{50} (milligram/liter)	LC_{50} divided by 20	NOEL (milligram/liter)	NOEC (milligrams/liter)
Clopyralid (rainbow trout)	20	1.0	20	Not Available
Dicamba (rainbow trout)	135	6.8	Not Available	Not Available
Glyphosate -Rodeo (rainbow trout, salmon)	923	46	Not Available	Not Available
Glyphosate -Round up (rainbow trout)	22	1.1	Not Available	Not Available
Metsulfuron methyl (rainbow trout)	150	7.5	Not Available	Not Available
Picloram (cutthroat trout, rainbow)	0.8 - 26		Not Available	0.29 - .55
Triclopyr –TEA (rainbow trout)	199		Not Available	104
Triclopyr -BEE (rainbow trout)	0.25 - 0.65		Not Available	0.24
2,4-D (fish; salt & esters)	1-100	0.05-5	10	Not Available

The second part of the risk analysis involves determining the possible herbicide concentration in streams. Field studies of herbicide spray operations have shown that herbicide input to streams ranges from non-detectable to 6% of the amount applied (Monnig 1988). To determine the delivery rate of herbicides to streams it is important to distinguish between infiltration-dominated sites and runoff-dominated sites.

An assessment by Rice (1990) reviewed numerous studies of picloram runoff to streams. It was determined that a maximum of ten percent of the herbicide applied to a runoff-dominated site could reach a stream within 6 hours of a heavy rainfall event. On infiltration-dominated sites, it was found that a maximum of only one percent of the applied herbicide could reach a stream within 24 hours of a heavy storm. Rice's assessment methodology was used in the aquatics effects analysis. For cumulative effects, it was assumed that chemical from all of the upstream treatment sites would reach the same stream at the same time. This worst-case scenario is extremely unlikely.

Because of its relatively long environmental persistence and relatively high soil mobility, picloram represents the worst-case scenario of a highly mobile herbicide. A report by Scott et al. (1978) of the U.S. Fish and Wildlife Service concluded that a concentration of 0.6 milligrams per liter (mg/l) picloram decreased cutthroat fry growth by 25 percent. No adverse effects were observed when concentrations were below 0.3 mg/l. Woodward (1979) concluded that picloram increased the mortality of

fry in concentrations above 1.3 mg/l and reduced their growth in concentrations above 0.61 mg/l when exposure exceeded 20 days.

For the purpose of the analysis, the entire herbicide application was calculated per watershed as if weeds were sprayed continuously along each road in just one day instead of over one to two months. Continuing with the worst-case scenario, the lowest streamflow was calculated for all affected watersheds and used to determine maximum concentration of herbicides within the streams. The lowest stream flows generally occur in the middle of September prior to the fall rains. Though September flows would be the lowest, all spraying would occur between May and August when flows are higher. Streamflow data was calculated using Embry's (1981) water yield formula; his equation was used to calculate the average cubic feet per second (cfs) of water yield for a seven-day, two-year low flow (Q7L2) during September. Table 13 shows the data for each watershed.

Other assumptions used in completing the aquatics/herbicide analysis include:

- Treatment of all sites within the same year.
- Picloram or Clopyralid would not be sprayed within 15 feet of perennial flowing streams, rivers, wetlands or water.
- The Picloram application rate of 1.0 pounds of active ingredient per acre corresponds to 4 pints of liquid Picloram per acre. This is the current maximum recommended rate; in most cases, a lesser amount would actually be used.
- All acres would be treated with herbicides. In reality, some of the acreage would be treated by mechanical or biological means.

Using this information, the acreage capable of being sprayed with each herbicide was calculated in each affected watershed – without exceeding the lethal amount ($LC_{50}/20$ or NOEL or NOEC) for trout or salmon. Table 13 summarizes those results.

Table 13. Watershed Characteristics and Average Annual Low Flow

Subbasin	Watershed Number	Watershed Name	Watershed (acres)	Watershed (sq. miles)	Average Annual Precipitation (in)	Average Annual flow Qaa (cfs)	Average Low Flow Qlow (cfs)
Clearwater 17060306	170603060502	Lower Orofino	68,399	107	35	111.39	11.38
	170603060501	Upper Orofino	27,972	44	45	61.13	5.99
Lower North Fork Clearwater 17060308	170603080601	Alder Creek	15,459	24	34	25.81	2.38
	17060308030101	Bear Creek	3,817	6	56	10.98	0.95
	170603080101	Beaver Creek	39,812	62	48	91.47	9.21
	170603080103	Isabella Creek	19,774	31	53	50.68	4.90
	170603080102	NF Clearwater to Beaver	50,077	78	38	90.72	9.13
	17060308030102	Minnesaka Creek	3,572	6	53	9.68	0.83
Upper North Fork Clearwater 17060307	1706030703	Cayuse Creek	107,851	169	60	293.28	32.06
	170603070502	Fourth of July Creek	28,491	45	49	67.13	6.62
	170603070105	Lake Creek	22,057	34	65	68.81	6.79
	170603070103	Long Creek	17,981	28	64	55.39	5.39
	170603070203	Lower Kelly Creek	30,424	48	41	60.26	5.90
	1706030704	Moose Creek	46,619	73	50	110.52	11.28
	1706030707	Orogrande Creek	58,820	92	44	121.61	12.50
	170603070902	Quartz Creek	27,936	44	52	69.23	6.84
	170603071001	Skull Creek	55,859	87	57	147.62	15.38
	170603070201	Upper Kelly Creek	56,885	89	58	153.16	16.00
	170603070101	NF Clearwater to Headwaters	50,342	79	65	152.22	15.89
	170603070501	NF Clearwater to Kelly	55,391	87	42	109.90	11.21
	170603070104	NF Clearwater to Long	38,625	60	59	106.66	10.86
	170603070801	NF Clearwater to Washington	62,177	97	44	129.42	13.36
	170603070802	Washington Creek	30,232	47	40	57.79	5.64
	1706030706	Weitas Creek	139,796	218	45	285.86	31.19
	TOTAL		**1,058,368**	**1654**			

Average Annual Flow = 0.0405 (Precipitation * Area) ^0.9641

Average Low Flow = 0.0734 * Average Annual Flow ^1.0701

Capacity = Average Low Flow * 62.43 * 54,000

Yield = NOEL * Capacity / 1,000,000

Maximum Acres to be Treated = Yield (Application Rate * 0.05)

Table 14. Maximum Annual Sprayable Acreage Using Each Herbicide with No Observable Effect (or equivalent).

North Fork Ranger District Noxious Weed EA - 2004				Clopyralid	Dicamba	Glyphosate Rodeo	Glyphosate Roundup	Methsulfuron Methly	Picloram	Triclopyrl TEA	2,4-D
Chemical Application Rate (pounds/acre)				0.5	1.5	1.5	1.5	0.4	1.0	0.4	1.0
Median Lethal Concentration (LC50 - ppm)				100	135	923	22	150	0.8-26	199	240
Median Lethal Concentration/20 (LC50/20 - ppm) or *NOEL* or **NOEC** (ppm)				**20**	6.8	46.2	1.1	7.5	**0.29**	**104**	*10*
Major Subbasin	Watershed Name	Watershed Acres	Known Concentrations of Noxious Weeds (acres)	Maximum Acres to be Treated							
Clearwater	Lower Orofino	68,399		30,684	3,452	23,601	563	14,383	222	199,448	7,671
	Upper Orofino	27,972		16,144	1,816	12,417	296	7,567	117	104,936	4,036
Lower North Fork Clearwater	Alder Creek	15,459		6,417	722	4,936	118	3,008	47	41,712	1,604
	Bear Creek	3,817		2,571	289	1,977	47	1,205	19	16,711	643
	Beaver Creek	39,812	21	24,850	2,796	19,114	456	11,649	180	161,527	6,213
	Isabella Creek	19,774	14	13,210	1,486	10,161	242	6,192	96	85,867	3,303
	Lower NF Clearwater	50,077	4	24,634	2,771	18,948	452	11,547	179	160,120	6,158
	Minnesaka Creek	3,572		2,248	253	1,729	41	1,054	16	14,610	562
Upper North Fork Clearwater	Cayuse Creek	107,851	167	86,459	9,727	66,502	1,585	40,528	627	561,986	21,615
	Fourth of July Creek	28,491		17,847	2,008	13,727	327	8,366	129	116,004	4,462
	Lake Creek	22,057	213	18,326	2,062	14,096	336	8,590	133	119,117	4,581
	Long Creek	17,981	9	14,530	1,635	11,176	266	6,811	105	94,442	3,632
	Lower Kelly Creek	30,424	47	15,899	1,789	12,229	291	7,453	115	103,342	3,975
	Moose Creek	46,619	**239**	30,427	3,423	23,403	558	14,262	221	197,773	7,607
	Orogrande Creek	58,820	**122**	33,705	3,792	25,925	618	15,799	244	219,085	8,426
	Quartz Creek	27,936	**5**	18,445	2,075	14,187	338	8,646	134	119,892	4,611
	Skull Creek	55,859	**5**	41,474	4,666	31,901	760	19,441	301	269,584	10,369
	Upper Kelly Creek	56,885	**3**	43,143	4,854	33,184	791	20,223	313	280,430	10,786
	Washington Creek	30,232		15,203	1,710	11,694	279	7,127	110	98,822	3,801
	Weitas Creek	139,796	**174**	84,122	9,464	64,704	1,542	39,432	610	546,790	21,030
TOTAL		**1,058,368**	**3,038**	**678,759**	**76,360**	**522,079**	**12,444**	**318,168**	**4,921**	**4,411,934**	**169,690**

From this analysis, each herbicide has a limited amount of acres that can be treated by watershed annually (Table 13). These acres will include activities on adjacent ownerships and still remain below the no observable effects level. The District will track the acres treated with herbicides annually.

The acreages proposed for spraying with Dicamba, Clopyralid, Glyphosate-rodeo Metsulfuron methyl, Triclopyr-TEA and 2,4-D are well below the maximum acres annually treatable with no effect for aquatic organisms expected. However, the amount of acres proposed for treatment would be reduced for the chemicals: Glyphosate-roundup, and Picloram from the original proposal in three watersheds. Triclopyr-BEE would not be applied based on comments received during scoping with regulatory agencies.

Within the project area, approximately 4,921 acres could be sprayed annually using Picloram without exceeding the NOEC for cutthroat trout. The 3,038 acres proposed for treatment in Alternative 3 would be below this threshold. Picloram is not to be used for all the noxious weeds, but only those that have thicker leaves and waxy surfaces such as the toadflaxes or rush skeltonweed. Surveyed acres proposed for treatment do not exceed the maximum treatable acres per watershed, and where they do, adjustments to the spraying program will keep the treated acres below the annual maximum acres for each watershed. The acres treated using Picloram would also be limited in Lake Creek (133 acres), the North Fork Clearwater to Kelly (219 acres) and NF Clearwater to Washington (261 acres).

The acres treated using Glyphosate-roundup would be limited to: 554 and 660 acres in the North Fork Clearwater to Kelly and NF Clearwater to Washington, respectively.

It should be emphasized that the effects analysis calculations represent the worst-case scenario. The likelihood that the levels of chemical concentrations shown in the previous table would be reached is very low. In fact, it is unlikely that any herbicide would be detected in stream water as result of proposed herbicide applications because of the low level of herbicide use spread over a period of two months or more compared to the higher water yields in these watersheds over the same period of time. The spraying of picloram – applied under similar conditions as the proposed action – was monitored along a streamside in Montana (Watson et al. 1989). In this study no herbicide was detected in the stream at the on part per billion detection limit.

Application of site-specific Best Management Practices (BMPs) would further reduce the likelihood of herbicide being detected in stream waters as described in Chapter 2.

Application procedures would follow Inland Native Fish Strategy (INFISH) Standard and Guideline RA-3 and PACFISH strategies as well as State of Idaho Best Management Practices (BMPs) guideline for herbicide use within Riparian Habitat Conservation Areas (RHCAs).

Therefore, herbicide concentrations in streams smaller than those identified above are not expected to reach NOEL/NOEC levels. An explanation of the formula used to determine the acreages capable of being sprayed with the proposed herbicides in each watershed can be found in the project file.

Based on the persistence in soil, soil half-life, potential for movement in to water, and the possibility of repeat application; Picloram, Clopyralid and Dicamba, are expected to have a short term effect to water quality and aquatic organisms. Based on analysis the concentration being delivered would be non lethal to aquatic species.

Best Management Practices (BMPs) and mitigation measures that will be applied to minimize the effects to soil and water resources, from Picloram, Clopyralid or Dicamba, are listed in Chapter 2 and summarized here. BMPs that mitigate these effects include:

- No direct application to water or areas with high water tables. No application within 15 feet of streams or water.
- Limited application by wind speed and weather considerations.
- Reduce application rate to a maximum of 1.0 pounds/acre of Picloram with spot treatment of no more that 50% of an acre (USDI-EPA 1995a).

- Use of picloram would be allowed only once every two years, to reduce accumulation in the soil (USDI-EPA 1995a).
- Limited annual application of herbicide chemicals to below the Lethal Concentration (LC_{50}), or No Observed Effect Level/Concentration (NOEL/NOEC) as determined by watershed (Table 14).
- Controlled mixing, storage and transportation of all herbicides.

When herbicides are applied, there is often concern that they will bio-concentrate in organisms through uptake and retention by tissue or gills. Norris et al. (1991) reported that bio-concentration of chemicals has resulted in organisms exhibiting 100,000 times the concentration of the chemical in the water. For this to occur, retention of a pollutant must exhibit a high resistance to breakdown or excretion by an organism to allow a sufficient uptake period for an elevate concentration. A high concentration must also be applied for an extended period of time. The predominant factors that determine the extent of bio-concentration are physio-chemical properties of the compound and the organism. The ratio of fat solubility to water solubility of the chemical and the amount of fat in the organism are of primary importance. Bio-concentrations are greatest in organisms with a high fat content when exposed to chemicals with a high ratio of fat to water solubilities. Bio-concentration factors provide an indicator of potential for a chemical to bio-concentrate. Chemicals with a Bioconcentration Factor (BCF) of greater than 1,000 indicated a need for a precise risk analysis and values less than 100 suggest experimental verification of the chemical's potential to bio-concentrate is not warranted. In terms of the amount and timing of this project's application of herbicides, as well as the BCFs for herbicides proposed for use (Norris et al. 1991), there is a low risk of bio-concentration. BCFs for each of the herbicides proposed for use can be found in Appendix F.

Concern has been expressed over the possible cumulative or synergistic effects of mixtures of chemicals on sensitive resources. Synergism is a special type of interaction in which the combined effect of a certain herbicide with other chemicals in the environment is greater that the effect of any one chemical alone. This issue is discussed in greater detail in the section on Human health Impacts. As noted there, EPA currently supports an additive model in predicting such interactions. Even with the assumption that the chemicals are present simultaneously; their additive concentrations are Stillwell below the NOEL/NOEC threshold.

Margins of safety can be used to indicate the toxic risk associated with herbicides applications by watershed. These calculations can also help assess the potential for individual herbicides to act in synergism with one another. Margins of safety that equal 1, result when the exposure of an organism to an herbicide is equal to the no-effect level (define as the concentration that causes no mortality of test animals in acute toxicity tests). Margins of safety that are less than 1 suggest a direct toxic effect is likely; margins greater than 1 indicate that toxic effects are less likely to occur. Various standards have been used for margins of safety; margins of safety around 100 are typically used for pesticide tolerances in food while margins may be appropriately set much greater than 100 when rare organisms will be exposed to the chemical.

Due to the method of calculating the potential acres for herbicide treatment, margins of safety for herbicide applications in Alternative 3 would always be greater than or equal to 1 for each watershed. Margins of safety would only equal 1 in the unlikely event that sufficient funding is available to treat all of the acres shown in Table 12 at the same time and the analyzed worst-case scenario materializes. Therefore, it is expected that Alternative 3 will result in margins of safety that exceed 1 for herbicide applications.

To help address the concern for synergistic effects in situations where more than one herbicide would be applied, the amount of each chemical is reduced (Klarich 1997). Alternative 3 includes a provision that limits the maximum number of acres that can be treated with herbicides within a watershed when multiple herbicides would be used (Appendix N). This limit is identified by the number of acres capable of being sprayed with the most restrictive chemical, e.g. Picloram. This criterion helps ensure that margins of safety will always be greater than 1 in the situation where multiple herbicides would be applied. Therefore, synergistic

effects are not expected from implementation of Alternative 3.

Cumulative Effects

This alternative would result in indirect effects to water quality and aquatic organisms in the short term. With the application of Best Management Practices and mitigation measures no cumulative effects are expected.

Other activities occurring in this analysis area include: timber harvest, grazing, mining, prescribed burning, recreation, road construction, re-construction, maintenance and decommissioning. These activities will continue occur over the next ten years. The amount of each activity is undetermined at this time. The Forest will follow national direction to prevent the spread of noxious weeds for each of these activities. Management of individual activities to prevent the introduction and spread of noxious weeds is designed to reduce the amount and extent of noxious weeds across the analysis area overtime.

Other projects that include the application of herbicides will be included to determine the maximum allowable acres to be treated annually. This will include other land managers in each watershed. The North Fork Ranger District will monitor herbicide application, similar to what has been completed on other Districts (USDA-FS 2001-Potlatch). See Table 13 for the maximum allowable acres to be treated by herbicide and watershed.

The Clearwater National Forest began implementation of a similar project on the Potlatch Ranger District in 2001. Water quality was monitored during implementation of spraying of glyphosate to control noxious weeds. Monitoring found no detectable levels of glyphosate in streams as a result of drift or run off from the treated area (Foltz 2001).

Other Sensitive Aquatic Biota

Herbicides can also indirectly influence fish populations by affecting the populations of other organisms upon which fish are dependent. Table 15 provides toxicity data for other aquatic organisms, e.g. macroinvertebrates (USDA Forest Service 1992).

