

**Noxious Weed Survey
Final Report for
Energy Northwest's Packwood Lake
Hydroelectric Project
FERC No. 2244
Lewis County, Washington**

Submitted to



**P.O. Box 968
Richland, Washington 99352-0968**

**Submitted by
Beck Botanical Services**

**Kathryn Beck
Bellingham, Washington 98225
360.671.6913 phone**

January 2007

TABLE OF CONTENTS

Section	Title	Page
1.0	INTRODUCTION	1
1.1	Study Area.....	1
2.0	STUDY GOALS AND OBJECTIVES.....	3
3.0	METHODS	3
3.1	Pre-field Review	3
3.2	Field Surveys	4
3.3	Documentation of Results	4
4.0	RESULTS	5
4.1	Class B Designate Weeds.....	7
4.2	Class B Select Weed.....	7
4.3	Class C Select Weed.....	8
4.4	Other Class B and Class C Weeds.....	8
4.4.1	Class B Noxious Weeds	8
4.4.2	Class C Noxious Weeds	9
5.0	DISCUSSION AND RECOMMENDATIONS.....	10
6.0	LITERATURE CITED	11

LIST OF FIGURES

Figure	Title	Page
1-1	Study Area Map	2
4-1	Class B designate, Class B select, and Class C select weed species populations located in the Packwood Lake study area, 2005-2006	6

LIST OF TABLES

Table	Title	Page
4-1	Noxious weed species observed in the Packwood Lake Study Area, 2005 – 2006.....	5

APPENDICES

Appendix A - Lewis County Noxious Weeds Lists, 2006

Appendix B – Invasive Plant Inventory Forms for Class B designate, Class B select and Class C select weed populations located in the Packwood Lake study area, 2005 – 2006

1.0 INTRODUCTION

Energy Northwest operates the Packwood Lake Hydroelectric Project (Project) near the town of Packwood in Lewis County, Washington. The Project, FERC No. 2244, received its initial license in 1960. On November 12, 2004 Energy Northwest filed a Notice of Intent (NOI) to file an application for a new license to operate the hydroelectric project. Energy Northwest also concurrently filed with the Federal Energy Regulatory Commission (FERC) and the resource agencies and tribes, a Pre-Application Document (PAD), containing existing, relevant and reasonably available information describing the existing environment and the potential effects of Project facilities and operations. Studies of the location, distribution, and abundance of noxious weeds in the Project area were requested to supplement information contained in the PAD (WDFW 2005, USDA Forest Service 2005). Energy Northwest, in consultation with tribes and agencies developed a study plan to survey for noxious weeds in the Project area. This draft report presents results of the survey.

The majority of the Project is located within the Gifford Pinchot National Forest and consists of an intake canal, a concrete drop structure (dam) and intake building on Lake Creek located about 424 feet downstream from the outlet of Packwood Lake, a 21,691-foot system of concrete pipe and tunnels, a 5,621-foot penstock, a surge tank, and powerhouse with a 26,125 kW turbine generator. The source of water for the Project, Packwood Lake, that is situated at an elevation of approximately 2,857 feet above mean sea level (MSL), about 1,800 feet above the powerhouse. Water discharged from the Project is released to the Cowlitz River via a tailrace channel. Power from the Project is delivered over an 8,009-foot 69 kV transmission line to the Packwood substation.

1.1 Study Area

For purposes of the Packwood Lake noxious weed survey, the study area is defined as including: the Project boundary and 100 feet on each side of the Project boundary, including Project facilities, pipeline, penstock corridor, tailrace, transmission line, Pipeline Road (FSR 1260-066), and FSR 1260 from the surge tank to the junction with FSR 1260-066, Trail #74, Latch Road (FSR 1262); a 200-foot-wide margin around the perimeter of Packwood Lake (elevation 2860 ft MSL); the mouths of all Forest Service type 1, 2, and 3 streams (Osprey Creek, Trap Creek, Baker Creek, Crawford Creek, Upper Lake Creek) that have a defined channel from the point where they enter Packwood Lake, upstream as far as weed species are present; and where noxious weeds are present in populations outside the study area that are considered contiguous to populations inside the study area. The survey included wetland and riparian sites. Lower Lake Creek below the drop structure was surveyed in riparian areas (stream buffer) with the exception of inaccessible safety areas. Two landslide areas (from 1995 and 2000) near the pipeline were included in the survey. See Figure 1-1 for a map showing the Packwood Lake noxious weed study area.

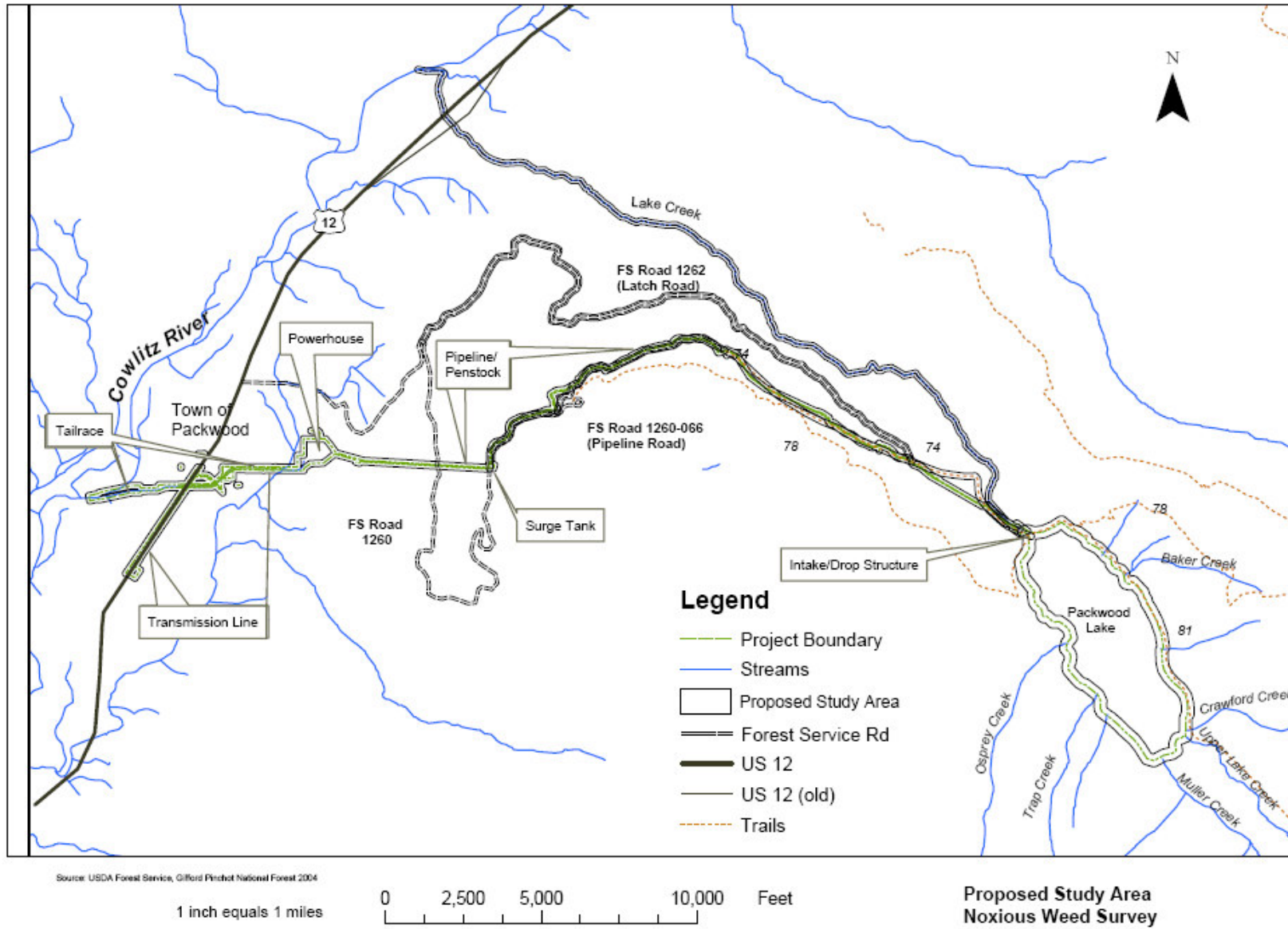


Figure 1-1 Study Area Map

2.0 STUDY GOALS AND OBJECTIVES

The noxious weed survey of the Packwood Lake Hydroelectric Project determined the location, distribution and abundance of noxious weed infestations in the Project area, and infestations spreading from the Project to adjacent lands. It assesses their effects on native plant diversity and habitat quality, and provides a baseline of information for future surveys. For the survey, the term “noxious weed” includes species listed as noxious by the Lewis County Noxious Weed Control Board (LCWCB) and any additional species the Gifford Pinchot National Forest may be tracking as noxious weeds. Noxious weeds listed Class A, Class B designate, Class B select, and Class C select were the target species for the survey because the LCWCB requires control and or management measures to be taken for these categories. The work was conducted in consultation with the Gifford Pinchot National Forest, LCWCB, Washington Department of Fish and Wildlife (WDFW), U.S. Fish and Wildlife Service (USFWS), and concerned tribes.

