

Evaluation Report

Invasive Weeds

DRAFT: 8/2006

Clearwater National Forest

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USDA Forest Service, Northern Region

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Introduction

This report documents the evaluation and development of direction for treating invasive weeds for the Clearwater National Forest.

This report reflects various discussions and works done by the Invasive Weeds Working Group from the Clearwater National Forest. The information and processes described in this technical paper is intended as supporting documentation for the planning record for the Clearwater National Forest Land and Resource Management Plan (LRMP).

Because of potential changes in the draft proposed forest plan this is a working document intended to be “draft” until the Forest Plan revision is signed, after which the document should be considered a “living” document for the same reasons.

Area of Consideration

The Clearwater National Forest (CNF) is responsible for the resource management of 1.8 million acres on the Clearwater. The majority of the land administered by the Clearwater National Forest is located in Latah, Clearwater and Idaho counties with small portions in Shoshone and Benewah counties in Idaho. The National Forest System lands within these counties make up the area for this analysis.

The Clearwater National Forest is bordered on the east by Montana and by Washington State to the west.

Cooperative Weed Management Areas

The State of Idaho is responsible for overseeing and directing noxious weeds management. Weed management is organized according to two Cooperative Weed Management Areas (CWMAs), Clearwater River Basin and Palouse River, and incorporates private, state, federal and tribal lands within defined boundaries. Each CWMA has organized Weed Coordinating Committees, with members from the local tribes, private landowners, Bureau of Land Management, Idaho Dept. of Lands, National Forests, local counties, and other agencies that develop consistent management objectives and organize treatment efforts.

The Clearwater River Basin CWMA is divided into the north sub-basin (the headwaters of the Palouse and Potlatch Rivers, and a portion of the North Fork of the Clearwater River) and the south sub-basin making up the remainder.

Background

A species is considered invasive if it meets two criteria from the *National Strategy and Implementation Plan for Invasive Species Management*:

1. It is non-native to the ecosystem under consideration.
2. Its introduction causes or is likely to cause economic or environmental harm or harm to human health.

Invasive plants include noxious weeds and exotic non-native plants. “Noxious” is a legal classification and not an ecological term. Noxious weeds are those invasive plant species that have been officially designated as such by various governmental agencies. These species can have detrimental effects on agriculture, commerce, or public health. Those plants designated as noxious by the state of Idaho is the primary focus, however, noxious weeds designated by other surrounding states will also be considered due to the potential for these weeds to spread from these areas (ICBEMP 1997; ICBEMP 2000).

Other exotic non-native invasive plants have not been legally defined as noxious, but have the ability to out compete native vegetation or be dangerous to humans. Species such as cornflower, common chicory, creeping buttercup, curly dock and nightshade are considered undesirable.

Noxious weeds present the most immediate and disruptive threat to ecosystem function and integrity nationally, regionally, and on the Forest. Noxious weed infestations are difficult to manage and can substantially change biological diversity by affecting the amount and distribution of native plants and animals. They can also have negative effects on forest regeneration, wildlife and livestock forage, native plants associated with tribal rights, landscape and soil productivity, fire cycles, nutrient cycling, riparian and hydrologic function, water quality, and human recreational activities (ICBEMP 2000).

Noxious weeds that are classified as *invaders* pose the greatest threat. Invaders can become established within relatively undisturbed vegetation conditions, displace native vegetation without the aid of ground disturbance, and spread quickly over large geographical areas. *Spotted knapweed, diffuse knapweed, yellow star thistle, leafy spurge, cheatgrass* and *dyers woad* are some examples of invaders. The rapid rate of weed invasion is partly due to the lack of natural control agents in new environments, prolific seed production, physiological advantages over other native plants, and the strong ability to become established in various vegetative communities and successional stages. Roads, trails, and rivers have been identified as the primary conduits or *vectors* for invasive plant establishment and spread (ICBEMP 1997; USDA 2003).

Some landscapes are more susceptible to weed invasion than others, due to the similarity of environmental conditions from where the invading plant originated, and the productivity of the site being invaded. This susceptibility can affect the rate of spread and extent or size of infestations. Susceptibility evaluations are conducted to identify at-risk landscapes or habitats most vulnerable to invasion (ICBEMP 1997; USDA 2003).