As shown in Table 13, these herbicides are generally less toxic to lower orders of aquatic organisms than to fish species. Although the species listed in the table are not the only aquatic organisms found in these waters, the U.S. Fish and Wildlife Service and the EPA use them as indicators of a wide range of aquatic organisms. The acreage proposed for spraying each year in Alternative 3 is below the acreage that could be sprayed while meeting chemical concentration thresholds for these organisms.

Alternative 1 and 2 would use biological and mechanical control of noxious weeds and would have no effect on other aquatic organisms.

The aquatic organisms generally have higher tolerances to toxic materials than fish, so keeping herbicide treatment rates in **Alternative 3** below the NOEL for fish should indicate very low risk to these organisms.

Adaptive Strategy

New sites proposed for future treatment must meet the requirements of the adaptive strategy (See Chapter 2). The adaptive strategy includes parameters established by the project aquatics specialist to ensure that future herbicide treatment falls within the scope of this EA relative to aquatic resources. The parameters require that the combined treatments in any watershed would result in a concentration of herbicide in surface water lower than the lethal concentration/NOEL/NOEC for each watershed within any given treatment year.

Combined with the design criteria listed in Chapter 2 and herbicide application guidelines in Appendix I, use of these parameters would protect aquatic resources from the potential effects of herbicide treatment. No adverse effects to soils or aquatic resources would be expected to occur from future herbicide applications under the adaptive strategy.

Forest Plan Consistency

All Clearwater National Forest Plan water quality standards as listed on pages II-27-29 would be followed throughout project design development and implementation phases.

Table 15: Levels of Herbicide Toxic to Aquatic Organisms Other than Fish

Herbicide	Test Species	Test Results
Picloram	Daphnia magna	48-hr LC_{50} is 76 mg/l
Picloram	Scuds (Gammarus fasciatus)	96-hr LC_{50} is 27 mg/l
Picloram	Scuds (Gammarus pseudolimnaeus)	96-hr LC_{50} is 16.5 mg/l
Picloram	Stonefly (Pteronarcys californica)	96-hr LC_{50} is 4.8 mg/l
2,4-D amine	Daphnia magna	48-hr LC_{50} is greater than 100 mg/l
2,4-D amine	Seed shrimp (Cypridopsis vidua)	48-hr LC_{50} is 8 mg/l
2,4-D amine	Scuds (Gammarus fasciatus)	96-hr LC_{50} is greater than 100 mg/l
2,4-D amine	Midges (Chironomus plumosus)	48-hr LC_{50} is greater than 100 mg/l
Glyphosate	Scuds (Gammarus fasciatus)	96-hr LC_{50} is greater than 43 mg/l
Glyphosate	Midge Larvae	48-hr LC_{50} is 18 mg/l
Glyphosate	Water Flea (*Daphnia magna*)	48-hr LC_{50} is 3 mg/l
Glyphosate	Copepod (Nitocra spinipes)	96-hr LC_{50} is 22 mg/l
Dicamba	Daphnia magna	96-hr LC_{50} is greater than 100 mg/l
Dicamba	Sow bugs (Asellus brevicaudus)	96-hr LC_{50} is greater than 100 mg/l
Dicamba	Scuds (Gammarus faciatus)	96-hr LC_{50} is greater than 100 mg/l
Dicamba	Shrimp (Palaemonetes kadiasis)	96-hr LC_{50} is 28 mg/l
Dicamba	Frog, tadpole (1-2 wks) (*Adelotus brevis*)	96-hr LC_{50} is 185 mg/l
Dicamba	Frog, tadpole (1-2 wks) (*Limnodynastes peroni*)	96-hr LC_{50} is 106 mg/l
Clopyralid	Ram's Horn Snail (*Helisoma trivolvis*)	No mortality after 48 hrs in 1 mg/l solution
Clopyralid	Green algae (seenastrum capricornutum)	96-hr LC_{50} is 61 mg/l
Clopyralid	Duck weed (*Lemna minor*)	No growth reduction at 2 mg/l after 21 days
Clopyralid	Daphnids (*Daphnia sp.*)	48-hr LC_{50} is 225 mg/l
Triclopyr	Daphnia magna	48-hr LC_{50} is 1170 mg/l
Metsulfuron Methyl	Daphniamagna	48-hr LC_{50} is greater than 150 mg/l

AIR QUALITY

Affected Environment

All projects of the Clearwater National Forest must comply with procedural requirements of the Clean Air Act (U.S. EPA 1971) and State Implementation and Smoke Management Plans. The U.S. Environmental Protection Agency (EPA) has adopted national primary and secondary ambient air quality standards (NAAQS) under the authority of Section 109 of the Clean Air Act.

These standards include acceptable levels of pollutants and particulate matter. The Prevention of Significant Deterioration (PSD) requirements of this Act limit the increase of pollutants such as these from point sources that could impact Class 1 areas. All areas within the project area are designated as Class 2.

The air quality within the project area is generally good to excellent throughout a majority of the year. Smoke and dust accumulations case a seasonal deterioration of air quality. Smoke is generated from natural fires and prescribed burning while dust primarily results from vehicle traffic on roads surfaced with gravel and native materials.

The climate in northern Idaho is characterized by dry summers and wet winters. Late May and June are characterized by spring moisture pattern that gives way in late June to the summer drought when the subtropical high pressure system along the west coast shifts abruptly north. Little moisture is received in the area during July, August and early September. By mid- to late September, the winter climatic pattern begins to form. The subtropical high pressure shifts south and permits prevailing westerly winds to become re-established. This allows a succession of high and low pressure systems to move through the area (Ross and Savage, 1967).

Environmental Consequences

Effects Common to Alternative 1 (No Action) **and Alternative 3** (Mechanical, Biological, Cultural and Chemical Treatments)

Both Alternatives would have short-term localized impacts on air quality because of the drift of herbicide spray particles. Generally the greatest part of this drift would settle out with 25 feet of the site, although small amounts could carry greater distances (USDA Forest Service, 1993). The smell of chemicals such as 2,4-D may also persist at a spray site for several days following spraying.

Alternative 1 would have less impact – spray on up to 1500 acres – compared with Alternative 3 – proposed spray on 500-3000 acres.

Alternative 2: Mechanical, Biological and Cultural Treatments

This alternative would not affect air quality within the project area.

HUMAN RESOURCE AND HUMAN HEALTH

Affected Environment

In general, the presence of noxious and undesirable weeds does not pose significant health threats to a large portion of the population. However, some individuals are affected by allergies and minor skin irritations from certain weed species. For example, leafy spurge contains a latex-bearing sap which irritates human skin and can cause blindness in humans upon contacts with the eye (Callihan et al. 1991). Some species of weeds, such as the thistles, cause minor scrapes and irritations.

Hand pulling weeds can cause minor skin irritations in situations where gloves are not used. The sap of Russian knapweed contains a known carcinogen.

Exposure to herbicides currently used by state, county and private landowners may also result in a reaction in some people. The possibility of an illness or accident occurring from exposure to an herbicide varies from person to person, but is considered to be low. The potential for impacts is dependent upon the herbicide used, the method of application and the size of the treated area.

The proposed herbicide control sites vary in location from being isolated from concentrated human activity to heavily used recreation sites. In the preparation of this proposal, a number of possible vectors for impacts to human health were considered per the Northern Region's "*Human Risk Assessment for Herbicide Applica-*

tions to Control Noxious Weeds and Poisonous Plants in the Northern Region: 1988 Edition" (Monnig, 1988).

Environmental Consequences

Alternative 1: No Action

The direct, indirect and cumulative effects on human health from use of Clopyralid for areas inside the Middle Black project would be the same as Alternative 3.

The spread of noxious weeds within the National Forest lands is likely to have little impact on human health and safety. Human reactions range from allergic reaction to skin irritation and, as in the case of leafy spurge, the possibility of blindness (Callihan et al. 1991). It should also be noted that while the potential does exist for severe reactions, the probability of their occurrence is very low.

Alternative 2: Mechanical, Biological and Cultural Treatments

Impacts to human health and safety from mechanical and cultural treatments are likely to be minimal. Possible effects include cuts, burns, allergies and skin irritation to the individuals performing the work. Skin irritations may result from a reaction to the sap of various noxious weeds such as knapweed or to the physical parts of the plant itself such as the spines on thistles. Gloves, long-sleeved shirts and boots would be required for mechanical treatment and would minimize the risk of injury or irritation.

Due to the nature of the work sites, injuries such as sprains or strains from repeated bending or working on uneven ground surfaces may result. Cumulative effects to human health would be insignificant because the risks associated with weed treatment under this alternative would be similar to those of other forest activities.

The release of biological control agents for different species of noxious weeds would pose no threat to human health or safety beyond that associated with working on uneven ground surfaces.

Alternative 3: Mechanical, Biological, Cultural and Chemical Treatments

Impacts on human health from mechanical and biological treatments would be the same as those disclosed under Alternative 1.

Treatment with Herbicides

There are a wide variety of opinions within the general population on the value and safety of herbicides including those proposed for use. Many people, particularly in rural and agricultural settings, view herbicides as a necessary part of business and if used properly, a relatively safe tool. However, the risks of herbicides are being questioned for many reasons, for example, concerns over worker safety are being raised.

The Northern Region of the Forest Service (Region One) has analyzed the risk of the use of clopyralid, 2,4-D, dicamba, glyphosate, metsulfuron methyl, triclopyr and picloram to control noxious weeds. This analysis is presented in two documents: 1) *Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4, and 10 on Bonneville Power Administration Sites* (USDA Forest Service 1992), and 2) *Human Health Risk Assessment for Herbicide Application to Control Noxious Weeds and Poisonous Plants in the Northern Region* (Monnig 1988).

Analysis of the human health risk from herbicide use follows the same basic format as outlined under the section for aquatics. Toxicity information for the herbicides of interest is reviewed to determine the levels of these chemicals that would be harmful to human health. Exposures and does that might occur as a result of these projects are then estimated for workers and members of the general public. The toxic effect levels established are compared to predicted dose levels to determine the possibility of health impacts.

A considerable body of data from tests on laboratory animals is available for these herbicides. Most of these tests have been conducted as a requirement of EPA registration of these compounds for use in the United States. It should be noted that none of these compounds have completed all testing required for final registration. Current Federal regulations allow for conditional registration pending the completion of all tests as long as no unreasonable adverse

effects are found in the interim. This allowance for continued use before all testing is completed concerns some members of the public and has led to charges that "untested" pesticides are allowed on the market. All of the herbicides proposed for use within this project are EPA approved for according to their labeled instructions, are *conditionally* registered, and have been assigned EPA registration numbers.

All of the herbicides proposed for use have been long subjected to long-term feeding studies that test for general systemic effects such as kidney and liver damage. In addition, test of the effects on reproductive systems, mutagenicity (birth defects), and carcinogenicity (cancer) have been conducted. No observable effect levels (NOEL) are available for most types of tests.

Extrapolating a NOEL from an animal study to humans is an uncertain process. The EPA compensates for this uncertainty by dividing NOELs from animal tests by a safety factor (typically 100) when deciding how much pesticide will be allowed on various foods. This adjusted dose level is referred to as the Acceptable Daily Intake (ADI) and is presumed by the EPA to be a dose that is safe even if received every day for a lifetime. This value is usually expressed as milligrams of herbicide allowed per kilogram of body weight (mg/kg). Table 16 displays the ADIs for the herbicides proposed for treatment.

Table 16: Acceptable Daily Intake (ADI) mg/kg/day

Herbicide	ADI
Picloram	0.07
2,4-D	0.01 (0.3)*
Glyphosate	0.1
Dicamba	0.03
Clopyralid	0.5
Triclopyr	0.025
Metsulfuron Methyl	0.25

Note: Values for ADI taken from USDA Forest Service (1992). The values are established by the EPA and are listed for all of the chemicals of concern.

*For 2,4-D the World Health Organization has established an ADI of 0.3.

Potential effects of herbicide treatment on human health were evaluated in three ways. **Direct effects** are those that may occur from direct contact with an herbicide such as when an applicator sprays an herbicide. **Indirect effects** are those that may occur from secondary contact with an herbicide such as when people pick berries in an area where herbicide was absorbed by the plant through the soil. **Cumulative effects** are those that may occur in combination with other effects or have an increased effect over time such as continued exposure to herbicides.

Direct Effects

Worker doses vary depending on several factors. The conditions under which a given herbicide is applied will affect the level of exposure; higher winds create more drift especially when using a high-pressure nozzle which creates more vapor.

Using appropriate personal protective equipment (PPE) as required can lower the exposure for workers by as much as 68% (USDA Forest Service 1992). The use of PPE is critical since most of the application exposure to herbicides is absorption through the skin rather than inhalation through the lungs (Monnig 1988).

Finally, the attention and care given by a worker mixing, loading or applying herbicides greatly influences the risk of exposure. Proper training and certification for the mixing, loading and application of herbicides is essential to reduce the risks.

It is highly unlikely that the one-day exposure for workers applying 2,4-D with a backpack sprayer would exceed the EPAs recommended daily dose. The risks would be very small because the spraying would only take place a few weeks per year and ADI assumes a lifetime of daily doses. Furthermore, use of design criteria listed in Chapter 2, herbicide handling guidelines (Appendix H) and herbicide application guidelines (Appendix I) during project implementation would reduce the incidence of worker exposure to herbicides.

There is the possibility of hypersensitivity in a small percentage of the population. These persons are generally aware of their sensitivities since they are typically triggered by a variety of natural and synthetic compounds. Such persons would not be permitted to work on the spray crews.

Indirect Effects

Indirect effects could result from people entering a previously treated area and being exposed to herbicide residues. Concerns are raised about the possibility of consuming wild foods such as berries or mushrooms after herbicide treatment has occurred; the potential for this is low. Most of the spraying would occur along road rights-of-way where the occurrence of wild foods is low. Occasionally, a spray swath may overlap with huckleberries and the berries may be sprayed. Within a few days of treatment the huckleberry plants would turn brown and lose their fruit. However, berries could be picked and consumed before they drop off.

To determine the dose for consumption of huckleberries that might accidentally be sprayed with herbicide, the USDA Forest Service Risk Assessment's (1992) methodology was used. Oral consumption of 2,4-D was used to analyze the concentration in the berries and the dose received by the person consuming the sprayed berries. The analysis used 2,4-D because it would have the highest concentration based on its application rate.

Based on this methodology, a 150-pound person would have to consume 210 pounds of huckleberries each day for a lifetime to reach the EPA's acceptable daily intake (ADI) if the huckleberry plants occurred on the edge of the spray zone and received only drift spray. In the worst case scenario where the huckleberry plants were sprayed directly, that same 150-pound person would have to consume a half pound of huckleberries daily for their lifetime in order to reach the ADI for 2,4-D. The likelihood of a person reaching the ADI for 2,4-D is extremely low for several reasons. First, the probability of a large amount of huckleberries being sprayed in a road right-of-way is very low. Second, the chance of a person picking huckleberries in a road right-of-way where weeds are occurring (cut banks and fill slopes) is also low. Third, the probability of a person picking and consuming even a half-pound of huckleberries every day of their life is extremely low. Fourth, the time period between when the plants are sprayed and the berries dry up is generally less than a week, which reduces the chance of those berries being picked. Lastly, signing of the sprayed areas would discourage berry-picking at those sites.

Similarly, the risk of exposure to people hiking though a recently sprayed area would be low (USDA Forest Service 1992 and Monnig 1988). The main route of ingestion of herbicide would be through the skin. If a hiker did walk through an area just sprayed with 2,4-D the dose received would be 40 times lower than the ADI established by the EPA. Mullison (1985) concluded that, based upon several studies, picloram is not likely to cause skin irritation. For people picking berries in recently sprayed areas, the dose of picloram received in one hour would be 37 times lower than the ADI.

Cumulative Effects

Cumulative effects would apply both to workers and to the public, who may experience continued exposure to herbicides. The ADI used for analysis is based on the level of herbicide that would be acceptable each day for a lifetime. Over time, a person may be exposed to some quantity of herbicide but since spraying would occur for only a few weeks each year, the daily intake over a lifetime would not approach the EPA standard.

The issue of delayed effects of low levels of chemical exposure is raised among some people. Principal among these effects is cancer. All of these herbicides have been tested for carcinogenicity. The evidence for cancer initiation or promotion from 2,4-D and picloram has been widely debated. Current evidence is mixed and these compounds seem, at most, mildly carcinogenic. The project file contains a summary of a report from the EPA's Science Advisory Board Joint Committee regarding carcinogenicity of 2,4-D. The report recognized that 2,4-D might be a carcinogen. However, the committee concluded that current research couldn't distinguish whether observed risks are due to the use of 2,4-D or to daily exposure to other substances. Also included in the project file is a letter from Dr. John Graham of the Harvard University School of Public Health summarizing the current evidence on 2,4-D. As noted in the letter, the weight of evidence that 2,4-D is a carcinogen is not strong, and even if it is ultimately shown to be an animal carcinogen, it is not likely to be potent.

Nonetheless, the Risk Assessments cited above assume that the two herbicides are carcinogens. Those analyses also assume that any dose of a carcinogen could cause cancer and that the

probability of cancer increases with increasing doses. Estimations of the probability of developing cancer from exposure to these compounds are based on a conservative extrapolation from cancer rates in animals subjected to a given chemical over a lifetime.

The risks are relatively low compared to other commonly encountered risks. For example, there is an increased risk of cancer accumulated from living in Denver, Colorado, at a high elevation for 1.5 months compared to living a sea-level; this is due to cosmic rays. Smoking two cigarettes increases the risk of cancer by one in a million.

Projected cancer rates are highest for workers since their exposure is the highest. Cancer probabilities of workers would increase by about one in a million after spraying 2,4-D for 193 days or spraying picloram for 17,000 days (Monnig 1988). These numbers were derived using a worst-case scenario of a high dose of herbicide with a low amount of worker protection. Given the requirements for worker protection outlined in **Appendix H: Handling of Herbicides**, the cumulative impact from spraying at the rates proposed would be insignificant.