3.0 METHODS

The goals of the noxious weed survey in the Packwood Lake study area (see Figure 1-1) are to identify noxious weed species, and their distribution and abundance in the study area. The noxious weed inventory consists of a pre-field review, field surveys and herbarium research if deemed necessary, and documentation of results. The following sections discuss each survey task.

Kathryn Beck is a botanist with 24 years of fieldwork in Washington, Oregon, Idaho, Alaska, and California. Ms. Beck has designed and participated in a diversity of vegetation analysis and natural resources planning projects, and provides botanical consulting and expertise in the following fields: RTE plant surveys, vegetation mapping, and natural resources planning. She is familiar with numerous RTE plant species throughout the Pacific Northwest, their phenology, and habitat requirements. Ms. Beck has over ten years of experience in hydroelectric project licensing and land management assessments. Ms. Beck was involved in locating, describing, and publishing three plant taxa new to science. She has a B.S. in Environmental Sciences and a B.A. in Biology from Western Washington University.

3.1 Pre-field Review

Existing information on noxious weeds and botanical resources generally in and near the Packwood Lake Project area is limited. No known dedicated noxious weed surveys had been conducted in Forest Service-owned portions of the study area. In 2004, a limited noxious weed survey was done along the Project tailrace and stilling basin, and along Lake Creek from its confluence with the Cowlitz River upstream to the Forest Service property boundary (Malkin 2004). The current noxious weed survey focused on plant species listed by the LCWCB as Class A, Class B designate, Class B select and Class C select. These categories constitute the target species for the survey. In addition, the general vicinity of other Class B and C noxious weeds is noted. Appendix A contains the LCWCB noxious weed list (LCWCB 2006).

Class A weeds are non-native species with a limited distribution in the state. Eradication of all Class A weeds is required by state law.

Class B weeds are established in some regions of Washington, but are of limited distribution or not present in other regions of the state. Because of differences in distribution, treatment of Class B weeds varies between regions of the state. Class B designate weed species are designated for control in regions where they are not yet widespread. Class B select weed species are those for which there is mandatory control in selected areas in Lewis County.

Class C weeds are non-native species that are already widely distributed in Washington or are of special interest to the state's agricultural industry. Placement on the state Class C noxious weed list allows counties to enforce control if locally desired. Class C select weed species are those for which there is mandatory control in selected areas in Lewis County.

3.2 Field Surveys

The noxious weed survey of the Packwood Lake study area was performed using commonly accepted botanical survey methods to systematically locate and identify noxious weed infestations. Survey methods are straightforward, and involve visually searching the study area for the presence of noxious weeds. Timing of field surveys is based on flowering times and identifiability of potential weed species. The noxious weed survey was done concurrently with the rare plant survey.

The entire study area is searched as noxious weed species are potentially present in many of the habitat types that comprise the Packwood Lake study area, although most noxious weed infestations are typically associated with areas that have had prior disturbance. Where feasible, a GPS unit is used to aid in mapping. The majority of plants were identified in the field using the Flora of the Pacific Northwest (Hitchcock and Cronquist 1973).

3.3 Documentation of Results

Products of the Packwood Lake noxious weed survey include documentation of target weed species, including Class A, Class B designate, Class B select and Class C select noxious weeds. USDA Forest Service Invasive Plant Inventory Forms are completed for noxious weed infestations located on Forest Service land. The form includes site information, such as population size, area, habitat, disturbance, and associated species. Invasive Plant Inventory Forms are accompanied by USGS maps with noxious weed infestations mapped on them. Noxious weed infestations located on non-Forest Service lands are mapped with area and dominance ratings (given below), and other site information. The presence of Class B and C noxious weeds is noted. These documents will be provided separately to the Forest Service, the LCWCB, Federal Energy Regulatory Commission, WDFW, and other agencies as appropriate.

Dominance ratings – Is a measure of plant density of the target noxious weed within the surrounding plant community. It is an estimate based on a 0 (zero) to 5 scale where:

0 = not present

1 = target species is present, but not obvious in the surrounding plant community.

2 = target species is present, but not obvious. On a close examination multiple plants are present.

3 = target species is present and obvious in the surrounding plant community. The target species is not an obvious dominant within the plant community.

4 = target species is present and obvious in the surrounding plant community. The target species is a co-dominant in the plant community.

5 = target species is present and dominates the surrounding plant community.

4.0 RESULTS

Infestations of Class A, Class B designate weeds, Class B select weeds, and Class C select weeds were the target species for this survey because the LCWCB requires control and or management measures to be taken for these categories.

A total of seventeen noxious weed species were located in the Packwood Lake study area (Table 4-1). No Class A noxious weeds were located. General information on each of the target species, i.e., Class B designate, Class B select and Class C select weed species, located in the study area is provided below (Figure 4-1). Meadow knapweed (*Centaurea jacea x nigra*) was the only noxious weed found on Forest Service land. Observations of Class B (non-designate) and Class C weeds are given for a more complete picture of the presence of noxious weed species in the study area. More information can be found on all noxious weed species at the Washington Noxious Weed Control Board website: <http://www.nwcb.wa.gov/>.

Table 4-1. Noxious weed species observed in the Packwood Lake Study Area, 2005 – 2006.

Common Name	Scientific Name	Class *
Butterfly bush	Buddleja davidii	C select
Diffuse knapweed	Centaurea diffusa	B designate
Meadow knapweed	Centaurea jacea x nigra (moncktonii)	B designate
Canada thistle	Cirsium arvense	C
Bull thistle	Cirsium vulgare	C
Scotch broom	Cytisus scoparius	B non-select
Wild carrot	Daucus carota	B
Herb Robert	Geranium robertianum	B
Common St. John's-wort	Hypericum perforatum	C
Common catsear	Hypochaeris radicata	B
Oxeye daisy	Leucanthemum vulgare	B
Reed canary-grass	Phalaris arundinacea	C
Japanese knotweed	Polygonum cuspidatum	B select
Sulfur cinquefoil	Potentilla recta	B non-select
Tansy ragwort	Senecio jacobaea	B non-select
Common groundsel	Senecio vulgaris	C
Common tansy	Tanacetum vulgare	C
* Refer to text for noxious weed Class definitions.		