Existing Condition

Invasive weeds pose a serious threat to the diversity, integrity and health of native plant communities on the Clearwater National Forest. The Nez Perce and Coeur d’Alene Indian tribes both have historic and current interests. The management of invasive weeds has significant implications to their cultural and resource values and needs.

The current condition of invasive weeds on the Clearwater National Forest has been influenced by the introduction of invasive species into the area by various methods of transportation, and subsequent establishment particularly after ground disturbances such as timber harvest, prescribed burning and wildland fire events. These types of ground disturbing events have provided favorable conditions for weed establishment by clearing vegetation and/or exposing

mineral soils. In addition, the lack of integration of prevention and early detection in past project development and implementation has facilitated the infestation and spread of invasive weeds.

Currently, all 5th code watersheds contain some level of invasive weed populations on the Clearwater National Forest. New infestations along roads and trails, on national forests system lands and on other land ownerships, are occurring. Expansion in some areas is out-pacing containment and control efforts.

Weed Species

There are numerous species of invasive weeds on the Forest. The Forest, working with CWMA partners, is continually updating the inventory of weed infestations on an annual basis. The Forest has identified the following key weed species.

Table 2. Key Invasive Weed Species

Weed Species	Clearwater NF
Spotted Knapweed	X
Meadow Hawkweed	X
Yellow Toadflax	X
Dalmatian Toadflax	X
Yellow Star Thistle	X
Tansy Ragwort	X
Sulfur Cinquefoil	X
Orange Hawkweed	X
Canada Thistle	X
Scotch Thistle	X
Leafy Spurge	X
Hoary Cress	X
Rush Skeletonweed	X
Diffuse Knapweed	X
Japanese Knotweed	
Dyer's Woad	X

Susceptibility and Risk Assessment

The two primary landscape factors that influence the spread of invasive weeds and plants. They are: 1) *Susceptibility*, and 2) *Risk*. All plant communities are capable of being invaded or colonized but vary in their susceptibility to invasive plants. Invasive plants may disperse and occupy areas within existing plant communities where sunlight, space, water, and nutrient requirements can be met. Invasive plants can be expected to invade those sites or habitats that provide the necessary requirements to meet their life cycle needs and where ground disturbance is a factor.

Habitats or areas that lack the necessary conditions for a given weed species are not considered susceptible to colonization. Risk is determined for the most part by habitat susceptibility, invasive species threat, and the potential of invasive plant seed exposure. The combination of susceptibility and risk help land managers to identify those invasive plants that pose the greatest threat, display areas at greatest risk, and prioritize areas for inventory, treatment and monitoring. In addition, this information can help land managers by integrating weed management into

project planning in order to select projects that address other resource needs with a lower risk of weed invasion.

Susceptibility

Susceptibility refers to the vulnerability of a native plant community to establishment and colonization by invasive plants. The National Forest has environmental conditions similar to landscapes from where invasive plants have originated, and this affects the potential for weed establishment and expansion. Weed guilds can be considered as groups of invasive plants that share common growing requirements and generally colonize and impact similar habitats. Many weeds are capable of growing across a greater range of environmental conditions. Invasive plant species have been grouped into weed guilds based on similar environmental condition needs and where they have the greatest potential to impact the existing plant community. The selection of weed species for these guilds is also based on one or more of the following criteria:

1. The species presents a significant management challenge due to physiological advantages and resistance to control.
2. The species currently exists at relatively low levels, but are significant invasion risks due to their ability to invade undisturbed sites, rates of expansion in other similar areas, and known scientific information.
3. The species have limited biological control agents and lack effective methods for control.
4. The species are not present on the Forests now, but are in close proximity and spreading regionally at high rates.
5. The species are precursors to more pervasive weeds.

The weed guilds and associated invasive weeds are:

Riparian/dry meadow weed guild: Invasive weeds capable of colonizing and impacting riparian or open dry meadow habitats. Weed species in this guild include Japanese knotweed and hoary cress.