Concerns are occasionally raised about the cumulative and synergistic interaction of the pesticides and other chemicals in the environment. Synergism is a special type of interaction in which the cumulative impact of two or more chemicals is greater than the impact predicted by adding their individual effects. The Risk Assessments referenced above address the possibility of a variety of such interactions. These include the interaction of the active ingredients in a pesticide formulation with its inert ingredients; the interactions of these chemicals with other chemicals in the environment; and the cumulative impacts of herbicide treatment as proposed and other herbicide use to which the public might be exposed to.

We cannot absolutely guarantee the absence of a synergistic interaction between the herbicides proposed for use and the other chemicals to which workers or the public might be exposed. Testing the virtually infinite number of chemical combinations would be impossible.

There are a number of reasons to expect that synergistic or other unusual cumulative interactions would be rare. Mullison (1985), Monnig (1988), USDA Forest Service Risk Assessment (1992), an EPA (1994) refer to low teratogenic, mutagenic and carcinogenic properties of herbicides compared to naturally occurring chemicals in foods. The low, short-lived doses that would result from spraying these herbicides are very small compared to many other chemicals in the environment. The EPA states in a discussion entitled *Guidelines for Health Risk Assessment of Chemicals* (Federal Register September 24, 1986) that, for these relatively small doses, a synergistic effect is not expected. They suggest in their discussion of interactions (synergistic or antagonistic effects) that "there seems to be consensus that for public health concerns regarding causative (toxic) agents, the additive model is more appropriate [than any multiplicative model]".

There have been some recent concerns regarding this claim. Arnold et al. (1996) discuss their findings of higher than expected synergistic effects of four pesticides (three of these four pesticides have been banned in the U.S.). In discussing this new study, Kaiser (1996) describes how the findings may cause need to revise current assumptions concerning synergism. Kaiser also cites that more work needs to be done to determine any relevance to humans and that currently there are more questions than answers concerning the new findings. While this one study does show the possibility of increase risk, there is not yet sufficient scientific research to conclude that the chemicals being proposed for use would exhibit the same results as found in the Arnold study. Based on the best scientific information available, we would reasonably expect that human health impacts from herbicide applications on the proposed sites would be insignificant.

RECREATION

Affected Environment

Many of the proposed chemical treatment sites are located along primary Forest roads and trails where dispersed outdoor recreation activities such as camping, hiking, fishing and hunting occur. In addition, treatment of administrative sites such as campgrounds and airstrips would take place, as well as treatment within

the Middle Black project area. However, many dispersed campsites would still be untreated.

Several of the sites are associated with developed campgrounds. These sites vary in the amount of developed recreational use, and were identified for treatment to reduce the potential of recreational use spreading weeds.

The remaining sites are located in areas that are isolated from human activities or where there is a lower chance of dispersed recreation activities occurring.

Environmental Consequences

Alternative 1: No Action

While treatment of administrative sites such as developed campgrounds and airstrips would continue as would sites within the Middle Black project area, many dispersed recreation sites would remain untreated. Thus, the spread of noxious weeds could negatively impact recreation use and enjoyment within the North Fork Clearwater basin. For many people the presence of noxious weeds is evidence of negative human impact and negligence in the stewardship of natural resources and public lands.

Alternative 2: Mechanical, Biological and Cultural Treatments

Under this alternative weed concentrations at some recreation sites would be reduced in the short term. However, because of its estimated low effectiveness, the long-term effects would likely be worse than Alternative 1.

Alternative 3: Mechanical, Biological, Cultural and Chemical Treatments

An aggressive integrated treatment program could greatly decrease the likelihood of the spread of non-native invasive vegetation within the project area as well as minimize the negative impact of weeds on recreation. However, the treatment itself could affect recreational users particularly during the short time periods when the treatment would occur on a particular site.

Visual impacts of some mechanical and chemical treatments would be temporary. Once the weed is removed or sprayed, the plants would begin to yellow and wither. This process would not look too much different than the natural wilting of plants. The species specificity of the hand mechanical or spraying would retain other green vegetation on sites. For roadside brushing treatments, the visual effects would be greater because the potential for treating larger areas exists.

Signs posted at recreation sites informing forest visitors of herbicide use at the site may disturb some visitors who disagree with or do not understand the application of herbicides.

WILDLIFE

Affected Environment

A range of wildlife species may intermittently be present on or adjacent to some sites proposed for treatment. Wildlife which may be present include big game (deer, elk, bear), small mammals (coyote, ground rodents), and land birds (numerous species).

The analysis addresses wildlife species for which treatment sites may be providing suitable habitat or with potential to be affected by the proposed action.

Effects of management activities were assessed by analyzing:

- Potential changes in vegetation/habitat for each species or group of species
- Responses to habitat changes
- Direct effects on wildlife from treatment (e.g. chemical)
- The response of species to disturbance

A combination of factors including the resource/species being considered, potential effects, consequences of potential effects and the ability to measure effects determine the geographic scope of wildlife analysis. The scope for direct/indirect effects is the proposed treatment sites and immediate adjacent areas while cumulative effects were considered within the area encompassed by the treatment sites.

Noxious weeds provide neither the same food nor cover that native wildlife species evolved with. Big game show a low preference for all of the targeted weed species especially when given a choice to use native forage species.

However, elk and deer do forage on some weed species, i.e. knapweed. Some species of birds, notably black-capped chickadees, have also learned to eat the seeds and the seedhead gall fly larvae of knapweed.

The sites proposed for treatment are disturbed sites either directly disturbed by human activity (e.g. campgrounds) or adjacent to human travel corridors (e.g. road fills). They provide little habitat for Threatened and Endangered (T&E) species, sensitive species, or Management Indicator Species (MIS). Most of these species are known, or suspected, to occur on the Forest and do so in areas associated with water, riparian areas, mature/old-growth forest habitat, cavity habitat, or areas with low human disturbance.

Threatened, Endangered and Proposed Species

Threatened and Endangered species are managed under the authority of the Endangered Species Act (ESA) (P.L. 94-205, as amended) and the National Forest Management Act (PL 94-588). The U.S. Fish and Wildlife Service identified the following listed and/or proposed wildlife species that may occur on the Clearwater National Forest (Species List 1-4-04-SP-260-U.S. Fish and Wildlife Service – December 1, 1999): Bald Eagle, Gray Wolf, and Canada Lynx.

Direction provided by the USFWS was used to develop a project specific species list requiring analysis. Using the Species List, a review of the areas to be treated, a search of district records and scientific literature, professional knowledge of the area, and a review of information from the Conservation Data Center it has been determined that the species which may occur within the vicinity of treatment areas and/or with potential to be impacted by the proposed actions include gray wolf, bald eagle and lynx.

Gray Wolf

Quality gray wolf habitat is characterized by high prey densities – particularly big game – and isolation from human disturbance. Other important habitat features for wolves include den and rendezvous sites (Hansen, 1986).

The project area falls within the Central Idaho reintroduction area where gray wolves are classified as non-essential experimental populations. This classification treats wolves as proposed for listing under the ESA. The reintroduction of wolves in Central Idaho did not envision conflicts with current or anticipated management actions. No changes in land use restrictions (other than the possibility of temporary restrictions near den sites) are required because of the reintroduction.

Wolf habitat within the project area ranges from low to high quality. Wolves are known to occur within the project areas – the Kelly Creek pack is monitored regularly. However, no proposed treatment will affect the natural activities of the pack.

Bald Eagle

Bald eagles are winter visitors and yearlong residents of northern Idaho. They are attracted to the area's large lakes and rivers, and the accompanying food supply. Bald Eagles are opportunistic feeders and will prey on fish, waterfowl, small mammals and carrion.

Bald Eagles generally nest in large dominant live trees or snags with open crowns in areas relatively free from disturbance. Nest sites occur within 1 mile of a large body of water – most often within one-quarter mile (MBEWG 1991).

Perch sites, roost sites and access to prey are the essential components of winter habitat. Bald eagles generally use traditional communal roost sites in the winter, especially during periods of severe weather. Roosts are often located in large trees at the head of sheltered draws that provide protection from wind and inclement weather. Although proximity to food resources is not critical, roosts are often in the closest available forest stand. Roosts at greater distances from food sources will require more energy expenditures (MBEWG 1991).

Occupies nesting territories, known communal roosts, are located within the project area, primarily within proximity of the Dworshak Reservoir located in the lower reaches of the North Fork Clearwater River drainage. Proposed activities will have no effects on eagle activities.

Canada Lynx

Lynx are associated with alpine and montane boreal plant communities generally above 4000 feet elevation (IDF&G 1995). Lynx habitat in

the western mountains consists primarily of 2 forest structural stages: 1) early successional structures (foraging cover) that provides habitat for prey – especially snowshoe hare, and 2) late successional structure for denning (denning cover). Denning cover and foraging cover must be in close proximity and interconnected by stands suitable for lynx travel. Lynx population presence can be threatened by low quality, quantities and interspersion of habitat.

Human access into remote areas may also have direct and indirect negative effects on lynx populations. Female lynx may move kittens in response to disturbance; incidental take by trappers targeting coyote or bobcat may affect lynx distribution; and snowmobile or cross-country ski trails may allow lynx competitors to infiltrate high elevations thereby increasing competition for food.

Sensitive Species

Sensitive species are determined by the Regional Forester (FSM 2670.5) and are those species for which population viability is a concern. The National Forest Management Act directs the Forest Service to review programs and activities to ensure that species do not become threatened or endangered as a result of Forest Service actions.

Forest Plan direction for the Clearwater National Forest states that habitat of sensitive species will be managed to prevent further declines in populations to prevent federal listing.

The Regional Forester for Region One has compiled a listing of sensitive species (USDA Forest Service, April 1999). Species from this list which may occur within the project area, a short description of habitat requirements, treatment site presence, and comments are displayed in Table 15.

The composition and structure of treatment sites do not provide optimal habitat for sensitive wildlife species. Sensitive species within the project area are associated within narrow habitat requirements such as mature/old growth forest habitat, areas removed from human disturbance, lakes, or other specialized habitats (e.g. caves).

Table 17. Terrestrial MIS/TES species: Their status, occurrence, & habitat within the North Fork Ranger District

Species	Status	Occurrence	Comments
Bald Eagle	T (MIS)	Present	
Gray Wolf	Ex/N (MIS)	Known	
Lynx	Proposed	Rare	
Wolverine	S		
Harlequin Duck	S		
Fisher	S		
Flammulated Owl	S		
Northern Goshawk	S (MIS)		
Black Backed Woodpecker	S		
Coeur d'Alene Salamander	S		
Boreal Toad	S		
Northern Leopard Frog	S		
Pine Marten	MIS		
Pileated Woodpecker	MIS	Common	Suitable
Elk	MIS	Common	Suitable
Moose	MIS	Present	Suitable
White-tail Deer	MIS	Common	Suitable
Belted Kingfisher	MIS	Common	Suitable

E = Endangered, Ex/N = Experimental Populations/ non-essential, T = Threatened (USFWS Federal Status),
S = Sensitive (USFS Region One), MIS = Management Indicator Species (Clearwater National Forest)

The nature and location of treatment sites, i.e. disturbed sites adjacent to human travel corridors, make it highly unlikely that these areas are providing habitat for any sensitive species. However, the project area may be providing sub-marginal habitat and/or routes of movement for some species as described in Table 15.

Management Indicator Species

Since it is impractical to estimate the effects of proposed actions and alternative on each and every species, ten (10) wildlife species were selected because changes in their populations and preferred habitat are thought to represent most of the parameters that would be important to other wildlife species. It is recognized that individual species may have unique habitat requirements but it has generally been accepted that if the needs of management indicator species are met, then the needs of the remaining species utilizing the project area would also be met. The wildlife management indicator species in the Clearwater National Forest Plan include three threatened and endangered species (previously discussed), three big-game species, three species dependent on older forests, and one riparian dependent species.

Other Wildlife Species

Other native wildlife species of interest include a diverse group of land birds. These birds include small songbirds that migrate from northern breeding grounds to neotropic locations and resident birds that remain in the area year round. Their habitat requirements vary from rocky slopes (rock wrens) to meadows and lower seral stages (chipping sparrows) to densely timbered old growth (winter wren).

Environmental Consequences

Action 1: No Action

Threatened, Endangered and Proposed Species

The direct, indirect and cumulative effects on wildlife species from use of Clopyralid for areas inside the Middle Black project would be the same as Alternative 3.

As noted in the discussion on Vegetative Community Diversity, untreated weeds can effectively displace native herbaceous vegetation including preferred forage species. As native plant species are displaced by expanding weed populations, long-term habitat quality would diminish. At this time, there is no method for measuring the potential impacts and consequences within the North Fork Clearwater River basin.

The majority of infestation sites at this time are areas that do not provide high quality habitat for T&E species or their prey, e.g. big game and snowshoe hare, or other native wildlife species. By their nature most sites are physically disturbed and/or subject to high human disturbance levels. Acknowledging the spread of noxious weeds and the potential for effects on wildlife habitat suitability from competition with native plant communities; the effects of noxious weed infestations is not expected to have a significant effect on herbivores (prey species for gray wolves and lynx).

Given the relationship – albeit inconclusive – between noxious weeds and big game populations and the fact that wolves prey on big game, the spread of noxious weeds could potentially lead to a reduction in the ability of an area to support gray wolves. The nature and location of infestations, the relatively small area potentially affected within the project area during the scope of this analysis, and the limited occurrence of wolves within the project drainage limits the potential for effects on the prey species of wolves. Direct or indirect effects on prey availability or the gray wolf is unlikely within the temporal scope of this analysis.

Lynx could be potentially affected in a manner similar to the gray wolf in that prey availability could be reduced by the spread of noxious

weeds. However, because of the nature and location of noxious weed habitat and the habitat associations of lynx and their primary prey any effect on prey availability is unlikely. There would be no anticipated direct or indirect affect from existing infestations and/or the spread of noxious weeds on lynx.

The habitat requirements of bald eagles or peregrine falcons are not dependent on ground vegetation. There is likely to be little effect on fish populations or prey species for peregrine falcons – see disclosed effects on succeeding pages. Therefore, the bald eagle and peregrine falcon would not be affected, directly or indirectly, from existing and/or anticipated noxious weed infestations.

The No Action Alternative would have no direct impact on threatened, endangered or proposed wildlife species. Noxious weeds would continue to spread at current or accelerated rates.

Sensitive Species

Sensitive wildlife species tied to habitat features that are no influenced by noxious weed contamination would not be impacted. Such species include the black-backed woodpecker, flammulated owl, northern goshawk, boreal toad, Coeur d'Alene salamander, harlequin duck, and northern leopard frog. The black-backed woodpecker and flammulated owl depend more on forest structure, i.e. snags, than on ground vegetation. The Coeur d'Alene salamander, boreal toad, northern leopard frog, and harlequin duck are associated with aquatic environments where there are no current noxious weed threats to their habitat. Townsend's big-eared bat requires caves/old mine adits and would be unaffected. Goshawks, associated with mature/old-growth forest vegetation, are predators on species – some of which could be affected by the spread of noxious weeds. However, because of the nature and location of noxious weed habitat, any effect on goshawk prey availability is unlikely.

There would be no direct affect from existing infestations and/or the spread of noxious weeds on sensitive forest carnivore species – fisher and wolverine. They could be potentially affected in a manner similar to the gray wolf and lynx in that their prey availability could be reduced; this is also unlikely.

Management Indicator Species

As noted previously, big game species such as moose and elk could be impacted by the spread of noxious weeds. However, given the location of infestations and the relatively small area affected, significant effects on big game populations are not likely.

Pileated woodpecker and pine marten are not likely to be affected, as their habitat is primarily mature/old-growth timbered stands that are not favored by noxious weeds. The potential impacts to goshawks have been discussed earlier.

Other Wildlife Species

Impacts to other species such as forest land birds would vary depending on their habitat needs. In general, bird species that eat insects or seeds would be most affected by the spread of noxious weeds that cause a reduction in native vegetation and subsequent food supplies. The least impacted birds would be those that are tied to habitat features that are not strongly influenced by noxious weed contamination, e.g. forest structure or undisturbed moist forest conditions.

Alternative 2: Mechanical, Biological and Cultural Treatments

Alternative 2 would continue to allow the spread of many weed species as discussed above in Alternative 1. Most infestations would not be brought under control. The potential negative effects of Alternative 2 on wildlife would be greater than those of Alternative 1 especially for those areas inside of Middle Black project area.

The treatment of noxious weeds under Alternative 2 would reduce the potential for adverse effects on wildlife from the spread of noxious weeds on those sites where the treatment maintains or restores the native plant diversity.

Alternative 3: Mechanical, Biological, Cultural and Chemical Treatments

The direct effects of cultural, mechanical and biological treatments to wildlife would be the same as those discussed under Alternatives 1 & 2. As a result, the discussion of effects for this Alternative will concentrate on the effects of herbicide treatment to wildlife.

None of the herbicides proposed for use bio-accumulate in wildlife in concentrations greater than their general environmental concentrations. Inferences of possible effects can be made by comparing the exposure levels wildlife would experience with the concentrations that elicit responses in wildlife. As discussed in the *Human Health risk Assessment for Herbicide Application to Control Noxious Weeds and Poisonous Plants in the Northern Region* (Monnig 1988), immediately following an application of one (1) pound of herbicide per acre, the herbicide concentration on grasses and small forbs would be about 125 parts per million (ppm). Within 90 days, the concentration of picloram on vegetation would be about 25 parts per million (Watson et al. 1989). The concentrations of 2,4-D amine, dicamba and clopyralid would likely be less than that of picloram because of their faster decomposition rates.

The avian toxicity of herbicides proposed for use is extremely low (USDA Forest Service 1984). The picloram LC50 for mallard ducks and quail is in excess of 10,000 parts per million which was the highest dose tested. Comparable values for the highest dose of clopyralid are 4,640 ppm; for dicamba, in excess of 10,000 ppm; and for 2,4-D amine, in excess of 5,000 ppm.