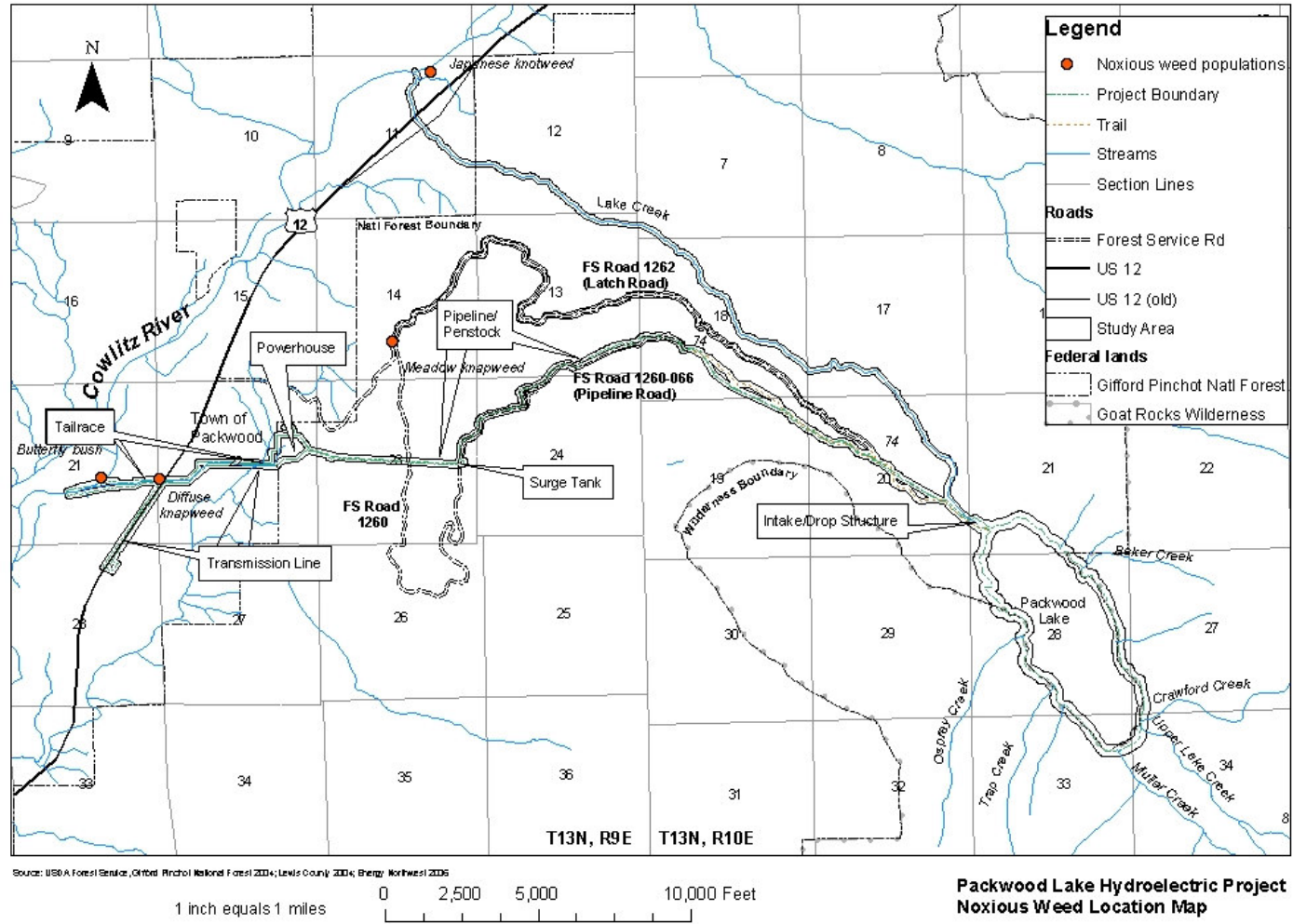


Figure 4-1 Class B designate, Class B select and Class C select weed species populations located in the Packwood Lake study area, 2005-2006

4.1 Class B Designate Weeds

Diffuse knapweed (*Centaurea diffusa*) is an aggressive biennial or short-lived perennial in the sunflower family with a long taproot and generally white, to sometimes pink to lavender flowers (NWCB 2006). It spreads primarily by seed. It is capable of forming dense colonies in a variety of disturbed habitats including roadsides, sandy or gravelly ground, sandy river shores, vacant lots, trails, and gravel pits. It is not tolerant of flooding or shade (NWCB 2006).

In the study area, a small population of diffuse knapweed was located on private land along the tailrace west of Highway 12. Approximately ten to 15 scattered plants were observed between the gravel road and the fence along the tailrace. Its roadside habitat is disturbed and plant associates include many other non-native species. In the late-1990's, a very dense population of diffuse knapweed along the tailrace was treated with herbicides and largely eliminated (R. Crawford Energy Northwest personal communication). The tailrace knapweed population is near the Lewis County-owned solid waste and transfer station where there is a large known population of diffuse knapweed (B. Wamsley LCWCB personal communication). This larger population may act as a local seed source for surrounding areas. The LCWCB has been treating plants at that site on an on-going basis. Diffuse knapweed can be controlled by hand pulling, herbicides, and biocontrol methods.

Meadow knapweed (*Centaurea jacea* x *nigra*) is a perennial plant in the sunflower family, which grows from a woody root crown. It spreads primarily by seed. It blooms from July to September producing rose-purple flowers and eventually ivory-white to light brown seeds (NWCB 2006). Meadow knapweed is a self-proliferating cross between two other knapweed species: brown knapweed (*Centaurea jacea*) and black knapweed (*Centaurea nigra*). A recent treatment of *Centaurea* species in the Flora of North America refers to it as *C. x moncktonii* (Barkley et al. 2006) In some references, it is known as *Centaurea pratensis*, although this is not considered a legitimate name.

There is a large, previously known population of meadow knapweed on Forest Service land along FSR 1260 in the vicinity of FSR 1262 that the Forest Service and the LCWCB have treated by hand pulling in the last few years (B. Wamsley LCWCB personal communication). It is also present on the roadside of the first tenth of a mile of FSR 1262 (Latch Road). The plants growing along FSR 1262 (Latch Road) are only portion of this population that is in the study area. Although co-dominant with other species along roadsides, it has not invaded adjacent forested areas. Meadow knapweed can be controlled by hand pulling, herbicides and biocontrol methods.

4.2 Class B Select Weed

Japanese knotweed (*Polygonum cuspidatum*) is a perennial species with spreading rhizomes and numerous reddish-brown freely branched stems that can reach eight feet in height. The species forms dense stands that crowd out all other vegetation, degrading native plant and animal habitat (NWCB 2006). Its habitat includes waste places, roadsides and along streambanks (NWCB 2006).

Near the study area, a small population of Japanese knotweed was observed on private land along a forested, muddy side channel on the Cowlitz River approximately 100 feet upstream of Lake Creek. It is a previously known population that the LCWCB has been treating for several years with glyphosate (B. Wamsley LCWCB personal communication). At the time of the observation, it had six non-reproductive stems, which were approximately 1.5 feet tall. In addition, there were several clumps of plants at the gravelly area at the Lewis County-owned and operated solid waste and transfer station near the tailrace that have been successfully treated and eliminated (B. Wamsley LCWCB personal communication). Japanese knotweed is most effectively controlled by herbicide application (NWCB 2006).

4.3 Class C Select Weed

Butterfly bush (*Buddleja davidii*) Butterfly bush is a deciduous shrub with opposite leaves that can reach 15 feet in height. It is superficially similar looking to ornamental lilacs in that it has showy spikes of purple flowers. It is often planted in yards and gardens as an ornamental, but then colonizes disturbed areas, including roadsides, pastures, riverbanks, and recently logged forests (NWCB 2006). It can form dense thickets, especially along riparian areas and gravel bars that crowd out native vegetation and may alter soil nutrient concentrations. It can reproduce by seed or vegetatively as cut stems can sprout roots and grow into new plants (NWCB 2006). The LCNWCP has a policy of requiring control of plants obviously escaped from cultivation as opposed to plants that are ornamental yard plantings (B. Wamsley LCWCB personal communication).

Several butterfly bush plants (2 to 3 individuals) were located on private land near where the tailrace enters the Cowlitz River. It was growing in semi-stabilized cobbles and gravels. The plants looked as though they might have originally have been plant fragments that washed downriver during a flood event and then took root. When not blooming, butterfly bush is difficult to spot amongst willows and other riverine vegetation. Butterfly bush can be controlled by herbicides and mechanical methods.

4.4 Other Class B and Class C Weeds

Class B weeds are established in some regions of Washington, but are of limited distribution or not present in other regions of the state. In regions where Class B weeds are already abundant control is decided at the local level. Class C weeds are non-native species that are already widely distributed in Washington or are of special interest to the state's agricultural industry. Placement on the state Class C noxious weed list allows counties to enforce control if locally desired.