Montane weed guild: Invasive weeds capable of colonizing and impacting the composition of open dry/warm forest communities and mountain grasslands. Weed species in this guild include leafy spurge, sulfur cinquefoil, spotted knapweed, meadow hawkweed and dalmatian toadflax.

Dry land weed guild: Invasive weeds capable of colonizing and impacting dry steppe grasslands such as bunchgrass habitat below 4,500 feet in elevation. Weed species in this guild include cheatgrass, Japanese brome, yellow star thistle, diffuse knapweed and dyer's woad.

Disturbance weed guild: Invasive weeds capable of colonizing and impacting across a wide array of habitats but require **disturbed** or **altered** habitats. Weed species in this guild include common tansy; rush skeleton weed, Canada thistle, orange hawkweed yellow toadflax, Russian knapweed and common crupina.

The existence of a weed guild represents the site susceptibility to invasion by the associated weed species. One or more weed guilds could be present in a watershed based on site conditions.

Risk

In 2003, Maria Mantis of The Nature Conservancy of Montana and the Cohesive Strategy Team developed a weed risk assessment process for the Northern Region (Mantis 2003; available at

http://www.fs.fed.us/r1/cohesive_strategy/datafr.htm). This process determined weed risk for each weed species studied. The Mantis process is based on four elements: disturbance, susceptibility, threat, and exposure.

The Clearwater/Nez Perce Invasive Weeds Working Group modified this process so that landscapes are rated for inherent weed risk and used weed guilds rather than individual species. Ratings are a combined score of susceptibility, threat and exposure to determine risk by weed guild. Disturbance became it's own landscape guild based on those weed species that respond most vigorously to disturbances and those landscapes most associated with disturbances.

The number of Forest-wide acres at risk, by weed rating (none, low, moderate and high), is displayed by each of the four weed guilds. The following table displays the number of forest-wide acres at risk by weed guild.

Table 2. Existing weed risk conditions

Weed Guild	None	Low	Moderate	High
Riparian Meadow	1,657,566	118,602	18,710	27,857
Montane	752,316	118,678	489,898	461,791
Dry Land	1,800,240	0	11,796	11,186
Disturbance	1,408,225	11,717	180,558	222,693

See links to weed guild maps in the Appendices.

The Clearwater NF has fewer acres at risk likely because of the wetter climate and denser vegetation that hinders the establishment and spread of weed species with some exceptions. However, invasive plants have spread, primarily along roads and trails, and there is the potential for increases where existing vegetation is removed by fire or other disturbances.

Based on acres treated and acres infested, spotted knapweed and orange and meadow hawkweed are the most common noxious weeds on the Clearwater NF. The greatest weed threat based on susceptible habitat, risk of spread, existing infestations, and difficulty to control comes from the following weed species: rush skeleton weed, and orange and meadow hawkweed. The top treatment priorities of “contain and control efforts” are new invaders, which include tansy ragwort, Mediterranean sage, scotch broom, leafy spurge, yellow toadflax, perennial peavine, perennial pepperweed, musk thistle and diffuse knapweed.

A comparison of the numbers between this assessment and that predicted at the ERU level by the Interior Columbia Basin Ecosystem Management Project (ICBEMP 1997, 2000) indicates that the National Forest has a greater susceptibility to invasion. This indicates a greater magnitude of the invasive weed problem, the significant potential of weed spread and long-term effects to other species. Addressing specific and potentially significant vectors of invasive weed establishment and spread are key to effective weed management.

Vectors of Invasive Weed Establishment and Spread

Vectors are those causal factors that allow for invasive plant establishment and spread. The most common vectors are: *Roads, Recreation Areas and Use, Timber Harvest, Fire, and Animal Grazing.*

Roads

Roads are the most common vector of weed transportation and establishment. Most existing weed infestations are along or have originated from road sides, because motorized vehicle traffic and road maintenance are the largest contributors to invasive plant establishment and expansion. Large highways provide conduits for high volumes of traffic over relatively short periods of time which facilitates for the rapid movement of new invading weed species, or a steady flow of weed seeds into an area that perpetuate existing infestations in spite of treatment efforts.