Feeding studies on grazing animals confirm the low toxicity of these herbicides. Deer that were fed foliage treated with 2,4-D at up to four times the rate proposed for this project showed no ill effects 9Campbell et al. 1981). Cattle fed picloram-treated hay with concentrations 20 or more times greater than those expected on the proposed sites suffered no lethal effects (Monnig 1988). Heifers given dicamba at 20,000 ppm in feed showed no ill effects (Edson and Sanderson 1965). Clopyralid feeding studies with grazing animals are not available but would likely be similar to picloram which is close to clopyralid's chemical analogue.

A comparison of expected environmental concentrations with the toxicity levels of these herbicides indicates that negative impacts on birds, rodents and grazing animals are not expected. In addition, the evidence reviewed in the Human Health Risk Assessment indicates that animals quickly excrete these herbicides. Thus, impacts on predators such as wolves or raptors are not expected. Because these herbicides do not bio-accumulate, cumulative effects from the proposed herbicide application would not be expected.

Alternative 3 has the highest predicted effectiveness at controlling weeds, thereby preserving native plant community diversity. Inclusion of herbicide use would therefore increase the overall benefit of weed control to wildlife habitat.

Threatened, Endangered and Proposed Species

Chemical treatment of noxious weeds is not likely to have an adverse affect on T&E species.

There is a negligible likelihood of exposure to herbicides by the gray wolf or to the lynx. The treatment sites are very small compared to the area available for either species. The location and nature of known wolf populations as well as the potential for additional wolf or lynx populations further decrease the likelihood of exposure. In addition, the herbicides proposed for use have a low toxicity and do not bio-accumulate in the environment or in wildlife. Adverse effects from herbicides are not reasonably expected.

Bald eagles and peregrine falcons are unlikely to be exposed to the herbicides. The treatment of the noxious weed infestations is unlikely to affect the prey of bald eagles, e.g. fish populations.

Sensitive Species

The same rationale concerning exposure to and effects from herbicide treatment that were discussed under T&E species also applies to most sensitive species. It is unlikely that any of the sensitive wildlife species know or though to inhabit the project area would be exposed to herbicides. These species occupy habitats that are not likely to be located near proposed treatment sites such as travel corridors, dispersed and developed campgrounds, timber sale areas or administrative sites.

Forest Plan Consistency – All Alternatives

The Clearwater National Forest Plan directs that sensitive species be managed to prevent further declines which could lead to Federal listing under the Endangered Species Act, and that management activities contribute to the

conservation and recovery of threatened and endangered species. For other species, the Forest plan directs that habitat will be managed to maintain viable populations. All alternatives would meet that direction.

Probable Environmental Effects That Cannot be Avoided

The application of herbicides brings with it the likelihood of some environmental impacts that cannot be avoided. These have been discussed above and would primarily involve non-target plants. Although it is possible that minute amounts of herbicide would migrate from treatment sites, alternative design criteria would prevent environmentally significant concentrations of herbicide from reaching surface or groundwater. Thus, under reasonably foreseeable circumstances, there would be no significant environmental effects.

The adoption of the No Action Alternative or of the non-chemical Alternative 2 would not immediately result in unavoidable environmental impacts. However, it is clear that alternatives which allow the continued spread of noxious weeds would eventually result in unavoidable environmental effects. Weed species that are considered naturalized in an area are very difficult to control. A visible example is the level of spotted knapweed infestation in many areas of northern Idaho. Although spotted knapweed is generally considered to be naturalized in many locations, there are still areas that are relatively uninfested by this weed. Successful eradication of small populations of this species, and reduction of seed production in large populations, would slow its rate of spread and reduce its occurrence relative to other more desired species. But when infestation levels increase to the point that is not practical or economically feasible to control them, adverse environmental impacts are unavoidable.

Possible Conflicts with Planning and Policies of Other Jurisdictions

The Idaho noxious weeds laws direct the County control authorities to make all reasonable efforts to develop and implement a noxious weed program. The lack of weed control under the No Action Alternative would conflict with these State and County weed plans and policies. Alternatives 2 and 3 would indicate that the Forest Service is committed to the management of noxious and undesirable weeds within the project area.

None of the alternatives would conflict with State and Federal water or air quality regulations or with U.S. Fish and Wildlife Service recovery plans for threatened and endangered species.

Irreversible and Irretrievable Commitment of Resources

All action alternatives would involve an irretrievable commitment of labor, fossil fuels and economic resources.

APPENDIX A – LIST OF PREPARERS

The following individuals participated in the analysis and the preparation of this document.

Interdisciplinary Team

Suzanne Qualmann, Palouse Ranger District – Team Leader

Stewart Wilson, North Fork Ranger District – Team Leader

Jennie Fischer, Lochsa Ranger District – Watershed and Soils

Dan Davis, Supervisor's Office – Wildlife Biologist

Pat Murphy, Supervisor's Office – Fisheries Biologist

Jeanne Rieman, North Fork Ranger District – Writer/Editor

Technical Support

Stephanie Grubb – GIS Support

Sue McWilliams – GIS Support

APPENDIX B – REFERENCES

Ames, B.N. 1193. Dietary Carcinogens and Anticarcinogens. Science 221 pgs 1256-1164.

Arnold, S.F. and D.M. Klotz, B.M. Collins, P.M. Vonier, L.J. Guillette Jr. and J.A. McLachlan. 1996. Synergistic Activation of Estrogen Receptor with Combinations of Environmental Chemicals. Science 272 pgs 1489-1492.

Baltz. D.M., B. Vondracek, L.R. Brown and P.B. Moyle. 1991. Seasonal Changes in Microhabitat Selection by Rainbow Trout in a Small Stream. Transaction of the American Fisheries Society 120:2 pgs 166-176.

Bechninski, E.J., R.L. Mahler and H.W. Homan. 1992. The role of Integrated Pest Management. Current Information Series No. 938. University of Idaho College of Agriculture Cooperative Extension System. Moscow, Idaho.

Belcher, J.W. and S.D. Wilson. 1989. Leafy Spurge and the Species Composition of a Mixed-Grass Prairie. Journal of Range Management 42(2) pgs 172-175.

Boneville Power Administraion (BPA) 2003. Herbicide Fact Sheets. Pesticide and Right-of-Way Maintenance Support, Approved List of Herbicides. BPA. www.efw.bpa.gov/portal/Organizations/Government/Federal/Dept_of_Energy/BPA/Environment/PPA/ROWMaintenance/ROWMain2.htm

Bursik, Robert J. and Robert K. Moseley. 1995. Ecosystem Conservation Strategy for Idaho Panhandle Peatlands. Idaho Department of Fish and Game. Boise, Idaho.

Callihan, R.H., F.E. Northam, J.B. Johnson, E.L. Michalson and T.S. Prather. 1989. Yellow Starthistle Biology and management in Pasture and Rangeland. Current Information Series No. 634. University of Idaho College of Agriculture Cooperative Extension Service. Moscow, Idaho.

Callihan, R.H., D.C. Thill and D.W. Wattenbarger. 1989. Hawkweeds. Current Information Series No. 633. University of Idaho College of Agriculture Cooperative Extension Service. Moscow. Idaho.

Callihan, R.H., J.P. McCaffrey and V.J. Parker-Clark. 1991. Leafy Spurge Biology and Management. Current Information Series No. 877. University of Idaho College of Agriculture Cooperative Extension Service. Moscow, Idaho.

Callihan, Robert H. and Timothy W. Miller. 1997. Idaho's Noxious Weeds. Noxious Weed Advisory Council. Idaho Department of Agriculture. Boise, Idaho. 74 pages.

Campbell, D.L., J. Evans, G.D. Lindsey and W.E. Dusenberry. 1981. Acceptance by Black-tailed Deer of Foliage Treated with Herbicides. Research Paper PNW-290. USDA Forest Service. Pacific Northwest Forest and Range Experiment Station. Portland, Oregon.

Cassirer, E.F. and C.R. Groves. 1993. Conservation Assessment for the Coeur d'Alene Salamander *Plethodon Idhoensis*. USDA Forest Service. Region One.

Clearwater National Forest. Stream Surveys.

Crop Data Management Systems (CDMS). 2003. Material Data Safety Sheet on Picloram and Metsulfuron methly. Marysville, CA. www.cdms.net

Cook, Kevin J. 1991. Wildlife and Weeds. Colorado Outdoors. May/June 1991 pgs 10-14.

Cousens, Roger and Martin Mortimer. 1995. Dynamics of Weed Populations. Cambridge University Press. Cambridge, Great Britain. Chapter 2 pgs 21-54.

Cross, P.D. 1992. Status of Bull Trout on the Idaho Panhandle National Forests. USDA Forest Service. Coeur d'Alene, Idaho.

Crouch, E.A.C., R. Wilson and L. Zeise. 1983. The risk of Drinking Water. Water Resources 19 pgs 1359-1375.

DeGraff, R.M., V.E. Scott, R.H. Hamre, L. Ernst and S.H. Anderson. 1991. Forest and Rangeland Birds of the United States Natural History and Habitat Use. USDA Forest Service. Agricultural Handbook 588.

Dobkin, D.S. 1994. Conservation and Management of Neotropical Migrant Land Birds in the Northern Rockies and Great Plains. University of Idaho Press. Moscow, Idaho.

Dow Chemical Company. 1986. Chemistry, environmental, and toxicology profiles of clopyralid herbicide. Dow Agricultural Products. Midland, Michigan.

Edson, E.F. and D.m. Sanderson. 1965. Toxicity of the Herbicides 2-methoxy-3, 6-dichlorobenzoic acid (dicamba) and 2-methoxy-3, 5, 6-trichlorobenzoic acid (tricamba). Food Cosmet. Toxiocol. 3-299-304.

Embry, R. S. 1981. Predicting Average Annual, Low and Peak Flows on the Idaho Panhandle National Forest. USDA Forest Service. Idaho Panhandle National Forests, Coeur d'Alene. Unpublished.

Everett, R.L., compiled 1994. Restoration of Stressed Sites and Processes. Gneral Technical Report PNW-GTR_30. Portland, Oregon. USDA Forest Service. Pacific Northwest Research Station.

Fredrick, G.P. 1991. Effects of Forest Roads on Grizzly Bear, Elk and Gray Wolves: A Literature Review. USDA Forest Service. Kootenai National Forest. Libby, Montana.

Graham, J.D. Harvard University, School of Public Health. Personal letter to Dr. Richard Stuckey, February 1, 1990 re: 2,4-D Cancer Risk to Humans.

Groves, C. 1987. Distribution of the Wolverine (*Gulo gulo*) in Idaho. Idaho Natural Heritage Program. Non-game program. Idaho Department of Fish and Game.

Guidelines for Coordinated Management of Noxious Weeds in the Greater Yellowstone Area. 1990. GYA Memorandum of Understanding.

Hansen, J. 1986. Wolves of Northern Idaho and Northeastern Washingtron. Montana Cooperative Wildlife Rescue Unit. U.S. Fish and Wildlife Service. 88 pages.

Hayward, G.D. 1989. Boreal Owl Habitat Relationships. A Report to Region One. USDA Forest Service.

Heinemeyer, K.S. and J.L. Jones. 1994. Fisher Biology and Management: A Literature Review and Adaptive Management Strategy. USDA Forest Service. Northern Region. Missoula, Montana. 108 pages.

Hickman, T. and R.F. Raleigh. 1982. Habitat suitability Index Models: Cutthroat Trout. U.S. Fish and Wildlife Service, FWS/OBS-82/10.5. WELUT. Fort Collins, Colorado. 38 pages.

Hirsch, Steven A. and Jay A. Leitch. 1996. The Impact of Knapweed on Montana's Economy. Agriculture Economics Report No. 355. North Dakota State University Department of Agricultural Economics. Fargo, North Dakota. Pg 16.

Hobbs, Richard J. and Stella E. Humphries. 1995. An Integrated Approach to the Ecology and Mangement of Plant Invasions. Conservation Biology 9:4 pgs 761-770.

Hornocker, M.G. and H.S. hash. 1981. Ecology of the Wolverine in Northwestern Montana. Canadian Journal of Zoology 59 pgs 1286-1301.

Hunter, M. Jr. 1990. Wildlife, Forests and Forestry: Principles of Managing Forests for Biological Diversity. Prentice-Hall, Inc. Englewood Cliffs, New Jersey.

Idaho Conservation Data Center. 1999. Rare Plant Records and GIS Data. Idaho Department of Fish and Game. Boise, Idaho.

Idaho Department of Enviormental Quality (IDEQ)

2003 draft. Idaho's 2002-2003 Integrated Report (303d list). IDEQ, Boise, Idaho. Available at: www.deq.state.id.us/water/surface_water/IntegratedReport/DraftReport.htm

2002. TMDL Settlement Agreement and Eight Year Schedule. IDEQ, Boise, Idaho. 22p.+ Appendices. Available at: http://www.deq.state.id.us/water/tmdls/TMDLAgreement/SettlementAgreement.pdf

2001. Upper North Fork Clearwater River Subbasin Assessment and TMDL. T. Dechert, K. Baker, J. Cardwell. IDEQ, Lewiston Region, Lewiston, ID. (February 28, 2001).

1998. Title 1, Chapter 2, Water quality standards and wastewater requirements. IDAPA 16.01.0200. State of Idaho, Boise, Idaho. . IDAPA 16, Title 01, Chapter 02.

Idaho Department of Lands. 1998.

Monnig, E. 1988. Human Health Risk Assessment for Herbicide Applications to Control Noxious Weeds and Poisonous Plants in the Northern Region. FPM Report 88-9. USDA Forest Service. Missoula, Montana.

Rice, P. M. 1990. A risk Assessment Method for Reducing Picloram Contamination of Streams and Groundwater from Weed Spraying Projects.

Scott, Thomas G., Helen C. Schultz and Paul H. Eschmeyer. 1978. Fisheries and Wildlife Research 1977. Stock #024-010-00471-1. U.S. Fish and Wildlife Service. U.S. Government Printing Office. Denver, Colorado.

Syracuse Environmental Research Associates, Incorporated (Syracuse)

2001. 2,4-D. Word Perfect Worksheets for Human Health and Ecological Risk Assessment – Final Report. Prepared for the USDA-FS (SERA WPWS 01-43-07-05a). Syracuse Environmental Research Associates, Inc., Fayetteville, NY.

2003. Dicamba Risk Assessment (Vanquish) - Final Report. Prepared for the USDA-FS (SERA TR 95-22-02f). Syracuse Environmental Research Associates, Inc., Fayetteville, NY and Syracuse Research Corporation, Syracuse, NY.
www.fs.fed.us/foresthealth/pesticide/risk_assessments/091602_dicamba.pdf

2003. Glyphosate– Revised Human Health and Ecological Risk Assessment – Final Report. Prepared for the USDA-FS (SERA TR 02-43-09-04a). Submitted by : Patrick R. Durkin. Syracuse Environmental Research Associates, Inc., Fayetteville, NY.
www.fs.fed.us/foresthealth/pesticide/risk_assessments/glyphosate_0303_02_43_09_04a.pdf

2003. Picloram – Revised Human Health and Ecological Risk Assessment – Final Report. Prepared for the USDA-FS (SERA TR 03-43-16-01b). Syracuse Environmental Research Associates, Inc., Fayetteville, NY. www.fs.fed.us/foresthealth/pesticide/risk_assessments/03431601b_picloram.pdf

2003. Triclopyr – Revised Human Health and Ecological Risk Assessment – Final Report. Prepared for the USDA-FS (SERA TR 02-43-13-03b). Syracuse Environmental Research Associates, Inc., Fayetteville, NY.
www.fs.fed.us/foresthealth/pesticide/risk_assessments/triclopyr_riskassessment_02_43_13_03b_0303.pdf

2000. Metsulfuron methyl - Risk Assessment (Escort) Final Report. Prepared for the USDA-FS (SERA TR 99-21-21-01f). Syracuse Environmental Research Associates, Inc., Fayetteville, NY. www.fs.fed.us/foresthealth/pesticide/risk_assessments/91602_metsul.pdf

1999. Clopyralid (Transline)- Final Report. Prepared for the USDA-FS (SERA TR 99-21-11/12-01C). Syracuse Environmental Research Associates, Inc., Fayetteville, NY. www.fs.fed.us/foresthealth/pesticide/risk_assessments/91602_clopyralid.pdf

United States Department of Agriculture - Forest Service (USDA-FS).

2001. Water Quality Monitoring related to Noxious Weeds – West Fork Potlatch. Prepared by Meg Foltz USDA-FS, Clearwater National Forest, Palouse Ranger District, Potlatch, ID.

1997. Clearwater Subbasin Ecosystem Analysis at the Watershed Scale. Final Report: Potlatch and Lolo/ Orofino Creeks. Clearwater National Forest, Potlatch, ID.

1995. Inland Native Fish Strategy (INFISH). Decision Notice and Finding of No Significant Impact. USDA-FS, Intermountain, Northern and Pacific Regions. 62 p. + Appendices. Washington. DC.

Forest Service Handbook FSH 2509.22 Soil and Water Conservation Practices Handbook.

1992. Risk Assessment for Herbicide Use in Forest Service Regions 1, 2, 3, 4, and 10 and on Bonneville Power Administration sites. USDA Forest Service - Regions 1, 2, 3, 4, and 10 and Bonneville Power Administration.

1987. Clearwater National Forest – Forest Plan. USDA-FS, Northern Region, Clearwater National Forest, Orofino, Idaho.

US Department of Interior-Environmental Protection (USDI-EPA).

2000. State of Idaho 303(d) Stream List. USDI-EPA, Seattle, WA. See also: http://www.deq.state.id.us/water/water1.htm under the section on 1998 303(d) list.

1998. RED Facts. Triclopyr, EPA 738-F-98-0007. October 1998. USDI-EPA, Washington, D.C. 7p.

1995. RED Facts.

1995a. RED Facts. Picloram, EPA 738-F-95-018. August 1995. USDI-EPA, Washington, D.D. 11p.