4.4.1 Class B Noxious Weeds

Scotch broom (*Cytisus scoparius*) is a common and widespread shrubby weed in the general Packwood area. In the study area, it ranges from common to uncommon along: Latch Road (FSR 1262), Pipeline Road (FSR 1260-066), penstock, tailrace, powerhouse, Cowlitz River gravel bar, Lake Creek/Cowlitz River confluence, and Trail 78 parking lot. Although not required, Energy Northwest has done some control of Scotch broom along the tailrace over the

last few years (R. Crawford Energy Northwest personal communication). Although common in disturbed areas, it was not observed growing in undisturbed forested areas.

Wild carrot (*Daucus carota*) is common on roadsides and other disturbed areas in the study area, including the Latch Road (FSR 1262), Lake Creek/Cowlitz River confluence, and the tailrace. Although common in disturbed areas, it was not observed growing in undisturbed forested areas.

Herb Robert (*Geranium robertianum*) is a mesic upland annual to short-lived perennial species with pink flowers. It is common to co-dominant along all of Lake Creek from Packwood Lake down to its confluence with the Cowlitz River. The lower one-mile reach of Lake Creek has a particularly high density of plants, sometimes almost entirely replacing other herbaceous plant species. Scattered plants were observed along the penstock upslope of the powerhouse and on the Cowlitz River gravel bar near the tailrace slough. Unlike many weed species, herb Robert readily invades undisturbed habitats including forests.

Common catsear (*Hypochaeris radicata*) is common along roadsides and other disturbed areas in the study area, including the penstock, Latch Road, Lake Creek/Cowlitz River confluence, Trail 78 parking lot, tailrace, tailrace/Cowlitz River confluence, and FSR 1260-066. Although common in disturbed areas, it was not observed growing in undisturbed forested areas.

Oxeye daisy (*Leucanthemum vulgare*) is common along roadsides and other disturbed areas in the study area, including the Latch Road, penstock, Lake Creek, Trail 78 parking lot, and FSR 1260-066. Although common in disturbed areas, it was not observed growing in undisturbed forested areas.

Sulfur cinquefoil (*Potentilla recta*) An infestation of sulfur cinquefoil was observed growing west of Highway 12 along the tailrace on disturbed ground.

Tansy ragwort (*Senecio jacobaea*) Small patches of plants were observed along the Latch Road (FSR 1262), the junction with FSR 1260, FSR 1260-066, and the occasionally at the lakeshore area.

4.4.2 Class C Noxious Weeds

Canada thistle (*Cirsium arvense*) is a common and aggressive weed in moist, disturbed areas where it forms large rhizomatous patches. In the study area, a large patch was observed on the shore of the southeast end of Packwood Lake in the vicinity of Upper Lake Creek. Other large patches of Canada thistle were observed in moist areas in and around the Packwood Lake powerplant, Snyder Creek and Hall Creek. Smaller patches were observed along the Latch Road, Lake Creek/Cowlitz River confluence, and the shores of Packwood Lake. Although not required, there has been some effort on the part of Energy Northwest to control Canada thistle populations in the vicinity of the powerplant in the past (R. Crawford Energy Northwest personal communication).

Bull thistle (*Cirsium vulgare*) is occasional along roadsides and other disturbed areas, including the Latch Road, Lake Creek/Cowlitz River confluence, FSR 1260-066, and the lakeshore area. It was not observed growing in undisturbed forested areas.

Common St. John's-wort (*Hypericum perforatum*) is common along roadsides and other disturbed areas, including the Latch Road, penstock, tailrace, Cowlitz River gravel bar, FSR 1260-066, and the lakeshore area. Although common in disturbed areas, it was not observed growing in undisturbed forested areas.

Reed canary-grass (*Phalaris arundinacea*) forms dense swards in moist, often disturbed areas such as at the Hall Creek wetland, Snyder Creek and in moist areas around the Packwood Lake powerhouse. There were scattered small patches of reed canary-grass along the shores of Packwood Lake.

Common groundsel (*Senecio vulgaris*) is uncommon in disturbed areas in the study area, with small groups of plants at the powerhouse, FSR 1260-066, and at Packwood Lake.

Common tansy (*Tanacetum vulgare*) is occasional in disturbed areas in the study area. A few small patches of plants were observed at the tailrace.

5.0 DISCUSSION AND RECOMMENDATIONS

Energy Northwest has a Noxious Weed Control Plan in place, which establishes responsibilities and requirements for the control of noxious weed infestations at the Packwood Lake Hydroelectric Project (Energy Northwest 2006). The Noxious Weed Control Plan directs that the Packwood Project Manager shall have overall responsibility for ensuring that Packwood has a noxious weed control program that complies with local, state and federal regulations for control of noxious weeds. Through the plan, Energy Northwest has an on-going commitment to evaluate and develop alternatives for the management and control of noxious weed infestations in the Project area. The overall goal of the plan is to restrict, eliminate and prevent infestations of noxious weeds. The Plan directs that the Packwood staff identify noxious weeds within the Project boundary and take appropriate control measures for them. It would be useful for the Energy Northwest staff at Packwood Lake to have additional training that would familiarize them with existing and likely potential noxious weed species.

During the Packwood Lake noxious weed survey, infestations of two Class B designates, and one infestation each of a Class B select and a Class C select weed were located at the study area, which extended beyond the Project boundary. Control or management measures for these target noxious weed species, therefore, would be the responsibility of Energy Northwest, the Forest Service, LCWCB, and/or other property owners. There have been on-going control efforts by the Forest Service at the meadow knapweed population on FSR 1260. This meadow knapweed infestation is the only one known in the area, and does not appear to be spreading significantly (B. Wamsley LCWCB personal communication). The diffuse knapweed population along the tailrace is small and could probably be easily controlled or eliminated with prompt attention by Energy Northwest. Neither population of knapweeds was observed to be growing in undisturbed

plant communities including forests, nor did they show signs of spreading from Project areas to adjacent non-Project areas.

Small infestations of Japanese knotweed and butterfly bush were present in the study area in the Cowlitz River riparian area. Both species can reproduce vegetatively by resprouting from root and stem fragments, which can fall into rivers and streams and create new infestations downstream (NWCB 2006). There have been on-going control efforts at the Japanese knotweed patch by the LCWCB, which explains why stems are short and non-reproductive. Prompt control efforts of the butterfly bush population by Energy Northwest could potentially control or eliminate this small population.

Although not currently present in the study area, populations of Lewis County Class B designate weed species spotted knapweed (*Centaurea biebersteinii*) and Dalmatian toadflax (*Linaria dalmatica* ssp. *dalmatica*) have been treated and eliminated from the area inside the fence along the tailrace canal (B. Wamsley LCWCB personal communication).

Although a number of populations of Class B and Class C noxious weeds were observed in the study area, most were restricted to areas directly influenced by right-of-way maintenance and Project operations, including roadsides, the tailrace, the penstock, the pipeline, the powerhouse, the transmission line and the surge tank. These weeds were largely absent from adjacent forested areas, which are dominated almost entirely by native plant species. Although not required by the LCNWCP, Energy Northwest's Noxious Weed Control program has provided some control of some of these noxious weeds.

It does not appear that Project-related water level fluctuations at Packwood Lake has encouraged the proliferation of noxious weeds on the shore. Most of the Packwood Lake shore is steep and rocky with only a narrow band of habitat capable of supporting vegetation. With the exception of small, isolated patches of reed canary-grass and Canada thistle, noxious weed populations on the lakeshore are limited. No aquatic weeds were observed in the lake.

By the very nature of the activities related to operating and maintaining the Project, noxious weed infestations could be introduced and spread. Because some noxious weeds are capable of spreading very quickly and aggressively, prompt action needs to be taken to prevent their spread. Packwood staff should continue to take control actions when a noxious weed species has been identified, and should coordinate with the LCWCB to survey periodically for new infestations of target weed species. In Forest Service areas, Energy Northwest will utilize the weed prevention and treatment standards of the Invasive Plant FEIS. Native plants will be used to revegetate disturbed areas.

6.0 LITERATURE CITED

Barkley, T.M., L. Brouillet, J.L. Strother. 2006. *Centaurea*. In: Flora of North America Editorial Committee, eds. 1993+. Flora of North America North of Mexico. 12+ vols. New York and Oxford. Vol. 19, 20, 21, pp. 184 - 188.