Recreation Areas and Use

Motorized and non-motorized recreation activities are likely the second most common vector of weed seed transport and establishment. This is due to the difficulties in controlling the vehicle traffic on highways, roads and trails through within Forest boundaries. Frequently, invasive plants become established at trailheads, campgrounds, and other developed recreation sites. River recreation corridors also have a large number of infestations occurring within them.

Timber Harvest and Fire

Ground-disturbing activities are other common sources of invasive plant establishment and spread. Equipment use associated with timber harvest, road construction and maintenance are key ground disturbing activities that can result in weed establishment. Prescribed and wildland fire can expose new areas for weed establishment. Dryer non-forest grasslands and forest types are particularly vulnerable to invasive plant establishment or spread where ground disturbances and/or the opening of forested canopies with fire or mechanical equipment when weed seeds are already present in the area, or are transported in.

Most risks are minimized with preventive measures such as the washing of vehicles, and with localized site restoration and rehabilitation. However, equipment use associated with initial wildland fire suppression efforts can transport weed seeds until preventive measures are in place.

Animal Grazing

Invasive weed spread also occurs with the transport of weed seeds by domestic livestock and wildlife from infested areas. Seeds can be spread after attachment to hides and hooves, and through animal feces. Weed seeds can pass through an animals' digestive system and still retain the ability to germinate. This can be a key factor in non-forested grasslands and dry forest types where conditions are more conducive for some weed species to invade.

However, by using selective grazing domestic livestock has proven to be an effective method of managing invasive plant infestations. In addition, some weed species have invaded ungrazed grasslands and shrublands. Weed species such as leafy spurge, spotted knapweed, diffuse knapweed, and rush skeleton weed have effectively invaded sites that were ungrazed by domestic livestock.

Invasive Weed Management

Two conservation themes define invasive weed management: Conserve and Restore.

Conserve watersheds are those with no weeds or low weed populations. The emphasis is the early detection and rapid treatment to prevent the establishment and spread of newly discovered invaders.

Restore areas are those with well-established weed infestations. These areas have either a “Contain and Control” or Restoration and Rehabilitation” emphasis. They are prioritized as high, moderate or low based on the presence of new invaders and the long-term treatment needs of well-established weed infestations.

Conserve and Restore watersheds are identified based on the current weed status, susceptibility and risk of weed infestations, existing and emerging invader weed species, and ecological and social-economic importance.

Conserve and Restore designations and mapping allows for the planning of weed management actions. Actions are based on achieving the following desired conditions.

1. No weed or low weed populations occur in conserve watersheds.
2. High-priority restore watersheds are moved towards the conserve status.
3. Moderate-priority watersheds move towards an improved condition by reducing weed densities by 50 % or more where weeds are firmly established.
4. Low-priority restore watersheds are surveyed to determine the extent of the current infestations, and the spread of weed seeds are minimized.
5. Weed management is integrated into project design, development and implementation.

Other desired conditions are.

1. Restore representative and resilient native or desired non-native vegetation in areas infested by invasive weeds.
2. The introduction, establishment, spread and impact of invasive weeds are reduced, minimized or eliminated.
3. Native and desired non-native plant communities are healthy and self-sustaining with invasive weeds being a minor component.
4. Weed control efforts are prioritized according to the potential to contain, control or eradicate weed infestations.

Invasive Weed Treatment Prioritization

Within conserve and restore areas weed treatments are prioritized. Four treatment strategies (S1–S4) were developed to prioritize the management of invasive weeds at the landscape level. These strategies complement the existing management priorities (Clearwater Basin CWMA 2002; Palouse CWMA 2002) in current CWMA’s by providing a measurable and time-bound frame of reference.

1. S1 treatments emphasize the prevention and removal of newly discovered weed invaders.
2. S2 treatments emphasize the rapid response and removal of new invader weeds in 1-5 years.
3. S3 treatments emphasize the containment, control and reduction of current weed infestations within 15 years.
4. S4 treatments focus on long term and high investment efforts beyond 15 years.

Conserve watersheds only use a S1 strategy, whereas Restore watersheds use S1 through S4 treatment strategies. The following existing priorities still apply.