1995b. Re-registration Eligibility Decision (RED) – Picloram. EPA 738-R95-019. August 1995.

Utah State University Extension (USUE). 2003. Pesticide absorption and half-life. Pesticides No. 15. September 2003. Howard Deer. www.extension.usu.edu.ipm

Watson, V. J., P. M. Rice and E. M. Monnig. 1989. Environmental Fate of Picloram Used for Roadside Weed control. J. Environ. Qual. 18(2):198-205.

Woodward 1979.

APPENDIX C – MAP APPENDIX

Watersheds and Weed Locations Map

Coastal Disjunct Species Map

Watershed Maps of Known Concentrations of Noxious Weeds:

- Beaver Creek
- Cayuse Creek
- Isabella Creek
- Lake Creek
- Long Creek
- Lower Kelly Creek
- Moose Creek
- North Fork Clearwater to Beaver
- Orogrande Creek
- Quartz Creek
- Skull Creek
- North Fork Clearwater to Kelly
- North Fork Clearwater to Long
- North Fork Clearwater to Washington
- Weitas Creek

See Map Appendix for actual maps

APPENDIX D – ROADSIDE VEGETATION TREATMENT

Right-of-Way Treatments

ROAD #	TERMINI	SEGMENT LENGTH
246	Headquarters to FS boundary near Camp 60	12.4 miles
247	Headquarters to FS boundary near Steep Creek	23.7 miles
250	Jct. with Road 100 to FS boundary by Thompson Gulch	2.7 miles
680	Jct. with Road 247 to FS boundary going towards Sheep Mountain Saddle	2.2 miles
683	Jct. with Road 246 to FS boundary up Teepee Creek	0.3 miles
	TOTAL	41.3

National Forest System Lands Road Treatments

10-Year Herbicide Treatment of Roadside Vegetation by HUC					
HUC	HUC Name	Total NFSL miles	Estimated Miles of Treatment	% of Total Miles	Treatment Acres
1	Alder Creek	24.27	6.92	29%	17.646
2	Beaver Creek	183.29	34.06	19%	86.853
3	Cayuse Creek	117.68	62.32	53%	158.916
4	Isabella Creek	21.42	9.83	46%	25.0665
5	Lake Creek	52.18	10.04	19%	25.602
6	Long Creek	23.82	1649	69%	42.0495
7	Lower Kelly Creek	18.16	15.13	83%	38.5815
8	Lower NF Clearwater	44.47	15.37	35%	39.1935
9	Lower Orofino Creek	24.25	0	0%	0
10	Minnesaka Creek	12.05	8.85	73%	22.5675
11	Moose Creek	112.86	32.58	29%	83.079
12	Orogrande Creek	248.37	67.83	27%	172.9665
13	Quartz Creek	96.33	22.52	23%	57.426
14	Skull Creek	57.15	29.48	52%	75.174
15	Upper Kelly Creek	2.2	1.36	62%	3.468
16	Upper NF Clw – Headquarters	37.55	17.37	46%	44.2935
17	Upper NF Clw – Kelly	74.89	41.82	56%	106.641
18	Upper NF Clw – Long	221.13	29.58	13%	75.429
19	Upper NF Clw – Washington	228.33	71.27	31%	181.7385
20	Upper Orofino Creek	162.51	39.98	25%	101.949
21	Washington Creek	99.01	30	30%	76.5
22	Weitas Creek	142.94	82.12	57%	209.406
Totals		**2004.86**	**644.92**	**32%**	**1644.55**

APPENDIX E – PROPOSED ANNUAL OPERATING PLAN

This Annual Operating Plan (AOP) describes the management actions and activities that the cooperators agree to accomplish for the up-coming year. The AOP guides implementation ***Strategy For Vegetation Management in the Clearwater River Basin*** *(11/02)*; actions stated below are the specific Objectives and Priorities in the *Strategy*.

Clearwater Basin Weed Management Area
North Fork sub-Basin
Annual Operating Plan: 2004

Proposed Action Items:

1. Treatment

First Priority: ***Treatment of New Invaders***

Species	Locations	Methods	Acres	Lead
Dalmation toadflax	Headquarters (Potlatch); Dworshak Dam (CoE); CNF Trail 140 (FS); Grandad Bridge (IDL); Abandoned RR @ Headquarters (Cty & Potlatch); Hwy 11 @ Jaype (ITD).	ER: Herbicide, Mechanical	9	Clearwater County, Potlatch Corp., Corps of Eng., USFS, IDL, ITD (DOT)
Diffuse Knapweed	Cayuse Landing strip (USFS)	ER: Herbicide	<5	USFS
Yellow Toadflax	Canyon Creek Road, Hollywood Junction, Weippe area (Cty); Cayuse Landing strip (USFS)	ER: Herbicide, Mechanical	10	Clearwater County, USFS
Rush skeletonweed	Powerhouse Road, Ahsahka (CoE); Lower Fords (NPT)	ER: Herbicide	3	Corps of Eng., Nez Perce Tribe
Poison hemlock	Casey Meadows corral, Silver Creek Road MP2, Railroad Property	ER: Herbicide	1	IDL
Scotchbroom	Snake Creek clearcut (Potlatch); Dewey Ave in Orofino, Lynch property, Johnson's Mill site (Cty); CoE property on ridge above Merry's Bay (CoE), Brown's Rock	ER: Herbicide	4.5	Potlatch Corp., City of Orofino, Clearwater County, Corps of Eng.

Second Priority: ***Treatment of Isolated New Infestations, Transportation Corridors and High Human Use Areas***

Species	Locations	Methods	Acres	Lead
Spp. mixture	Clearwater County & Clearwater Highway District Road ROWs (Cty); City of Orofino streets & ROWs (City); CNF Roads 247, 250, & 255 (USFS); CoE Roads ROWs (CoE)	Herbicide, Mechanical, Mowing (CNF)	400+	Clearwater County, City of Orofino, USFS, ITD, IDL, Corps of Eng.
Spp. mixture	Campgrounds, Trailheads, Landings, Rock pits, Stock piles, Pull outs; Orofino airport & park	Herbicide,	50+	Clearwater County, City of Orofino, USFS, Corps of Eng.,

Species	Locations	Methods	Acres	Lead
		Mechanical, Investigate feasible IPM approach		IDL, IDT
Scotch Thistle	Weippe / Fraser (All on private land, not much of it)	ER: Herbicide, Mechanical	2	Clearwater County
Spotted Knapweed	Lower Salmon Creek & adjacent boat landings, Airport, Forest Service (Cummings Lot), District 171 Bus Garage, Beaver Creek (Road from Headquarters to Aquarius)	Herbicide, Mechanical	1	USFS
Puncturevine	Railroad, Orofino Airport	ER: Herbicide	<1	Clearwater County, City of Orofino
Perennial peavine	CNF Road 250 MP .33, Survival Island pullout	ER: Herbicide	<1	USFS

Third Priority: ***Treatment to Contain and/or reduce Density of Established Infestations***

Species	Locations	Methods	Acres	Lead
Spotted Knapweed	Drainage wide	RE: Continue introduction of Biocontrol agents, Herbicide, Mechanical	5000+	All
Yellow Starthistle	Downstream of Dent Bridge	CTN: Herbicide, Mechanical, Biocontrol Agents	5000+	All

2. Education – Awareness Activities

Action Item	Lead
Distribute Integrated Pest Management information to employees and public user groups	All
Display booth at Clearwater County Fair	Clearwater County
Host weed IPM training workshops	Clearwater County
Maintain informational bulletin boards: Loggers Park, Place weed information at stores in Orofino, Pierce, Weippe, Elk River, and County Courthouse	Clearwater County
Weed Identification Class/Tour (sometime in June)	Suzanne Qualmann, Mike Beard

3. Prevention Practices

Action Item	Lead
Require weed free forage, mulch and seed on National Forest lands	USFS
Reseed roads within Timber Sale Contracts	IDL
Put "Yellow Starthistle Fighter" seed on some Clearwater County ROWs	Clearwater County
Weed Free Hay Exchange (new for 2004)	Clearwater County

4. Monitoring

Action Item	Lead
Follow-up on all treatments of NEW INVADERS	All
Post release monitoring of Biocontrol Agents: Knapweed, Yellow Starthistle	USFS, IDL, Nez Perce Tribe

APPENDIX F – HERBICIDE DESCRIPTIONS

Additional information on the herbicides discussed below can be found in the project file.

2,4-D amine is a herbicide with very little persistence in the environment. 2,4-D has several formulations. Some of the common brand names include Weed-B-Gon, HiDep and Solution. This herbicide has low toxicity to aquatic species, and several formulations are approved for use in water and near water. At application rates of one to 1.5 pounds per acre, 2,4-D exhibits good control of knapweed with repeat applications and moderate control of St. Johns-wort, Houndstongue, sulfur cinquefoil, and Canada thistle.

The Bioconcentration Factor (BCF) for 2,4-D amine is 2.2. BDF factors were obtained from Morris, et al., 1991.

Clopyralid is a relatively new herbicide that is very selective and is toxic to some members of only three plant families: the composites (*Compositae*), the legumes (*Fabaceae*), and the buckwheats (*Polygonaceae*). Clopyralid is the active ingredient in Transline, and one of two active ingredients in Curtail (the other is 2,4-D). At application rates of ¼ to ½ pound per acre, clopyralid is very effective against knapweed, the hawkweeds, and Canada thistle. However, it does not control any of the other weed species of concern. Clopyralid is more persistent than 2,4-D and dicamba, but less persistent than picloram.

The selective nature of clopyralid makes it an attractive alternative on sites with non-target species that are sensitive to the other herbicides. Clopyralid has soil-mobility characteristics comparable to picloram so the possibility of groundwater impacts must be addressed.

Dicamba (the active ingredient in Banville) is a broad-leaf herbicide that is readily absorbed by leaves and roots and is concentrated in the metabolically active parts of plants. Dicamba is effective against a similar range of weed species as 2,4-D at similar application rates. Dicamba is somewhat more persistent than 2,4-D and therefore provides somewhat longer control of susceptible species.

Glyphosate is a non-selective, broad spectrum herbicide that is absorbed by the leaves and translocated throughout the plant. The most common brand name for glyphosate is Round-Up. Approved aquatic formulations include Rodeo and Accord. Glyphosate has little soil activity, and its absorption by roots is minimal to non-existent. Due to its non-selectivity, glyphosate tends to eliminate both desirable and undesirable vegetation. Even if desirable vegetation is reseeded, hawkweed and other noxious weeds maintain their competitive advantage. A certain degree of selectivity can be achieved through the application method by using a wick applicator to "paint" the herbicide on target vegetation; thus avoiding desired plants. Glyphosate has merit for use where low soil mobility and short-term persistence are required to alleviate environmental concerns. Application rates for glyphosate for the targeted weeds are in the 1.5 pounds per acre range.

The BCF of glyphosate for trout is 0.11.

Metsulfuron methyl is used for control of annual and perennial broad-leaf weeds. Control areas include rights-of-way on roadsides and powerlines. The most commonly used formulation is Escort. Metsulfuron methyl can be mixed with other chemicals to provide more effective control. Metsulfuron methyl is broken down in soil by the action of microorganisms and by the chemical action of water. Application rate for the target weeds is 0.4 lb/acre.

Picloram (the active ingredient in Tordon 22K) controls a variety of broad-leaf weed species, including all of the weed species of concern. Picloram is generally applied at rates of one-quarter to two pounds per acre. However, picloram's combination of mobility and persistence has generated concern over possible groundwater contamination. Possible environmental impacts are compared between this method and the other chemical and non-chemical control methods.

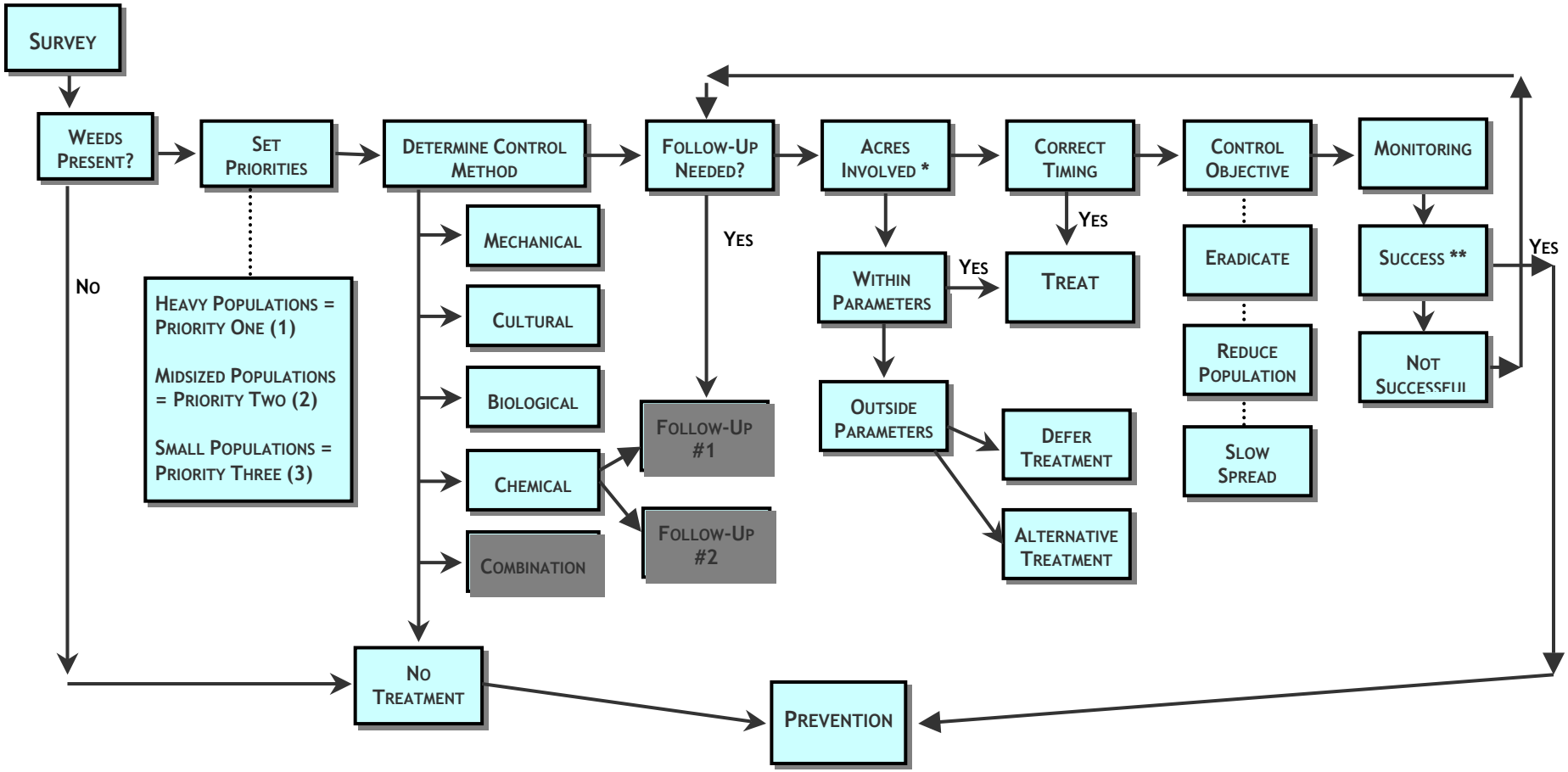
The BCF for picloram is 20.

Triclopyr is a selective herbicide used in a variety of vegetation management situations such as controlling weeds or controlling vegetation in powerline, railroad, pipeline, and road rights-of-way. It is the active ingredient in Garlon 4, an effective herbicide used to control

brush in combination with foliar, basal bark, and cut-stump treatments. It is often mixed with other chemicals at varying rates to improve effectiveness and reduce the amount of herbicide applied. Triclopyr degrades rapidly in soil and water. The recommended application rate for the target weeds is 1.0 lb/acre.

The BCF for Triclopyr is 20.

Appendix G - Adaptive Strategy Flow Chart



This decision process will be used to determine treatment methods and their appropriate timing following noxious weed surveys for each site.

* Any proposed herbicide treatment on a given site must be evaluated to determine if the acres proposed for chemical application fall within the parameters for maximum acres treated as established by Aquatics specialists.

** Measure of success will be based on objective of weed treatment (eradication or population reduction), infestation size and percent occupancy of targeted weed species after treatment.

APPENDIX H – HANDLING OF HERBICIDES

In Case of Spills

The following equipment will be available with vehicles or pack animals used to transport pesticides and in the immediate vicinity of all spray operations.

- A shovel
- A broom
- 10 pounds of absorbent material or the equivalent in absorbent pillows
- A box of large plastic garbage bags
- Rubber gloves
- Safety goggles or safety glasses
- Protective overalls
- Rubber boots

The following information will be reviewed with all personnel involved in handling of herbicides:

- Applicable Material Safety Data Sheets (MSDS).
- From the EPA guide "***Applying Pesticides Correctly: A Guide for Private and Commercial Applicators***," the section entitled "Clean Up of Pesticide Spills" (see project file).
- From the Northern Region Emergency and Disaster Plan, the section entitled "***Hazardous Materials Releases and Oil Spills***" (see project file).

Procedures for Mixing, Loading and Disposal of Herbicides

1. All mixing of herbicides will occur at least 100 feed from surface waters or well heads.
2. Dilution water will be added to the spray container prior to addition of the spray concentrate.
3. All hoses used to add dilution water to spray containers will be equipped with a device to prevent back-siphoning.
4. Applicators will mix only those quantities of herbicides that can be reasonably used in a day.
5. During mixing, mixers will wear a hard hat, goggles or face shield, rubber gloves, rubber boots and protective overalls.
6. All empty containers will be triple rinsed and disposed of by spraying near the application site at rates that do not exceed those on the spray site.
7. All unused herbicide will be stored in a locked building in accordance with herbicide storage regulations contained in Forest Service Handbook 2109.13.
8. All empty and rinsed herbicide containers will be punctured and either burned or disposed of in a sanitary landfill.