- Crawford, Randy. Energy Northwest. Telephone conversation with K. Beck, botanist, Beck Botanical Services, September 5, 2006.
- Hitchcock, C.L. and A. Cronquist. 1973. Flora of the Pacific Northwest. University of Washington Press. Seattle, Washington.
- Energy Northwest. 2004. Packwood Lake Hydroelectric Project. FERC Project No. 2244. Pre-Application Document. Supplement No. 1. December 6, 2004.
- Energy Northwest. 2006. Packwood Lake Hydroelectric Project Noxious Weed Control. Revision 1.
- Lewis County Noxious Weed Control Board (LCWCB). 2006. 2006 Noxious Weed List Lewis County, WA. Accessed August 2006. Available at URL:
<https://fortress.wa.gov/lewisco/home/DesktopDefault.aspx?tabid=233>
- Malkin, D. 2004. Memorandum from D. Malkin, Devine, Tarbell & Associated, Inc. to Kent Doughty, EES Consulting. Packwood Lake Project Aquatic/Emergent Weed Survey. September 24, 2004.
- NWCB (Washington Noxious Weed Control Board). 2006. Available at URL:
<http://www.nwcb.wa.gov/> (accessed August 2006)
- USDA Forest Service. 2005. Comments on PAD and Scoping Document 1 and Study Requests. Packwood Lake Project Number 2244-012. March 11, 2005.
- Wamsley, Bill, Lewis County Noxious Weed Board Coordinator. Telephone conversation with K. Beck, botanist, Beck Botanical Services, August 2006.
- Washington Department of Fish and Wildlife. 2005. Comments on PAD, Study Requests, Comments on Scoping Document 1. Packwood Lake Hydroelectric Project FERC No. 2244-1012. March 9, 2005.

APPENDIX A

Lewis County Noxious Weeds Lists, 2006

Class A Noxious Weeds, Lewis County

Common name	Scientific name
Bighead knapweed	<i>Centaurea macrocephala</i>
Buffalobur	<i>Solanum rostratum</i>
Clary sage	<i>Salvia sclarea</i>
Common crupina	<i>Crupina vulgaris</i>
Cordgrass	<i>Spartina densiflora</i>
Dyers woad	<i>Isatis tinctoria</i>
Eggleaf spurge	<i>Euphorbia oblongata</i>
Garlic mustard	<i>Alliaria petiolata</i>
Giant hogweed	<i>Heracleum mantegazzianum</i>
Goatsrue	<i>Galega officinalis</i>
Hydrilla	<i>Hydrilla verticillata</i>
Italian thistle	<i>Carduus pycnocephalus</i>
Johnsongrass	<i>Sorghum halepense</i>
Kudzu	<i>Pueraria montana var. lobata</i>
Lawnweed	<i>Soliva sessilis</i>
Meadow clary	<i>Salvia pratensis</i>
Mediterranean sage	<i>Salvia aethiopsis</i>
Milk thistle	<i>Silybum marianum</i>
Purple starthistle	<i>Centaurea calcitrapa</i>
Salt meadow cordgrass	<i>Spartina patens</i>
Silverleaf nightshade	<i>Solanum elaeagnifolium</i>
Slenderflower thistle	<i>Carduus tenuiflorus</i>
Spanish broom	<i>Spartium junceum</i>
Spurge flax	<i>Thymelaea passerina</i>
Syrian bean-caper	<i>Helianthus ciliaris</i>
Texas blueweed	<i>Zygophyllum fabago</i>
Velvetleaf	<i>Abutilon theophrasti</i>
Vochin knapweed	<i>Centaurea nigrescens</i>
Wild four o'clock	<i>Mirabilis nyctaginea</i>
Yellow devil hawkweed	<i>Hieracium floribundum</i>

APPENDIX A (CONTINUED)

Class B Noxious Weeds, Lewis County--Select

Common name	Scientific name
Bohemian knotweed**	<i>Polygonum Bohemicum</i>
Giant knotweed**	<i>Polygonum sachalinense</i>
Japanese knotweed**	<i>Polygonum cuspidatum</i>
Myrtle spurge	<i>Euphorbia myrsinites</i>
Scotch broom**	<i>Cytisus scoparius</i>
Tansy ragwort**	<i>Senecio jacobaea</i>

**Mandatory control in selected areas of Lewis County.

Class B Designates Region 8 Lewis County

Common name	Scientific name
Annual bugloss	<i>Anchusa arvensis</i>
Austrian fieldcress	<i>Rorippa austriaca</i>
Black knapweed	<i>Centaurea nigra</i>
Blackgrass	<i>Alopecurus myosuroides</i>
Blueweed	<i>Echium vulgare</i>
Brazilian elodea	<i>Egeria densa</i>
Brown knapweed	<i>Centaurea jacea</i>
Camelthorn	<i>Alhagi maurorum</i>
Common bugloss	<i>Anchusa officinalis</i>
Common cordgrass	<i>Spartina anglica</i>
Dalmatian toadflax	<i>Linaria dalmatica ssp. dalmatica</i>
Diffuse knapweed	<i>Centaurea diffusa</i>
Eurasian watermilfoil	<i>Myriophyllum spicatum</i>
Fanwort	<i>Cabomba caroliniana</i>
Garden loosestrife	<i>Lysimachia vulgaris</i>
Gorse	<i>Ulex europaeus</i>
Grass-leaved arrowhead	<i>Sagittaria graminea</i>
Hawkweed oxtongue	<i>Picris hieracioides</i>
Hedgeparsley	<i>Torilis arvensis</i>
Himalayan knotweed	<i>Polygonum polystachyum</i>
Hoary alyssum	<i>Berteroa incana</i>
Indigobush	<i>Amorpha fruticosa</i>
Leafy spurge	<i>Euphorbia esula</i>
Lepyrodiclis	<i>Lepyrodiclis holosteoides</i>
Longspine sandbur	<i>Cenchrus longispinus</i>
Meadow knapweed	<i>Centaurea jacea x nigra (moncktonii)</i>
Mouseear hawkweed	<i>Hieracium pillosella</i>

APPENDIX A (CONTINUED)

Class B Designates Region 8 Lewis County (Continued)

Common name	Scientific name
Musk thistle	<i>Carduus nutans</i>
Orange hawkweed	<i>Hieracium aurantiacum</i>
Parrotfeather	<i>Myriophyllum aquaticum</i>
Perennial pepperweed	<i>Lepidium latifolium</i>
Perennial sowthistle	<i>Sonchus arvensis ssp. arvensis</i>
Plumeless thistle	<i>Carduus acanthoides</i>
Polar hawkweed	<i>Hieracium atratum</i>
Policeman's helmet	<i>Impatiens glandulifera</i>
Purple loosestrife	<i>Lythrum salicaria</i>
Queen-devil hawkweed	<i>Hieracium glomeratum</i>
Rush skeletonweed	<i>Chondrilla juncea</i>
Russian knapweed	<i>Acroptilon repens</i>
Saltcedar	<i>Tamarix ramosissima</i>
Scotch thistle	<i>Onopordum acanthium</i>
Smooth cordgrass	<i>Spartina alterniflora</i>
Smooth hawkweed	<i>Hieracium laevigatum</i>
Spotted knapweed	<i>Centaurea biebersteinii</i>
Swainsonpea	<i>Sphaerophysa salsula</i>
Wand loosestrife	<i>Lythrum virgatum</i>
Water primrose	<i>Ludwigia hexapetala</i>
White bryony	<i>Bryonia alba</i>
Wild chervil	<i>Anthriscus sylvestris</i>
Yellow floating heart	<i>Nymphoides peltata</i>
Yellow hawkweed	<i>Hieracium caespitosum</i>
Yellow nutsedge	<i>Cyperus esculentus</i>
Yellow starthistle	<i>Centaurea solstitialis</i>

Class B Noxious Weeds, Lewis County

COMMON NAME	SCIENTIFIC NAME
Common catsear	<i>Hypochaeris radicata</i>
Kochia	<i>Kochia scoparia</i>
Herb Robert	<i>Geranium robertianum</i>
Houndstongue	<i>Cynoglossum officinale</i>
Oxeye daisy	<i>Leucanthemum vulgare</i>
Puncturevine	<i>Tribulus terrestris</i>
Sulfur cinquefoil	<i>Potentilla recta</i>
Wild carrot	<i>Daucus carota</i>