1. Prevent the establishment of potential invaders

2. Eradicate new invaders.
3. Eradicate new outbreaks (satellites) of established invasive plants or noxious weeds in susceptible habitat.
4. Control noxious weeds or invasive plants along transportation corridors and areas of concentrated activities, such as roads, trails, campgrounds, trailheads parking lots and gravel pits.
5. Control established noxious weeds and invasive plants in susceptible habitat.
6. Contain established noxious weeds and invasive plants.
7. Reduce the density or slow the spread of widespread established invaders

Conclusions

The Clearwater/Nez Perce Planning Zone has identified a strategic landscape-based approach to identifying conserve and restore watersheds and prioritizing those watersheds for weed treatments during the next Forest Plan cycle.

In order to successfully implement this strategy it would need to be integrated into the existing Cooperative Weed Management Area (CWMA) management programs, with county, federal, state agencies, and private groups and are reflected in updates to the Palouse and Clearwater River Basin CWMA management plans.

The development of a coordinated monitoring strategy with key partners would provide a basis for resource managers and decision-makers to direct limited resources to priority data collection needs and address weed treatment needs proactively. The implementation of plan components for invasive weeds could be monitored through the Environmental Management System at the Forest and Regional levels.

References

Clearwater Basin Cooperative Weed Management Area (CWMA). 2002. A Strategy For Invasive Plant Management in the Clearwater River Basin. Unpubl. Report. USDA-Forest Service, Clearwater and Nez Perce National Forests.

Executive Order 13112. Invasive Species. President William J. Clinton. February 3, 1999.

FSM 2000 – National Forest Resource Management. Noxious Weeds. Forest Service Manual: Series 2000. Amendment No. 2000-95-5. November 29, 1995. Washington D.C.

FSM 2000 – National Forest Resource Management. Zero Code 2080 – Noxious Weed Management. R1 Supplement No. R1-2000-2002-1. May 14, 2001. Kathy McAllister, Acting Regional Forester.

Interior Columbia River Basin Ecosystem Management Project (ICBEMP). 1997. Volume II: An Assessment of Ecosystem Components in the Interior Columbia Basin and Portions of the Klamath and Great Basins. Pgs. 407-448. Gen. Tech. Rep. PNW-GTR-405. Portland, OR. U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. (Quigley, Thomas M., tech ed.; Interior Columbia Basin Ecosystem Management Project: scientific assessment).

Interior Columbia River Basin Ecosystem Management Project (ICBEMP). 2000. Interior Columbia Basin Supplemental Draft Environmental Impact Statement. Volume 1. Pages 242-251. Interior Columbia River Basin Ecosystem Management Project. Walla Walla, WA and Boise, Idaho.

Mantis, Maria. 2003. *Evaluating Risk to Native Plant communities from Selected Exotic Species*. The Nature Conservancy of Montana, and U.S. Forest Service Cohesive Strategy Team, Kalispell, Montana. Available on the web at http://www.fs.fed.us/r1/cohesive_strategy/dadafr.htm

Palouse Cooperative Weed Management Area (CWMA). 2002. Long Range Strategy for Integrated Weed Management. Unpubl. Report. USDA-Forest Service, Clearwater National Forest.

USDA. 2004. National Strategy and Implementation Plan for Invasive Species Management. FS-805. USDA- Forest Service, Washington, D.C.

USDA. 2003. Vol. 3. Southwest Idaho Ecogroup Land and Resource Management Plans. Final Environmental Impact Statement (FEIS). Chapter 3. Affected Environment and Environmental Consequences.

Key Contacts

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Leonard Lake. U.S. Forest Service. Nez Perce National Forest. Personal communications with Alan Dohmen. 2004/2005/2006, and Weeds Working Group Team member.

Lynn Danly. USDI Bureau of Land Management. Cottonwood, Idaho. Personal communications with Alan Dohmen. 2004, and Weeds Working Group Team member.

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Appendices

Appendix A: Hotlinks to existing weed risk maps.

1. [Riparian Meadow](#) –
2. [Montane](#) –
3. [Dry Land](#) –
4. [Disturbance](#) –