APPENDIX I – HERBICIDE APPLICATION GUIDELINES

General Application

- Apply herbicide only when wind speeds are less than 6 miles per hour or as specified on the label.
- Do not apply herbicide if precipitation is expected within 4 to 6 hours.
- All registered herbicide application will be performed or directly supervised by a state licensed application.
- Post all treatment areas of special public concern with signs prior to treatment and immediately following treatment. Such areas include mushroom and huckleberry picking areas, trailheads, campsites, and other high use areas.
- Do not use picloram where there are coarse, sandy soils. Use of picloram would be allowed only once every two years, to reduce accumulation in the soil. Reduce application rate to a maximum of 1.0 pounds/acre of Picloram with spot treatment of no more that 50% of an acre (USDI-EPA 1995a).
- No application 2,4 –D amine (ester formulation) or triclopyr-BEE is allowed.
- Limited annually application of herbicide chemicals to below the Lethal Concentration (LC_{50}), or No Observed Effect Level/Concentration (NOEL/NOEC) as determined by watershed (Table 13).
- To prevent potential effects on Threatened, Endangered or Sensitive (TES) plants the following TES Plant restrictions would apply. Distances are to any known TES plant occurrence (Appendix I).
  - < 25 feet - No chemical spraying. Only mechanical treatment.
  - 25-50 feet - Only backpack chemical spraying with focused spraying of target species. Mechanical treatments allowed.
  - 50 Feet – All methods of chemical or mechanical allowed. Vehicle-based spraying devices allowed.

RHCA Restrictions

Distance from live water	Application Activity
0 feet	Chemicals will not be used over water, including water standing or running in ditchlines.
<15 feet	Chemicals will not be used over water. Spot spraying of individual plants with aquatically approved chemicals (gyphosate-Rodeo).
15 – 100 feet	Focused spraying of target species – may include area spraying when weed populations warrant (large patches of weeds, multiple patches in close proximity) Mixtures of chemicals may be used including those listed above and: gyphosate-Roundup, dicamba, 2,4 – D amine, triclopyr-TEA.
>100 feet	All appropriate ground application methods – includes spot spraying, focused spraying, or broadcast spraying as weed population warrant. All chemicals listed above as well as picloram and clopyralid.
All distances	Reseed with native mix or mix which will help prevent invasion of weeds (certified weed free)

- Only non-ionic surfactants would be allowed for use with the aquatically approved herbicides. Only non-ionic surfactants such as Spreader Sticker, LI 700 or Ortho 77 and with an LC_{50} value greater than 2348 ppm would be used within 150 feet of perennial flowing streams, rivers or wetlands (Appendix I).

Conifer Plantations

- Use mechanical control, hand spray of herbicides or hand spray with power equipment. Do not use power boom equipment.
- Do not use picloram. Depending on conditions, clopyralid or clopyralid combined with 2,4D are preferred.

APPENDIX J – WEED SPECIES CHARACTERISTICS

WEED SPECIES	FAMILY	PLACE OF ORIGIN	LIFE CYCLE	MODES OF REPRODUCTION	BIO-CONTROL AGENTS	CHEMICAL AGENTS	CULTURAL METHODS	MECHANICAL METHODS
St Johns-wort (*Hypericum perforatum*)	Clusiaceae	Southern Europe	Perennial	Seeds New shoots from shallow radiating roots	Defoliating beetle *(Chrysolina quadrigemina)* Root Boring Beetle *(Agrilus hyperici)* Leaf and flower moth *(Aplocera plagiata)*	2,4-D metsulfuron methyl picloram + 2,4-D	Revegetation for shade Regular cultivation	Hand pulling must remove all roots
Meadow hawkweed (*Hieracium pretense*)	Asteraceae	North-central Europe Eastern Europe	Perennial	Seeds, stolons, rhizomes	None currently available	2,4-D + picloram glyphosate clopyralid dicamba + 2,4-D	Revegetation for shade Seeding & fertilization Annual cultivation	Hand pulling not recommended (stimulates sprouting from rhizomes) Must remove all roots
Orange hawkweed (*Hieracium aurantiacum*)	Asteraceae	North-central Europe Eastern Europe	Perennial	Seeds, stolons, rhizomes	None currently available	2,4-D + picloram glyphosate clopyralid dicamba + 2,4-D	Revegetation for shade Seeding & fertilization	Hand pulling not recommended (stimulates sprouting from rhizomes) Must remove all roots
Houndstongue (*Cynoglossum officinale*)	Boraginaceae	Europe	Biennial	Abundant seed production	None currently available	picloram metsulfuron methyl	None recommended	Hand pulling before seed production Cutting plants at soil surface reduces seed production in regrowth
Diffuse knapweed (*Centaurea diffusa*)	Asteraceae	Eurasia	Biennial or short-lived perennial	Abundant seed production	Seed head gall fly *(Urophora affinis)* Seed head gall fly *(Urophora quadrifasciata)* Peacock fly *(Chaetorellia acrolophi)* Seed head weevil *(Bangasternus fausti)* Root weevil *(Cyphocleonus achates)* Root moth *(Agapeta*	glyphosate picloram 2,4-D clopyralid clopyralid + 2,4-D dicamba	Revegetation for shade Spring burning	Hand pulling of small infestations (usually takes 7-10 years)

Weed Species	Family	Place of Origin	Life Cycle	Modes of Reproduction	Bio-control Agents	Chemical Agents	Cultural Methods	Mechanical Methods
					zoegana)			
Spotted knapweed (*Centaurea maculosa*)	Asteraceae	Eurasia	Biennial or short-lived Perennial	Seeds, lateral shoots	Seed head gall fly *(Urophora affinis)* Seed head gall fly *(Urophora quadrifasciata)* Seed head moth *(Metzneria paucipunctella)* Black leaf blight fungus *(Alternaria alternata)* Root weevil *(Cyphocleonus achates)* Verdant seed fly *(Terellia virens)* Root moth *(Agapeta zoegana)*	glyphosate picloram 2,4-D clopyralid clopyralid + 2,4-D dicamba	Revegetation for shade Regular cultivation/ seeding Spring burning	Hand pulling of small infestations (usually takes 7-10 years)
Meadow knapweed (*Centaurea pratensis*)	Asteraceae	Eurasia	Biennial or short-lived Perennial	Seeds, lateral shoots	Seed head gall fly *(Urophora quadrifasciata)*	glyphosate picloram 2,4-D clopyralid clopyralid + 2,4-D dicamba		
Russian knapweed (*Cenuarea repens*)	Asteraceae	Eurasia	Perennial	Seeds, lateral shoots	Stem/leaf gall nematode *(Subanquina picridis)*	glyphosate picloram 2,4-D clopyralid clopyralid + 2,4-D dicamba		
Ox-eye daisy (*Chrysanthemum leucanthemum*)	Asteraceae	Eurasia	Perennial	Seeds, rhizomes	None currently available	2,4-D clopyralid clopyralid + 2,4-D	Revegetation for shade	Burning before flowering Hand pulling not recommended (regrowth from rhizomes)

Weed Species	Family	Place of Origin	Life Cycle	Modes of Reproduction	Bio-control Agents	Chemical Agents	Cultural Methods	Mechanical Methods
Tansy ragwort (*Senecio jacobaea*)	Asteraceae	Europe, Asia	Biennial or short-lived	Seeds, regrows from roots	Seed fly Cinnabar moth *(Tyria jacobaea)*	2,4-D picloram 2,4-D + dicamba metsulfuron methyl	Not recommended	Hand pulling small infestations before flowering (must remove all roots) Mowing to reduce seed production Grazing with sheep
Purple loosestrife (*Lythrum salicaria*)	Lythraceae	Europe, Asia, North Africa	Perennial	Seeds, rhizomes	Black-margined beetle *(Galerucella callmariensis)* Golden beetle *(Galerucella pullisa)*	glyphosate triclopyr	Not recommended	Hand pulling only small infestations (must remove all roots) Cut below water 3 consecutive years
Rush skeleton-weed (*Chondrilla juncea*)	Asteraceae	Eurasia, North Africa	Perennial	Seeds, lateral roots and root fragments	Gall midge *(Cystiphora schmidti)* Gall mite *(Eriophyes chondrillae)* Rush skeletonweed rust *(Puccinia chondrillina)*	2,4-D picloram clopyralid + dicamba	Cultivation not recommended (increases growth from roots) Seeding & fertilizing with nitrogen	Hand pulling must remove all roots (3-6 times per year for 6-10 years to eradicate new shoots and seedlings) Mowing not recommended
Sulfur cinquefoil (*Potentilla recta*)	Rosaceae	Eurasia	Perennial	Seeds	None currently available	2,4-D + dicamba picloram 2,4-D	Regular cultivation	Hand pulling of small infestations (must remove root crown) Mowing not recommended
Leafy spurge (*Euphorbia esula*)	Euphorbiaceae	Eurasia	Perennial	Seeds, spreading roots	Flea beetle *(Aphthona abdominalis)* Flea beetle *(Aphthona nigriscutis)* Hawk moth *(Hyles euphorbiae)*	dicamba picloram glyphosate glyphosate + 2,4-D picloram + 2,4-D	Cultivation every 14 days Seeding w/ sod-forming perennials Fall burning	Mowing/cutting before flowering Hand pulling of small infestations before seed production Grazing with sheep or goats

Weed Species	Family	Place of Origin	Life Cycle	Modes of Reproduction	Bio-control Agents	Chemical Agents	Cultural Methods	Mechanical Methods
Yellow starthistle (*Centaurea solstitialis*)	Asteraceae	Southern Europe	Winter Annual or Biennial	Seeds	Seed head weevil *(Bangasternus orientalis)* Peacock fly *(Chaetorellia australis)* Flower weevil *(Larinus curtus)* All have limited success	picloram clopyralid 2,4-D amine + clopyralid	Toxic to horses Revegetation for shade	Mowing, burning early in flower (timing is critical) Hard to control seed bank with mechanical methods Grazing before spine production
Common tansy (*Tanacetum vulgare*)	Asteraceae	Europe	Perennial	Seeds, rhizomes	None currently available	dicamba + picloram metsulfuron methyl	Revegetation for shade Regular cultivation	Hand pulling not recommended (stimulates sprouting from rhizomes) Must remove all roots Mowing to reduce seed production
Bull thistle (*Cirsium vulgare*)	Asteraceae	Eurasia	Biennial	Seeds	Gall fly *(Urophora stylata)*	picloram	Revegetation for shade	None recommended
Canada thistle (*Cirsium arvense*)	Asteraceae	Eurasia	Perennial	Seeds, shoots from lateral roots	Stem-boring beetle *(Ceutorhyncus litura)* Gall fly *(Urophora cardui)* Shoot fungus *(Sclerotinia sclerotiorum)*	2,4-D clopyralid + 2,4-D clopyralid dicamba	Revegetation for shade Cultivation not recommended	Removing flowers to prevent seed production
Musk thistle (*Carduus nutans*)	Asteraceae	Southern Europe Western Asia	Biennial or Winter Annual	Seeds	Seed head weevil *(Rhinocyllus conicus)* Rosette weevil *(Trichosirocalus horridus)*	2,4-D dicamba picloram metsulfuron methyl clopyralid 2,4-D amine + clopyralid glyphosate + 2,4-D	Revegetation for shade	Mowing before flowering Cutting plant below crown
Scotch thistle (*Onpordon acanthium*)	Asteraceae	Eurasia	Biennial	Seeds	None available	dicamba picloram metsulfuron methyl	Revegetation for shade	Mowing before flowering Cutting plant below crown

Weed Species	Family	Place of Origin	Life Cycle	Modes of Reproduction	Bio-control Agents	Chemical Agents	Cultural Methods	Mechanical Methods
Dalmatian toadflax (*Linaria genistifolia* ssp. *Dalmatica*)	Scrophulari-aceae	Southeastern Europe Western Asia	Perennial	Seeds, vegetative growth from lateral root buds	Toadflax moth *(Calophasia runula)*	dicamba picloram	Regular cultivation	Cutting plant below crown (annually, 10-15 years to eradicate)
Yellow toadflax (*Linaria vulgaris*)	Scrophulari-aceae	Southeastern Europe Western Asia	Perennial	Seeds and roots	Flower beetle *(Brachypterolus pulicarrius)* Defoliating moth *(Calophasia linula)* Seed head weevil *(Gymnaetron antirrhini)*	dicamba picloram picloram + 2,4-D	Regular cultivation	Cutting plant below crown (annually, 10-15 years to eradicate)
Common Crupina (*Crupina vulgaris*)	Asteraceae	Mediterran-ean region	Winter annual	Seeds	None available	picloram picloram + 2,4-D dicamba 2,4-D		
Common Mullein (*Verbascum thapsus*)	Scrophulari-aceae	Eurasia	Biennial	Seeds	None available	2,4-D		
Common Teasel (*Dipsacus fullonum*)	Dipsaceae	Europe	Biennial	Seeds	None available	2,4-D amine 2,4-D amine + dicamba		
Queen Anne's Lace (*Daucus carota*)	Apiaceae	Native	Biennial	Seeds	None available	metsulfuron	Regular cultivation	
White Top (*Cardaria drabal*)	Brassicaceae	Native	Perennial	Seeds	None available	2,4-D amine metsulfuron		
Texas Blueweed (*Helianthus cilaris*)	Asteraceae	Native	Biennial	Seeds	None available	dicamba 2,4-D glyphosate picloram clopyralid		

Weed Species	Family	Place of Origin	Life Cycle	Modes of Reproduction	Bio-control Agents	Chemical Agents	Cultural Methods	Mechanical Methods
Common Burdock (*Arctium minus*)	Asteraceae	Europe	Biennial	Seeds	None available	2,4-D amine		
Japanese Knotweed (*Polygonium cuspidatum*)	Polygonaceae	Asia			None available	dicamba glyphosate		
Cornflower (*Centaurea cyanus*)	Asteraceae				None available	glyphosate picloram 2,4-D clopyralid clopyralid + 2,4-D dicamba		
Common Chickory (*Chichorium intybus*)	Asteraceae	Mediter-ranean	Perennial	Seeds	None available	2,4-D	Regular cultivation	
Creeping Buttercup (*Rananculus repens*)					None available	2,4-D dicamba		
Curly Dock (*Rumex crispis*)	Polygonaceae	Europe	Perennial	Seeds	None available	2,4-D dicamba picloram		
Nightshade (*Solanum dulcumara*)	Solanaceae					2,4-D dicamba + 2,4-D		

Information in this table compiled from Whitson et al. 1992; Rees et al. 1996; and William et al. 1997.

APPENDIX K – DETERMINATION OF PREDICTED SUCCESS RATES FOR ALTERNATIVES 2 AND 3

Effectiveness of the action alternatives was determined using the following assumptions, based on available information on weed treatment methods for target species, results of Bonners Ferry and Priest Lake Ranger Districts of the Idaho Panhandle National Forests' weed control efforts, and the professional judgment of county weed coordinators and other agency professionals.

Alternative 2

Biological Control: Where biological control alone, or where biological and mechanical control combined were proposed, the effectiveness was estimated to be 40-60%.

Mechanical Control: On sites with orange and meadow hawkweed, sulfur cinquefoil, common tansy, and other species for which mechanical control is generally not effective, control was not anticipated. On other sites with very small infestations of St. Johns-wort or knapweed, control was predicted to be effective. Where mechanical control was proposed, it was considered the most feasible of the control methods available *under this alternative*. However, it was often proposed where effective control is difficult to achieve due to the need for repeated treatments and the aggressive response of some weed species. Therefore, overall success was predicted at 10% per year.

Cultural Control: On sites where cultural control alone was recommended, minimal success was predicted – the nature of the sites is such that other methods, while possibly more effective at controlling weeds, may or may be economically infeasible. Cultural control alone was not predicted to be effective over the life of the EA (approximately ten years), but may offer some long-term effectiveness (i.e. shading the site to eventually reduce habitat suitability for the weeds). For these sites, treatment options remain open to those available under this alternative.

Overall, success of the Alternative was predicted to be about 38% of proposed treatment areas.

Alternative 3

Biological Control: Where this method alone was proposed, the effectiveness was predicted to be 40-60%. Where it was proposed in conjunction with herbicide use, the effectiveness was predicted at 75%. Timing of herbicide treatment and biological control can greatly increase the chance of control.

Mechanical Control: Under this Alternative, mechanical control was selected only where it was anticipated that good control could be achieved over the life of the EA. This method was not selected for orange or meadow hawkweed, common tansy, sulfur cinquefoil or other weed species for which it either is not effective or causes aggressive re-sprouting of the weed species. Therefore, 30% control per year was predicted for this method under this alternative.

Chemical Control: Most chemical control was selected for smaller infestations, and would likely produce 100% control in many sites. On other sites, such as heavily infested road prisms, the effectiveness was predicted to be less, about 50-70%.

Cultural Control: On sites where cultural control alone was recommended, minimal success was predicted – the nature of the sites is such that other methods, while possibly more effective at controlling the weeds, may not be acceptable from a resource standpoint, or may not be economically feasible. It was not predicted to be effective over the life of the EA, but may offer some long-term effectiveness (i.e. shading the sited to reduce habitat suitability for the weeds). For those sites, treatment options remain open to those available under this alternative.

Overall success of this Alternative was predicted to be about 70%.