APPENDIX A (CONTINUED)

Class C Weeds of Local Interest, Lewis County--Select

Common Name	Scientific Name
Butterfly bush	<i>Buddleja davidii</i>
Hairy willow-herb	<i>Epilobium hirsutum</i>
Poison hemlock	<i>Conium maculatum</i>

Class C Noxious Weeds, Lewis County

COMMON NAME	SCIENTIFIC NAME
Absinth wormwood	<i>Artemisia absinthium</i>
Babysbreath	<i>Gypsophila paniculata</i>
Black henbane	<i>Hyoscyamus niger</i>
Bohemian knotweed	<i>Polygonum x Bohemicum</i>
Bull thistle	<i>Cirsium vulgare</i>
Canada thistle	<i>Cirsium arvense</i>
Old man's beard	<i>Clematis vitalba</i>
Cereal rye	<i>Secale cereale</i>
Common groundsel	<i>Senecio vulgaris</i>
Common reed	<i>Phragmites australis</i> (Non-native genotypes)
Common St. Johnswort	<i>Hypericum perforatum</i>
Common tansy	<i>Tanacetum vulgare</i>
Curley-leaf pondweed	<i>Potamogeton crispus</i>
English Ivy	<i>Hedera hibernica</i> 'Hibernica'
English Ivy	<i>Hedera helix</i> 'Baltica'
English Ivy	<i>Hedera helix</i> 'Pittsburgh'
English Ivy	<i>Hedera helix</i> 'Star'
Fragrant water lily	<i>Nymphaea odorata</i>
Field bindweed	<i>Convolvulus arvensis</i>
Hairy whitetop	<i>Cardaria pubescens</i>
Hawkweed	<i>Hieracium spp.</i>
Hoary cress	<i>Cardaria draba</i>
Jointed goatgrass	<i>Aegilops cylindrica</i>
Reed canarygrass	<i>Phalaris arundinacea</i>
Scentless mayweed	<i>Matricaria perforata</i>
Smoothseed alfalfa dodder	<i>Cuscuta approximata</i>
Spikeweed	<i>Hemizonia pungens</i>
Spiny cocklebur	<i>Xanthium spinosum</i>
White cockle	<i>Silene latifolia ssp. alba</i>

APPENDIX A (CONTINUED)

Class C Noxious Weeds, Lewis County (continued)

Willowherb	<i>Epilobium hirsutum</i>
Yellow flag iris	<i>Iris pseudacorus</i>
Yellow toadflax	<i>Linaria vulgaris</i>

APPENDIX B

Invasive Plant Inventory Forms for Class B designate, Class B select and Class C select weed populations located in the Packwood Lake study area, 2005 – 2006

Gifford Pinchot NF
Invasive Plant Inventory Form
Adapted from NRIS TERRA Forms (based on MBS form, tf)
Edited LS 2nov06

Fill out one form for each weed per survey unit, and attach a map to each form. Site ID must be unique for each form.

*Site ID 1: _____	Sample Type: INPA
Site ID 2: _____	Use multiple site ID's on one form when there are multiple weed species present in same area.
Site ID 3: _____	
Site ID 4: _____	
*Project <u>Packwood Lake Hydroelectric Project</u> Purpose: _____	
*Date (MM/DD/YYYY): <u>08/23/2006</u>	
*Primary Examiner (Last, First, Middle Initial): <u>Beck, Kathryn</u>	
*Region 06, Forest 03, District (Circle)	Mt. Adams Mount St Helens Cowlitz Valley
WA State	*County (Circle) <u>Lewis</u> Skamania Cowlitz Pierce
USGS 7.5' Quad Name <u>Packwood 7.5'</u> Quad # _____	
Watershed HUC code _____ *Ownership <u>Private</u>	
*HUC required for aquatic weeds	
Managed Area(s) _____	

*Legal Description of Polygon Center <u>T 13N R 9E S 21 NW 1/4 of SE 1/4 Willamette Mer.</u>	
*UTMs of Polygon Center _____ Must use Geodetic Datum NAD 83 CONUS	
Circle one:	GPS GIS easting _____ Zone 10 northing _____
GPS Model _____ Error _____	

Aspect (deg) 0 OR ALL Average Slope (%) 0
Elevation (ft) _____ min _____ max OR 1040' average

Circle *Dominant Life Form	AL Algae	LC Lichen	SS Subshrub
	FB Forb	NP Nonvascular plant	TR Tree
	GR Graminoid	SH Woody shrub	
3 Dominants	PLANTS Code	Scientific Name.	
	<u>SASI2</u>	<u>Salix sitchensis</u>	
	<u>ALRU2</u>	<u>Alnus rubra</u>	
	<u>CYSC4</u>	<u>Cytisus scoparius</u>	
Plant Association <u>N/A</u>	Plant Assn Code _____	Seral Stage _____	

Site Comments (Directions, description, aerial photo # and aerial photo date etc.)

_ From the town of Packwood, park on the west side of Hwy 12 where the Lake Creek diversion tailrace/ditch crosses Hwy 12. Walk west approx. ¼ mile along trail on first on the south side of tailrace, cross the wooden bridge, then walk on the north side of the tailrace to where its water enters the Cowlitz River. The 2 – 3 butterfly bush plants are on the gravel bar approximately 15' north (upstream) of the confluence mixed in with other tall shrubs

*Weed PLANTS Code _BUDA2_ *Weed Scientific Name ___Buddleja davidii_____

Circle one each for phenology, life form, and distribution of the weed.

Phenology			
	Grasses		Forbs and Shrubs
G1	Leaves Partially Developed, no heads	F1	Vegetative, rosette, pre flowering
G2	Inflorescence inside the sheath	<u>F2</u>	<u>Flowering</u>
G3	Inflorescence partially or fully extended	F3	Fruiting
G4	Seeds maturing or mature	F4	Senescent or dormant
G5	Senescent or dormant		
RG	Regrowth		
Life Form			
AL	Algae	NP	Nonvascular plant
FB	Forb	<u>SH</u>	<u>Woody shrub</u>
FU	Fungus	SS	Subshrub
GR	Graminoid	TR	Tree
LC	Lichen	UN	Unknown
LI	Woody liana	VI	Herbaceous vine
Distribution			
<u>CL</u>	<u>Clumpy</u>	SE	Scattered even
SP	Scattered patchy	LI	Linear

*Infested Area (acres)1: 0.1
 Infested Area (acres) 2
 Infested Area (acres) 3
 Infested Area (acres) 4 Gross area (ac) ___0.1_____

Infested area is REQUIRED. Minimum size is 0.1 acre. Use Gross Area ONLY when portions of polygon are uninfested. Minimum Gross Area ≥ 1 acre.

Gross Area x % of land occupied by weeds = Infested Area.

Daubenmire Cover Class		*Weed Canopy Cover of Infested Area		
		OR	Estimated percent (%) cover	
T	0-1%	4	50.1-75.0%	site 1: <u>_T_</u>
1	1-5.0%	5	75.1-95.0%	site 2: <u>_____</u>
2	5.1-25%	6	95.1-100%	site 3: <u>_____</u>
3	25.1-50.0%			site 4: <u>_____</u>

(use multiple sites when there are more than one weed species present)

Horizontal Distance to Water (ft) ___10'___ Vertical Distance to Water (ft) ___5'___
 as crow flies, not slope distance. At large sites, record nearest distance.

Associated Species	PLANTS Code	Scientific Name
	<u>___SASI2_</u>	<u>___Salix sitchensis_____</u>
	<u>___ALRU2_</u>	<u>___Alnus rubra_____</u>
	<u>___CYSC4</u>	<u>___Cytisus scoparius_____</u>

Comments: ___ Several butterfly bush plants (2 to 3 individuals) were located near where the tailrace enters the Cowlitz River. They were growing in semi-stabilized cobbles and gravels. The plants looked as though they might have originally have been plant fragments that washed downriver during a flood event and then took root. These plants are within 10 feet of the Oregon goldenaster population. ___

Directions for the Gifford Pinchot NF Invasive Plant Inventory Form.

Adapted from TERRA Rangeland General Form and Invasives Plant Field Form Protocols (based on MBS;tf)

Fill out one form for each species. Required fields are marked above and below an asterisk. *

***Site ID.** Must be unique for each form. Format is Region number, Forest number, Ranger District number, examiner initials, weed site number. Example 060502AR001 = Pacific Northwest Region, Mt. Baker-Snoqualmie NF, Darrington RD, Ann Risvold, first site.

***Project.** Name of the invasive plant project.

***Date.** Date of invasive plant sighting, using MM/DD/YYYY format. 05/22/2002.

***Primary examiner.** Enter as last name, first name, middle initial.

***District.** Circle the appropriate ranger district code.

***County.** Circle the appropriate county and code.

USGS 7.5' Quad Name and Code. Enter the quad name and code. Ex. Skykomish, F347121.

HUC code. Enter the watershed hydrologic unit code. Required for aquatic invasive plants only; optional for terrestrial and riparian invasive plants.

Ownership. Enter an appropriate code from the list below.

BLM	Bureau of Land Management
CGOV	County government
DOD	Department of Defense
F&G	State fish and game
MGOV	Municipal government
NPS	National Park Service
PRIV	Private
OTH	Other
TNC	The Nature Conservancy
TRIB	Tribal
UNIV	University
USFSWS	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service
USOT	U.S. other federal lands

Managed Area(s). Enter any management area names, such as wildernesses, research natural areas, ski areas, administrative sites, or other managed sites.

***Legal Description of Polygon Center.** Enter the township, range, section, ¼ ¼ section, and ¼ section of the center of the mapped polygon.

***UTMs of Polygon Center.** Enter the UTM easting and northing of the center of the mapped polygon. Circle GPS or GIS to document how UTM's were obtained. Give GPS model and estimated error for all GPS readings. PLGRs can give error estimate in Figure of Merit (FOM) or feet; other models use distance in feet. Ex. PLGR FOM1; Garmin GPS 12, EPE 23 ft

Aspect. Enter the average aspect as degrees, OR enter ALL for sites with multiple aspects.

Average Slope. Enter the average slope as percent.

Elevation. Enter the minimum and maximum elevation in feet, OR enter the average elevation for small infestations.

***Dominant Life Form.** Circle the dominant life form at the site.

Dominant Species. Enter the NRCS PLANTS code and full scientific names of the dominant vegetation at the site, 3 species maximum. PLANTS database is available on the web at <http://plants.usda.gov/>.

Plant Association and Code. Enter the abbreviated plant association name and code from MBS field guide (Henderson, J., R. Lesher, D. Peter, and D. Shaw, 1992. Field guide to the forested plant associations of the Mt. Baker-Snoqualmie NF, USDA Forest Service, Technical Paper R6-ECOL-TP-028-91) Ex. TSHE/GASH-BENE, CHS135.

Seral Stage. Enter seral stage.

EM	Early midseral
ES	Early seral
LM	Late midseral
LS	Late seral
MS	Midseral

Site Comments. Give directions to site and a general site description. Include aerial photo numbers and dates here.

***Weed PLANTS code.** Give the NRCS plants code of the weed. Ex. POCU6. PLANTS database is available on the web at <http://plants.usda.gov/>.

***Scientific Name.** Give the full scientific name of the species. Ex. *Polygonum cuspidatum*.

Phenology, life form, and distribution. Circle the appropriate choice for the invasive species.

***Infested Area.** Enter the area in acres that is infested by the single invasive species above. Minimum area is 0.1 acre.

Gross Area. Enter the area in acres of a mapped area that contains both infested and uninfested acres. Minimum gross area is 1 acre.

***Weed Canopy Cover.** Circle the Daubenmire Cover Class of the single weed species in the infested area OR enter the estimated percent cover of the weed in the infested area.

Horizontal Distance to Water. Enter the estimated horizontal distance water in feet.

Vertical Distance to Water. Enter the estimated vertical distance water in feet.

Associated Species. Enter a maximum of 3 species that appear to be directly associated with the invasive species. Use the NRCS plants code and the scientific name of each.

Comments. Give general description of weed occurrence, presence/absence of biocontrols, treatment history, special management concerns, etc.

Site Comments (Directions, description, aerial photo # and aerial photo date etc.)
 __Plants growing along disturbed road prism adjacent the south side of the tailrace between Highway 12
 and Cowlitz River. There are between 10 and 15 plants. _____

*Weed PLANTS Code __CEDI3__ *Weed Scientific Name __Centaurea diffusa__

Circle one each for phenology, life form, and distribution of the weed.

Phenology		Grasses	Forbs and Shrubs
G1	Leaves Partially Developed, no heads	F1	Vegetative, rosette, pre flowering
G2	Inflorescence inside the sheath	F2	Flowering
G3	Inflorescence partially or fully extended	F3	Fruiting
G4	Seeds maturing or mature	F4	Senescent or dormant
G5	Senescent or dormant		
RG	Regrowth		
Life Form			
AL	Algae	NP	Nonvascular plant
FB	Forb	SH	Woody shrub
FU	Fungus	SS	Subshrub
GR	Graminoid	TR	Tree
LC	Lichen	UN	Unknown
LI	Woody liana	VI	Herbaceous vine
Distribution			
CL	Clumpy	SE	Scattered even
SP	Scattered patchy	LI	Linear

*Infested Area (acres) 1: est. 0.5 acre
 Infested Area (acres) 2 _____
 Infested Area (acres) 3 _____
 Infested Area (acres) 4 _____ Gross area (ac) _____ 0.5 acre _____

Infested area is REQUIRED. Minimum size is 0.1 acre. Use Gross Area ONLY when portions of polygon are uninfested. Minimum Gross Area ≥ 1 acre.

Gross Area x % of land occupied by weeds = Infested Area.

Daubenmire Cover Class		*Weed Canopy Cover of Infested Area		
		OR	Estimated percent (%) cover	
T	0-1%	4	50.1-75.0%	site 1: __T__
1	1-5.0%	5	75.1-95.0%	site 2: _____
2	5.1-25%	6	95.1-100%	site 3: _____
3	25.1-50.0%			site 4: _____
				(use multiple sites when there are more than one weed species present)

Horizontal Distance to Water (ft) __15 feet__ Vertical Distance to Water (ft) 5 feet_____
 as crow flies, not slope distance. At large sites, record nearest distance.

Associated Species	PLANTS Code	Scientific Name
	__HYPE__	__Hypericum perforatum__
	__AGROS__	__Agrostis spp.____
	__RUAC3__	__Rumex acetosella__

Comments: In the late-1990's, this population of diffuse knapweed was very dense. It was treated with herbicides and largely eliminated. The tailrace knapweed population is near the Lewis County-owned solid

waste and transfer station where there is a large known population of diffuse knapweed. This larger population may act as a local seed source for surrounding areas. The LCNWCB has been treating plants at that site

Directions for the Gifford Pinchot NF Invasive Plant Inventory Form.

Adapted from TERRA Rangeland General Form and Invasives Plant Field Form Protocols (based on MBS;tf)

Fill out one form for each species. Required fields are marked above and below an asterisk. *

***Site ID.** Must be unique for each form. Format is Region number, Forest number, Ranger District number, examiner initials, weed site number. Example 060502AR001 = Pacific Northwest Region, Mt. Baker-Snoqualmie NF, Darrington RD, Ann Risvold, first site.

***Project.** Name of the invasive plant project.

***Date.** Date of invasive plant sighting, using MM/DD/YYYY format. 05/22/2002.

***Primary examiner.** Enter as last name, first name, middle initial.

***District.** Circle the appropriate ranger district code.

***County.** Circle the appropriate county and code.

USGS 7.5' Quad Name and Code. Enter the quad name and code. Ex. Skykomish, F347121.

HUC code. Enter the watershed hydrologic unit code. Required for aquatic invasive plants only; optional for terrestrial and riparian invasive plants.

Ownership. Enter an appropriate code from the list below.