APPENDIX L – DETERMINATION OF MAXIMUM ACRES ANNUALLY TREATABLE

North Fork Ranger District Noxious Weed EA - 2004				Clopyralid	Dicamba	Glyphosate Rodeo	Glyphosate Roundup	Methsulfuron Methly	Picloram	Triclopyrl TEA	2,4-D
Chemical Application Rate (pounds/acre)				0.5	1.5	1.5	1.5	0.4	1.0	0.4	1.0
Median Lethal Concentration (LC50 - ppm)				100	135	923	22	150	0.8-26		240
Median Lethal Concentration/20 (LC50/20 - ppm) or *NOEL* or NOEC (ppm)				20	6.8	46.2	1.1	7.5	0.29	104	*10*
Major Subbasin	**Watershed Name**	**Watershed Acres**	**Known Concen-trations of Noxious Weeds (acres)**	**Maximum Acres to be Treated**							
Clearwater	Lower Orofino	68,399		30,684	3,452	23,601	563	14,383	222	199,448	7,671
	Upper Orofino	27,972		16,144	1,816	12,417	296	7,567	117	104,936	4,036
Lower North Fork Clearwater	Alder Creek	15,459		6,417	722	4,936	118	3,008	47	41,712	1,604
	Bear Creek	3,817		2,571	289	1,977	47	1,205	19	16,711	643
	Beaver Creek	39,812	21	24,850	2,796	19,114	456	11,649	180	161,527	6,213
	Isabella Creek	19,774	14	13,210	1,486	10,161	242	6,192	96	85,867	3,303
	Lower NF Clearwater	50,077	4	24,634	2,771	18,948	452	11,547	179	160,120	6,158
	Minnesaka Creek	3,572		2,248	253	1,729	41	1,054	16	14,610	562
Upper North Fork Clearwater	Cayuse Creek	107,851	167	86,459	9,727	66,502	1,585	40,528	627	561,986	21,615
	Fourth of July Creek	28,491		17,847	2,008	13,727	327	8,366	129	116,004	4,462
	Lake Creek	22,057	213	18,326	2,062	14,096	336	8,590	133	119,117	4,581
	Long Creek	17,981	9	14,530	1,635	11,176	266	6,811	105	94,442	3,632
	Lower Kelly Creek	30,424	47	15,899	1,789	12,229	291	7,453	115	103,342	3,975
	Moose Creek	46,619	239	30,427	3,423	23,403	558	14,262	221	197,773	7,607
	Orogrande Creek	58,820	122	33,705	3,792	25,925	618	15,799	244	219,085	8,426
	Quartz Creek	27,936	5	18,445	2,075	14,187	338	8,646	134	119,892	4,611
	Skull Creek	55,859	5	41,474	4,666	31,901	760	19,441	301	269,584	10,369
	Upper Kelly Creek	56,885	3	43,143	4,854	33,184	791	20,223	313	280,430	10,786
	Washington Creek	30,232		15,203	1,710	11,694	279	7,127	110	98,822	3,801
	Weitas Creek	139,796	174	84,122	9,464	64,704	1,542	39,432	610	546,790	21,030
TOTAL		**1,058,368**	**3,038**	**678,759**	**76,360**	**522,079**	**12,444**	**318,168**	**4,921**	**4,411,934**	**169,690**

APPENDIX M – BEST MANAGEMENT PRACTICES

Idaho Forest Practices Act

Section 060. Use of Chemicals and Petroleum Products.

03. Licensing

04. Maintenance of Equipment

    a. Equipment used for transportation, storage, or application of chemicals shall be maintained in leakproof condition.

    b. Storage in accordance with Rules of the Idaho Pesticide Law and IDAPA 02.03.03

05. Mixing

    a. When water is used in mixing chemicals:

        i. Provide an air gap or reservoir between the water source and the mixing tank.

        ii. Use uncontaminated tanks, pumps, hoses, and screens to handle and transfer mix water for utilization in pesticide operations.

    b. Mixing and landing areas:

        i. Mix chemicals and clean tanks and equipment only where spills will not enter any water source or stream.

        ii. Landing area shall be located where spilled chemicals will not enter any water source or stream.

        iii. Rinsate and wash water should be recovered and used for make-up water, be applied to the target area, or disposed of according to state and federal laws.

07. Ground application with power equipment

    a. With exception of pesticides approved for aquatic use and applied according to labeled directions, when applying pesticide, leave at least twenty-five feet untreated on each side of all Class I streams, flowing Class II streams, and areas of open water.

08. Hand application

    a. Apply only to specific targets;

    b. Keep chemicals out of all water sources or streams.

09. Limitations of applications

    a. Chemicals shall be applied in accordance with all limitations and instructions printed on the product registration labels, supplemental labels, and other established by regulation of the director.

    b. Do not exceed allowable rates.

    c. Prevent direct entry of chemicals into any water source or stream.

10. Daily Records of Chemical Applications

    a. When pesticides are applied on forest land, the operator shall maintain a daily record of spray operations which includes:

        i. Date and time of day of application.

        ii. Name and address of owner of property treated.

        iii. Purpose of application.

iv. Contractor's name or applicator's name for ground application.

v. Location of project (section, township, range and county).

vi. Air temperature (hourly).

vii. Wind velocity and direction (hourly).

viii. Pesticides used including trade or brand name, EPA product registration number, mixture, application rate, carrier used, and total amounts applied.

d. Records retained for three years.

11. Container disposal.

Chemical containers shall be: cleaned and removed from the forest and disposed of in a manner approved by the director in accordance with applicable local, state and federal regulations; or removed for reuse in a manner consistent with label directions and applicable regulations of a state or local health department. Open burning of containers is prohibited.

12. Spills.

Spills shall be reported and appropriate cleanup action taken in accordance with applicable state and federal laws and rules and regulations.

a. All chemical accidents and spills shall be reported immediately to the director.

b. If chemical is spilled, appropriate procedures shall be taken immediately to control the spill source and contain the released material.

c. It is the applicator's responsibility to collect, remove, and dispose of the spilled material in accordance with applicable local, state and federal rules and regulations and in a manner approved by the director.

13. Misapplications.

Whenever chemicals are applied to the wrong site or pesticides are applied outside of the directions on the product label, it is the responsibility of the applicator to report these misapplications immediately to the director.

Soil and Water Conservation Practices Handbook (FSH 2509.22) 13

Vegetation Manipulation

PRACTICE: 13.07 – Pesticide Use Planning

OBJECTIVE: To incorporate water quality and hydrologic considerations into the Pesticide Use Planning Process.

EXPLANATION: The pesticide use planning process will be used to identify problem areas and the objectives of the project, establish the administrative controls, identify treatments and preventive measures, and incorporate the hydrologic considerations contained in SWCP 13.08 through 13.13. The NEPA process addresses these considerations in terms of impacts, mitigation measures, and alternative treatment measures. Project work and safety plans specify management direction.

Factors considered in pesticide selection are: purpose of the project, application methods available, target species, timing of treatment, pest location, size of treatment area, and need for repeated treatment. Practicability of application considers: registration restrictions, form and method of application, topographic relief and areas to be avoided, and social acceptance of the project. The degree of

risk considers: hazard to humans, method of application, transportation and handling hazards, carriers needed, and chemical persistence.

IMPLEMENTATION: The interdisciplinary team evaluates the project in terms of potential site response, potential social and environmental impacts, mitigating measures needed to protect water quality, and the need and intensity of monitoring and evaluation. The responsible Line Officer then prepares the necessary NEPA documentation, Project Plan and Safety Plan. Depending on the pesticide use, (FSM 2151.04) the Forest pesticide-use coordinator or Integrated Pest Management Working Group or regional IP-MWG reviews the documents along with the Pesticide-use Proposal, form FS-2100-2, and makes recommendations for or against approval of the project.

REFERENCES: NFMA; NEPA; FSM 2150 and 2323; State Hazardous Waste Management Plans; see references in "Best Management Practices" Definition 05—2 and 3.

PRACTICE: 13.08 – Apply Pesticides According to Label and EPA Registration Directions

OBJECTIVE: To avoid water contamination by complying with all label instructions and restrictions.

EXPLANATION: Label directions for each pesticide are detailed and specific, and include legal requirements to use.

IMPLEMENTATION: Constraints identified on the label and other legal requirements of application are incorporated into project plans and contracts. Responsibility for ensuring that label directions and other applicable requirement are followed rests with the Forest Supervisor or designate such as the Forest Pesticide Use Coordinator. For contracted projects, it is the responsibility of the Contracting Officer to ensure that label directions and all other requirements are followed.

REFERENCES: FSM 2150; see references in **Best Management Practice** Definition (05—2 and 3).

PRACTICE: 13.09 – Pesticide Application Monitoring and Evaluation

OBJECTIVE: To determine and document that pesticides have been applied safely and to provide an early warning for any contamination of water or non-target areas or resources.

EXPLANATION: This practice provides feedback on the placement accuracy, application amount, and any water contamination that might occur from pesticide use, so as to minimize or eliminate hazards to non-target areas or resources. Monitoring and evaluation methods include spray cards, dye tracing, and direct measurement of pesticide in or near water. Type of pesticide, equipment, application difficulty, public concern, beneficial uses, monitoring difficulty, availability of competent laboratory analysis and applicable federal, State, and local laws and regulations are factors considered when determining the monitoring and evaluation needs.

IMPLEMENTATION: The monitoring and evaluation of pesticide application is a component of SWCP 11.02. The need for a monitoring plan is identified during the Pesticide Use Planning Process/NEPA process. If determined necessary, this monitoring and evaluation plan will consider the same items as in SWCP 11.02. A technical staff familiar in pesticide monitoring will evaluate and interpret the monitoring results in terms of compliance, State water quality standards and adequacy of project specifications.

REFERENCES: FSM 2150; see references in **Best Management Practice** Definition (05—2 and 3).

PRACTICE: 13.10 – Pesticide Spill contingency Planning

OBJECTIVE: To reduce contamination of water from accidental pesticide spills.

EXPLANATION: A contingency plan that contains a predetermined organization and immediate actions to be implemented in the event of a hazardous substance spill will be prepared. The plan lists notification requirements, time requirements for notification, how spill will be handled, and who will be responsible for clean-up. Factors considered for each spill are: specific substance spilled, quantity, toxicity, proximity of spill to waters, and the hazard to life, property and the environment.

IMPLEMENTATION: The Pesticide Spill Contingency Plan will be incorporated into the Project Safety Plan. The NEPA process will provide the means for including public and other agency involvement in plan preparation. The plan will list the responsible authorities.

REFERENCES: SWCP 11.07; Pesticide Storage, Transportation, Spills, and Disposal Handbook (FSH 2109.12); FSM 6740, 7442, 7443, and 7460; Oil and Hazardous Substances Pollution contingency Plan for EPA Region 8 and 10, 7/26/85; R1 and R4 Emergency and Disaster Plan; see references **Best Management Practice** Definition (05—2 and 3).

PRACTICE: 13.11 – Cleaning and Disposal of Pesticide Containers and Equipment

OBJECTIVE: To prevent water contamination and risk to humans from cleaning and disposal of pesticide containers.

EXPLANATION: The cleaning and disposal of pesticide containers and equipment must be done in accordance with Federal, State, and local laws, regulations, and directives, and in a manner which will safeguard public health, the beneficial uses of water, aquatic organisms, and wildlife. Containers are rinsed three times, the rinse water applied on the project area as soon as practical, and the containers taken to the designated disposal site. Application equipment is also rinsed and rinse water applied to the project site before the equipment is moved from the project area.

IMPLEMENTATION: when the pesticide is applied by In-Service personnel, the Forest or District Pesticide Use Coordinator will locate proper rinsing and disposal sites, and will arrange for container disposal in an approved disposal site. When the pesticide is applied by a contractor, the contractor is responsible for proper clean-up and container disposal in accordance with label directions and Federal, State, and local laws.

REFERENCES: SWCP 11.07; Pesticide Storage, Transportation, Spills, and Disposal Handbook (FSH 2109.12); FSM 6740, 7442, 7443, and 7460; Oil and Hazardous Substances Pollution contingency Plan for EPA Region 8 and 10, 7/26/85; R1 and R4 Emergency and Disaster Plan; see references **Best Management Practice** Definition (05—2 and 3).

PRACTICE: 13.12 – Protection of Water, Wetlands, and Riparian Areas During Pesticide Spraying

OBJECTIVE: To minimize the risk of a pesticide entering surface or subsurface waters or affecting riparian areas, wetlands, or other non-target areas.

EXPLANATION: When applying pesticides, an untreated buffer strip will be left alongside surface waters, wetlands, and riparian areas. Factors considered in establishing buffer strip widths beyond minimums established by FSM and NEPA documents are: beneficial water uses, adjacent land use, rainfall, temperature, wind speed, wind direction, terrain, slope, soils and geology, vegetative type, and aquatic life. Other considerations include: persistence mobility, toxicity, and formulation of the pesticide, method of application, equipment used, spray pattern, droplet size, application height, and application pattern.

IMPLEMENTATION: Protected areas will be identified and mapped by an interdisciplinary team and the Forest Pesticide Use Coordinator during the NEPA process. Protection of untreated areas is the responsibility of the project supervisor for In-Service projects and the Contracting Officer for contracted projects. The certified commercial applicators are briefed about location of protected areas. These areas are flagged or otherwise marked when necessary to aid in boundary identification.

REFERENCES: FSM 2526, 2527, 2245, and 2150; see references in **Best Management Practice** (05—2 and 3).

PRACTICE: 13.13 – Controlling Pesticide Drift During Spray Application

OBJECTIVE: To minimize the risk of pesticide contaminating non-target areas.

EXPLANATION: Pesticide spray applications will be accomplished according to a prescription that specifies the following: areas to be left untreated, buffer areas, type of spray and associated materials, equipment and method to be used, droplet size, spray height, application pattern, flow rate, terrain and meteorological consideration. Hand spraying, with less associated risk, will have fewer application restrictions for drift than aerial spraying.

IMPLEMENTATION: The prescription is prepared by an interdisciplinary team and the Forest or District Pesticide Use Coordinator during the NEPA process. The Line Officer is responsible for designating a project supervisor who is responsible for ensuring that the prescription is followed during application and for terminating application if the standards are exceeded.

REFERENCES: FSM 2150 and 2245; SWCP 13.12; see **Best Management Practice** Definition (05—2 and 3).

OTHER BMPS

- A spill cleanup kit will be available whenever pesticides (herbicides) are transported or stored.
- A spill contingency plan will be developed prior to all herbicide applications. Individuals involved in herbicide handling or application will be instructed on the spill contingency plan and spill control, containment, and cleanup process.
- Herbicide applications will only treat the minimum area necessary for control of noxious weeds.
- No spraying will occur when wind velocity exceeds 6 miles per hour or as specified on the label.
- Do not spray if precipitation is occurring or is imminent.
- Do not spray if air turbulence is sufficient to affect the normal spray pattern.

FOREST SERVICE MANUAL
NORTHERN REGION (REGION 1)
MISSOULA, MT.

FSM 2000 – NATIONAL FOREST RESOURCE MANAGEMENT

ZERO CODE 2080 – NOXIOUS WEED MANAGEMENT

Supplement No.: R1 2000-2001-1

Effective Date: May 14, 2001

Duration: Effective until superseded or removed

Approved: KATHY A. MCALLISTER
Acting Regional Forester

Date Approved: 04/27/2001

Posting Instructions: Supplements are numbered consecutively by Title and calendar year. Post by document name. Remove entire document and replace with this supplement. Retain this transmittal as the first page of this document.

New Document(s):	2080	16 Pages
Superseded Document(s):	None. (This is the first supplement to this Manual.)	0 Pages

Digest:

	This supplement implements an Integrated Weed Management approach for management of noxious weeds on National Forest System lands in Region 1.

2080.4 - Responsibility.

Encourage weed awareness and education in employee development and training plans and orientation for both field and administrative work.

2080.43 - Forest Supervisor.

Forest Supervisors are responsible for:

1. Emphasizing weed awareness and weed prevention in all fire training, especially resource advisors, fire management teams, guard school, and district orientation.

2. Adding weed awareness and prevention education to Fire Effects and Prescribed Fire training.

3. Giving helicopter managers training in weed prevention and mitigation measures.

4. Resource Advisors should provide briefings to identify operational practices to reduce weed spread.

5. Providing Field Observers with weed identification aids and striving to avoid weed infestations in fire line location.

2080.44 - District Rangers.

District Rangers are responsible for:

1. Providing weed prevention briefings for helibase staff.

2. Ensuring at least one permanent staff member per District is trained and proficient in weed management.

3. Applying weed treatment and prevention on all Forest Service administrative sites including Ranger Stations, trailheads, campgrounds, pastures, interpretive and historic sites.

2081 – MANAGEMENT OF NOXIOUS WEEDS.

2081.2 - Prevention and Control Measures.

1. Roads.

    a. Required Objectives and Associated Practices.

(1) Incorporate weed prevention into road layout, design, and alternative evaluation. Environmental analysis for road construction and reconstruction will include weed risk assessment.

(2) Remove the seed source that could be picked up by passing vehicles and limit seed transport in new and reconstruction areas.

(a) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.

(b) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders as determined by the Forest Weed Specialist. Reference Contract Provision C/CT 6.626.

(3) Re-establish vegetation on bare ground due to construction and reconstruction activity to minimize weed spread.

(a) Revegetate all disturbed soil, except the travel way on surfaced roads, in a manner that optimizes plant establishment for that specific site, unless ongoing disturbance at the site will prevent weed establishment. Use native material where appropriate and available. Use a seed mix that includes fast, early season species to provide quick, dense revegetation. To avoid weed contaminated seed, each lot must be tested by a certified seed laboratory against the all State noxious weed lists and documentation of the seed inspection test provided.

(b) Use local seeding guidelines for detailed procedures and appropriate mixes. Use native material where appropriate and available. Revegetation may include planting, seeding, fertilization, and weed-free mulching as indicated by local prescriptions.

(c) Monitor and evaluate success of revegetation in relation to project plan. Repeat as indicated by local prescriptions.

(4) Minimize the movement of existing and new weed species caused by moving infested gravel and fill material. The borrow pit will not be used if new invaders, defined by the Forest Weed Specialist, are found on site.

(5) Minimize sources of weed seed in areas not yet revegetated. If straw is used for road stabilization and erosion control, it must be certified weed-free or weed-seed free.

(6) Minimize roadside sources of weed seed that could be transported to other areas during maintenance.

(a) Look for priority weed species during road maintenance and report back to District Weed Specialist.

(b) Do not blade roads or pull ditches where new invaders are found.

(c) Maintain desirable roadside vegetation. If desirable vegetation is removed during blading or other ground disturbing activities, area must be revegetated according to section (3) (a), (b), (c) above.

(d) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(e) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders, as determined by the Forest Weed Specialist. Reference Contract Provision C/CT 6.626.

(f) Straw used for road stabilization and erosion control will be certified weed-free or weed-seed-free.

(7) Reduce weed establishment in road obliteration/reclamation projects. Revegetate according to section (3) (a), (b), (c) above.

b. Recommended Objectives and Associated Practices.

(1) Retain shade to suppress weeds. Consider minimizing the removal of trees and other roadside vegetation during construction, reconstruction, and maintenance, particularly on southerly aspects.

(2) Consider re-establishing vegetation on bare ground due to construction and reconstruction activity to minimize weed spread. Road maintenance programs should include scheduled fertilization to maintain vigor of competitive vegetation (3-year period suggested).

(3) Minimize the movement of existing and new weed species caused by moving infested gravel and fill material. All gravel and borrow sources should be inspected and approved before use and transport. The source will not be used if the weeds present at the pit are not found at the site of intended use. If weeds are present, they must be treated before transport and use.

(4) Minimize roadside sources of weed seed that could be transported to other areas. Weed infestations should be inventoried and scheduled for treatment.

(5) Ensure that weed prevention and related resource protection are considered in travel management. Consider weed risk and spread factors in travel plan (road closure) decisions.

(6) Reduce weed establishment in road obliteration/reclamation projects. Consider treating weeds in road obliteration and reclamation projects before roads are made undriveable. Monitor and retreat as indicated by local analysis and prescription.

(7) Evaluate and prioritize noxious weeds along existing Forest Service access roads leading to project area and treat as indicated by local analysis and prescriptions, before construc-

tion equipment moves into project area. New road construction must be revegetated as described in Weed Prevention measure, see Roads Required Objectives and Associated Practices section (3) (a), (b), (c) above.

2. Recreation, Wilderness, Roadless Areas.

a. Required Objectives and Associated Practices.

(1) Minimize transport and establishment of weeds on National Forest Service lands.

(a) Include environmental analysis for recreation and trail projects in weed risk assessment.

(b) Post and enforce statewide weed-free feed orders.

(c) Seed only when necessary at backcountry sites to minimize introduction of nonnative species and weeds. Reseed according to Roads (3) (a), (b), (c) above.

(2) Reduce weed establishment and spread from activities covered by Recreation Special Use Permits.

(a) Include Clause R1-D4, (or subsequent approved direction), in all new and reissued recreation special use permits, authorizations, or other grants involving ground-disturbing activities. Include this provision in existing ground-disturbing authorizations, which are being amended for other reasons.

(b) Revegetate bare soil resulting from special use activity according to Roads (3) (a), (b), (c) above.

(3) Prevent weed establishment resulting from land and float trail use, construction, reconstruction and maintenance activities.

(a) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as determined by the Forest Weed Specialist).

b. Recommended Objectives and Associated Practices.

(1) Minimize transport and establishment of weeds on National Forest System (NFS) lands.

(a) Encourage backcountry pack and saddle stock users to feed only weed-free feed for several days prior to traveling off roads in the Forest. Before entering NFS land, animals should be brushed to remove any weed seed.

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

(c) Maintain trailheads, boat launches, outfitter and public camps, airstrips, roads leading to trailheads, and other areas of concentrated public use in a weed-free condition.

(d) Motorized and/or mechanized (such as mountain bikes) trail users should inspect and clean their vehicles prior to using NFS lands.

(2) Consider reducing weed establishment and spread from activities covered by recreation, special use permits. Consider including Clause R1-D4, (or subsequent approved direction), by amending existing ground-disturbing authorizations as indicated by local prescriptions.

(3) Prevent weed establishment resulting from land and float trail use, construction, reconstruction, and maintenance activities.

(a) All trail crews should inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment.

(b) Inspect and approve all gravel and borrow sources before use and transport. The source will not be used if the weeds present at the pit are not found at the site of intended use. If weeds are present, they must be treated before transport and use.

3. Cultural Resources.

Required Objectives and Associated Practices. Reduce weed establishment and spread at archeological excavations.

Revegetate bare soil resulting from cultural resource excavation activity according to the Roads (3) (a), (b), (c) section above.

4. Wildlife, Fisheries, and Botany.

Required Objectives and Associated Practices. Incorporate weed prevention into wildlife, fisheries, and botany project design.

a. Include weed risk assessment in environmental analysis for wildlife, fish and botany projects with ground disturbing actions.

b. Revegetate bare soil resulting from wildlife and fish project activity according to the Roads (3) (a), (b), (c) section above.

c. Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

d. Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as determined by the Forest Weed Specialist).

5. Range.

a. Required Objectives and Associated Practices.

(1) Ensure weed prevention and control are considered in management of all grazing allotments.

(a) Include weed risk assessment in environmental analysis for rangeland projects.

(b) When other plans do not already address noxious weeds, include practices and control measures in Annual Operating Plans.

(2) Minimize ground disturbance and bare soil.

(a) Revegetate, where applicable, bare soil from grazing activities according to the Roads (3) (a), (b), (c) section above.

(b) Check areas of concentrated livestock use for weed establishment and treat new infestations.

(3) Minimize transport of weed seed into and within allotments.

(a) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(b) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as determined by the Forest Weed Specialist).

(c) Straw used for road stabilization and erosion control will be certified weed-free or weed-seed-free.

b. Recommended Objectives and Associated Practices.

(1) Transport of weed seed into and within allotments should be minimized.

(a) Avoid driving vehicles through off-road weed infestations.

(b) Feed certified weed-free feed to livestock for several days prior to moving them onto the allotment to reduce the introduction of new invaders and spread of existing weed species. Consider using transitional pastures when moving animals from weed infested areas to the National Forest. (Transitional pastures are designated fenced areas that can be logistically and economically maintained.)

(c) Consider excluding livestock from sites with new invaders or treat new invaders in these areas before entry by livestock.

(2) Maintain healthy desirable vegetation that is resistant to noxious weed establishment.

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

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

6. Timber.

a. Required Objectives and Associated Practices.

(1) Ensure that weed prevention is considered in all pre-harvest timber projects.

(a) Include weed risk assessment in environmental analysis for timber harvest projects.

(b) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.) Reference Contract Provision C/CT6.26

(c) Clean all equipment prior to leaving the project site, if operating in areas infested with new invaders (as designated by the Forest Weed Specialist). Reference Contract Provision C/CT6.261

(2) Minimize the creation of sites suitable for weed establishment. Revegetate bare soil as described in the Roads (3) (a), (b), (c) section above.

b. Recommended Objectives and Associated Practices.

(1) Ensure that weed prevention is considered in all timber projects.

(a) Consider treating weeds on roads used by timber sale purchasers. Reference Contract Provision C/CT6.26.

(b) Treat weeds on landings, skid trails and helibases that are weed infested before logging activities, where practical.

(2) Minimize the creation of sites suitable for weed establishment. Soil disturbance should be minimized to meet harvest project objectives.

(3) Consider monitoring for weeds after sale activity and treat weeds as indicated by local prescriptions.

(a) Consider trust, stewardship, or other funds to treat soil disturbance or weeds as needed after timber harvest and regeneration activities.

(b) Consider monitoring and treating weed infestations at landings and on skid trails after harvest.

7. Minerals.

a. Required Objectives and Associated Practices.

(1) Minimize weed establishment in mining, oil and gas operations, and reclamation.

(a) Include weed risk assessment in environmental analysis for minerals and oil and gas projects.

(b) Include weed prevention measures in operation and/or reclamation plans.

(c) Retain bonds until reclamation requirements are completed.

(d) Revegetate bare soil as described in the Roads (3) (a), (b), (c) section above.

(2) Remove seed source and limit seed transport into new or existing mining and oil and gas operations. Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(3) Minimize weed spread caused by moving infested gravel and fill material.

(a) The borrow pit will not be used if new invaders (as defined by the Forest Weed Specialist) are found on the site.

(b) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(c) Do not establish new gravel and fill material sources in areas where new invaders are present on National Forest Service lands. Where widespread weeds occur at new pit sites strip at least the top 8" and stockpile contaminated material. Treat weeds at new pits where widespread weeds are present.

b. Recommended Objectives and Associated Practices.

(1) Consider removing seed source and limiting seed transport into new or existing mining and oil and gas operations. Where applicable, treat weeds on project access routes. Reference Contract Provision C/CT6.27.

(2) Minimize weed spread caused by moving infested gravel and fill material.

(a) Inspect and approve all gravel and borrow sources before use and transport. The source should not be used if the weeds present at the pit are not found at the site of intended use. If weeds are present, they should be treated before transport and use.

(b) Consider maintaining stockpiled material in a weed-free condition.

(c) Check the area where pit material is used to ensure that no weed seeds are transported to the use site.

8. Soil and Water.

a. Required Objectives and Associated Practices.

(1) It is required that integrated weed prevention and management be used in all soil, watershed, and stream restoration projects.

(a) Include weed risk assessment in environmental analysis for soil, watershed, and stream restoration projects with ground disturbing actions.

(b) Revegetate bare soil resulting from excavation activity according to the Roads (3) (a), (b), (c) section above.

(c) Remove all mud, dirt, and plant parts from all off road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

(d) Clean all equipment prior to leaving the project site, if operation in areas infested with new invaders (as designated by the Forest Weed Specialist).

(e) Straw used for road stabilization and erosion control will be certified weed-free or weed-seed-free.

b. Recommended Objectives and Associated Practices.

Integrate weed prevention and management in all soil, watershed, and stream restoration projects by considering treating weeds in road obliteration and reclamation projects before roads are made undriveable. Monitor and retreat as indicated by local prescriptions.

9. Lands and Special Uses.

a. Required Objectives and Associated Practices.

(1) Incorporate weed prevention provisons in all special use permits, road use permits, and easements.

(a) Include weed risk assessment in environmental analysis for land projects with ground disturbing actions.

(b) Revegetate bare soil as described in the Roads (3) (a), (b), (c) section above, as a condition of the authorization.

(c) Include approved special use provision R1-D4, see FSH 2709.11, chapter 50, (or subsequent approved direction) in all new and reissued special use permits, authorizations, or other grants involving ground disturbing activities. Include this provision in existing ground disturbing authorizations, which are being amended for other reasons .

(d) Include noxious weed prevention and control measures as indicated by local prescriptions in new or reissued road permits or easements granted pursuant to FLPMA (P.L. 94579 0/2/76), FRTA (P.L. 88657 0/3/64) or subsequent authorities. This includes FLPMA Private and Forest Road Permits and Easements; FRTA Private and Forest Road Easements; Cost Share Easements; and Road Use (commercial haul) Permits (7730). (While the approved terms and conditions of certain permits or easements may not provide for modification, the necessary weed prevention and control provisions may be included in written plans, specifications, stipulations and /or operation and maintenance plans attached to and made a part of the authorization.)

(e) Clean all equipment prior to leaving the project site, if operating in areas infested with New Invaders (as designated by the Forest Weed Specialist).

(2) Minimize weed spread caused by moving infested gravel and fill material.

(a) Do not establish new gravel and fill material sources on National Forest Service lands in areas where new invaders are present. Where widespread weeds occur at new pit sites strip at least the top 8" and stockpile contaminated material. Treat weeds at new pits where widespread weeds are present.

(b) Remove all mud, dirt, and plant parts from all off-road equipment before moving into project area. Cleaning must occur off National Forest lands. (This does not apply to service vehicles that will stay on the roadway, traveling frequently in and out of the project area.)

b. Recommended Objectives and Associated Practices.

(1) Incorporate weed prevention provisions in all special use permits, road use permits and easements.

(a) Consider including special use provision R1-D4 by amending existing ground disturbing authorizations as indicated by local prescriptions.

(b) Consider including noxious weed prevention and control provisions by amending existing ground disturbing authorizations when determined to be necessary by the authorized officer. (While the approved terms and conditions of certain permits or easements may not provide for modification, the necessary weed prevention and control provisions may be included in written plans, specifications, stipulations and/or operation and maintenance plans attached to and made a part of the authorization.)

(2) Minimize weed spread caused by moving infested gravel and fill material. All gravel and borrow sources should be inspected and approved before use and transport. The source should not be used if the weeds present at the pit are not found at the site of intended use. If weeds are present, they should be treated before transport and use.

10. Fire.

a. Required Objectives and Associated Practices.

(1) Increase weed awareness among all fire personnel. Include weed risk factors and weed prevention considerations in the Resource Advisor duties on all Incident Management Teams and Fire Rehabilitation Teams during pre-fire, pre-incident training.

(2) Mitigate and reduce weed spread during wild fire activities

(a) Initiate establishment of a network of helibases, camps and staging areas that will be maintained in a noxious weed-free condition.

(b) Minimize weed spread in camps by incorporating weed prevention and containment practices such as mowing, flagging or fencing weed patches, designating weed-free travel routes and washing equipment.

(c) Inspect all fire going vehicles regularly to assure that undercarriages and grill works are kept weed seed free. All vehicles sent off Forest for fire assistance will be cleaned before they leave or return to their home.

(3) Minimize weed spread during smoke jumper operations.

(a) Inspect, remove, and properly dispose of weed seed and plant parts found on clothing and equipment.

(b) Coordinate with Weed Specialist(s) to locate and/or treat practice jump areas.

(4) Mitigate and reduce weed spread in Air Operations.

(a) Initiate establishment of a network of helibases that will be maintained in a noxious weed-free condition.

(b) Minimize weed spread at helibases by incorporating weed prevention and containment practices such as mowing, flagging or fencing weed patches, designating weed-free travel routes.

(c) Provide weed prevention briefings for helibase staff.

(d) Inspect, and if necessary clean, contract fuel and support vehicles before and after each incident when travelling off road or through weed infestations.

(e) Inspect and remove weed seed and plant parts from all cargo nets.

(5) Mitigate and reduce weed spread from Logistics Operations activities.

(a) Look for weed-free camps, staging, drop points and parking areas.

(b) Regularly inspect and clean fire vehicles as necessary to assure that undercarriages and grill works are kept weed seed free.

(6) Integrate weed prevention and management in all prescribed burning. Mitigate and reduce weed spread during prescribed fire activities.

(a) Include weed risk assessment in environmental analysis for prescribed fire projects.

(b) Coordinate with local Noxious Weed Management Specialist to utilize helibases that are maintained in a weed-free condition, whenever possible.

(c) All crews should inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment.

(d) Add weed awareness and prevention education to Fire Effects and Prescribed Fire training.

(7) Encourage desirable vegetation during rehabilitation activities.

(a) Revegetate only erosion susceptible and high risk areas (as defined in Regional Risk Assessment Factors and Rating protocol) as described in the Roads (3) (a), (b), (c) section above.

(b) Straw used for road stabilization and erosion control will be certified weed-free or weed-seed-free.

b. Recommended Objectives and Associated Practices.

(1) Mitigate and reduce weed spread during fire activities.

(a) Initiate establishment of a network of helibases, camps, and staging areas on private land that will be maintained in a noxious weed-free condition.

(b) Consider checking and treating weeds that establish at cleaning sites after fire incidents, during rehabilitation.

(c) Emphasize Minimum Impact Suppression Tactics (M.I.S.T.) to reduce soil and vegetation disturbance.

(2) Minimize weed spread during smokejumper operations. Travel through weed infested areas should be avoided or minimized.

(3) Mitigate and reduced weed spread from Logistics Operations activities. Traffic should be routed through camps to avoid weed infested areas.

(4) Integrate weed prevention and management in all prescribed burning. Mitigate and reduce weed spread during prescribed fire activities.

(a) Consider treating high risk areas (as defined in Regional Risk Assessment Factors and Rating protocol) with weed infestations (such as roads, disturbed ground) before burning and check and retreat after burning if necessary.

(b) Consider avoiding ignition and burning in high risk areas (as defined in Regional Risk Assessment Factors and Rating protocol) that cannot be treated before or after prescribed fire.

(5) Encourage desirable vegetation during rehabilitation activities.

(a) Check and treat weeds at cleaning sites and all disturbed staging areas.

(b) Treat weeds within the burned area as part of rehabilitation plan to reduce weed spread.

(c) Check weed spread resulting from fire and fire suppression activities.

(d) Consider applying for restoration funding for treatment of weed infestations within the fire area.

11. Administration.

a. Required Objectives and Associated Practices.

(1) Ensure all Forest Service employees are aware of and knowledgeable about noxious weeds.

(a) Train Line Officers in noxious weed management principles and practices.

(b) Each unit will have access to Weed Specialist at the Ranger District or Supervisor's Office.

(2) Ensure all Forest workers are reducing the chance of spreading noxious weeds. All Forest workers will inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment including Forest Service vehicles.

b. Recommended Objectives and Associated Practices.

Consider a reward program for weed awareness, reporting, and beating new invaders.

2082 - COOPERATION.

1. Required Objectives and Associated Practices. Coordinate road maintenance activities with herbicide applications to maximize efficacy. Ensure road blading and roadside herbicide applications are coordinated chronologically to minimize herbicide use and increase effectiveness.

2. Recommended Objectives and Associated Practices. Consider providing Plans Section with weed control contact familiar with weeds in the fire area.

2082.2 - Methods of Cooperation.

6. Region 1 Required Objectives and Associated Practices.

a. Reduce weed establishment and spread at archeological excavations. Passports In Time programs and other Cultural Resource workers shall be given weed briefings and will inspect, remove, and properly dispose of weed seed and plant parts found on their clothing and equipment.

b. Promote weed awareness and prevention efforts among range permittees. Discuss weed awareness and prevention practices at annual permittee meetings.