BLM	Bureau of Land Management
CGOV	County government
DOD	Department of Defense
F&G	State fish and game
MGOV	Municipal government
NPS	National Park Service
PRIV	Private
OTH	Other
TNC	The Nature Conservancy
TRIB	Tribal
UNIV	University
USFSWS	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service
USOT	U.S. other federal lands

Managed Area(s). Enter any management area names, such as wildernesses, research natural areas, ski areas, administrative sites, or other managed sites.

***Legal Description of Polygon Center.** Enter the township, range, section, ¼ ¼ section, and ¼ section of the center of the mapped polygon.

***UTMs of Polygon Center.** Enter the UTM easting and northing of the center of the mapped polygon. Circle GPS or GIS to document how UTM's were obtained. Give GPS model and estimated error for all GPS readings. PLGRs can give error estimate in Figure of Merit (FOM) or feet; other models use distance in feet. Ex. PLGR FOM1; Garmin GPS 12, EPE 23 ft.

Aspect. Enter the average aspect as degrees, OR enter ALL for sites with multiple aspects.

Average Slope. Enter the average slope as percent.

Elevation. Enter the minimum and maximum elevation in feet, OR enter the average elevation for small infestations.

***Dominant Life Form.** Circle the dominant life form at the site.

Dominant Species. Enter the NRCS PLANTS code and full scientific names of the dominant vegetation at the site, 3 species maximum. PLANTS database is available on the web at <http://plants.usda.gov/>.

Plant Association and Code. Enter the abbreviated plant association name and code from MBS field guide (Henderson, J., R. Leshner, D. Peter, and D. Shaw, 1992. Field guide to the forested plant associations of the Mt. Baker-Snoqualmie NF, USDA Forest Service, Technical Paper R6-ECOL-TP-028-91) Ex. TSHE/GASH-BENE, CHS135.

Seral Stage. Enter seral stage.

EM	Early midseral
ES	Early seral
LM	Late midseral
LS	Late seral
MS	Midseral

Site Comments. Give directions to site and a general site description. Include aerial photo numbers and dates here.

***Weed PLANTS code.** Give the NRCS plants code of the weed. Ex. POCU6. PLANTS database is available on the web at <http://plants.usda.gov/>.

***Scientific Name.** Give the full scientific name of the species. Ex. *Polygonum cuspidatum*.

Phenology, life form, and distribution. Circle the appropriate choice for the invasive species.

***Infested Area.** Enter the area in acres that is infested by the single invasive species above. Minimum area is 0.1 acre.

Gross Area. Enter the area in acres of a mapped area that contains both infested and uninfested acres. Minimum gross area is 1 acre.

***Weed Canopy Cover.** Circle the Daubenmire Cover Class of the single weed species in the infested area OR enter the estimated percent cover of the weed in the infested area.

Horizontal Distance to Water. Enter the estimated horizontal distance water in feet.

Vertical Distance to Water. Enter the estimated vertical distance water in feet.

Associated Species. Enter a maximum of 3 species that appear to be directly associated with the invasive species. Use the NRCS plants code and the scientific name of each.

Comments. Give general description of weed occurrence, presence/absence of biocontrols, treatment history, special management concerns, etc.

**Gifford Pinchot NF
Invasive Plant Inventory Form
Adapted from NRIS TERRA Forms (based on MBS form, tf)
Edited LS 2nov06**

Fill out one form for each weed per survey unit, and attach a map to each form. Site ID must be unique for each form.

*Site ID 1: _____	Sample Type: INPA
*Site ID 2: _____	Use multiple site ID's on one form when there are multiple weed species present in same area.
*Site ID 3: _____	
*Site ID 4: _____	
*Project <u>Packwood Lake Hydroelectric Project</u> Project Purpose: _____	
*Date (MM/DD/YYYY): _____ 0724/2006 _____	
*Primary Examiner (Last, First, Middle Initial): <u>Beck, Kathryn</u>	
*Region 06, Forest 03, District (Circle)	Mt. Adams <u>Cowlitz Valley</u> Mount St Helens
WA State *County (Circle)	<u>Lewis</u> Cowlitz Skamania Pierce
USGS 7.5' Quad Name <u>Packwood 7.5' quad</u> Quad # _____	
Watershed HUC code _____ *Ownership <u>USFS</u>	
*HUC required for aquatic weeds	
Managed Area(s) _____	

*Legal Description of Polygon Center <u>T 13N_ R_ 9E S_ 14_ _SE1/4 of _SW1/4 Willamette Mer.</u>	
*UTMs of Polygon Center _____ Must use Geodetic Datum NAD 83 CONUS	
Circle one: GPS GIS	easting _____ Zone 10 northing _____
GPS Model _____ Error _____	

Aspect (deg) _____ OR ALL Average Slope (%) 1%
Elevation (ft) 1450 min 1600 max OR _____ average

Circle *Dominant Life Form	AL Algae	LC Lichen	SS Subshrub
	FB Forb	NP Nonvascular plant	<u>TR Tree</u>
	GR Graminoid	SH Woody shrub	
3 Dominants	PLANTS Code	Scientific Name.	
	<u>PSME</u>	<u>Pseudotsuga menziesii</u>	
	<u>ACCI</u>	<u>Acer circinatum</u>	
	<u>CYSC4</u>	<u>Cytisus scoparius</u>	
Plant Association <u>TSHE/</u>	Plant Assn Code _____	Seral Stage <u>MS</u>	

Site Comments (Directions, description, aerial photo# and aerial photo date etc.)

_Plants growing along disturbed edges of intersection of FS Rd. 1260 and FS Rd. 1262. This is a known infestation.

*Weed PLANTS Code CEJA _____ *Weed Scientific Name *Centaurea jacea x nigra / Centaurea moncktonii* in the FNA treatment.

Circle one each for phenology, life form, and distribution of the weed.

Phenology			
	Grasses		Forbs and Shrubs
G1	Leaves Partially Developed, no heads	F1	Vegetative, rosette, pre flowering
G2	Inflorescence inside the sheath	<u>F2</u>	Flowering
G3	Inflorescence partially or fully extended	<u>F3</u>	Fruiting
G4	Seeds maturing or mature	F4	Senescent or dormant
G5	Senescent or dormant		
RG	Regrowth		
Life Form			
AL	Algae	NP	Nonvascular plant
<u>FB</u>	<u>Forb</u>	SH	Woody shrub
FU	Fungus	SS	Subshrub
GR	Graminoid	TR	Tree
LC	Lichen	UN	Unknown
LI	Woody liana	VI	Herbaceous vine
Distribution			
CL	Clumpy	SE	Scattered even
SP	Scattered patchy	<u>LI</u>	<u>Linear</u>

*Infested Area (acres)1: 2 – 3 acres estimated

Infested Area (acres) 2 _____

Infested Area (acres) 3 _____

Infested Area (acres) 4 Gross area (ac) 2 – 3 acres _____

Infested area is REQUIRED. Minimum size is 0.1 acre. Use Gross Area ONLY when portions of polygon are uninfested. Minimum Gross Area ≥ 1 acre.

Gross Area x % of land occupied by weeds = Infested Area.

Daubenmire Cover Class		*Weed Canopy Cover of Infested Area		
		OR	Estimated percent (%) cover	
T	0-1%	4	50.1-75.0%	site 1: <u>1</u>
1	1-5.0%	5	75.1-95.0%	site 2: _____
2	5.1-25%	6	95.1-100%	site 3: _____
3	25.1-50.0%			site 4: _____
				(use multiple sites when there are more than one weed species present)

Horizontal Distance to Water (ft) _____ Vertical Distance to Water (ft) _____
as crow flies, not slope distance. At large sites, record nearest distance.

Associated Species	PLANTS Code	Scientific Name
	<u>CYSC4</u>	<u>Cytisus scoparius</u>
	<u>AREL3</u>	<u>Arrhenatherum elatius</u>
	<u>FRV1</u>	<u>Fragaria virginiana</u>

Comments: This is a known noxious weed infestation. There has been some handpulling efforts in this population in the past by the Forest Service and the Lewis County Noxious Weed Control Board. The population is linear following the road prism on both sides of the road. The weed does not appear to invade adjacent forested areas.

Directions for the Gifford Pinchot NF Invasive Plant Inventory Form.

Adapted from TERRA Rangeland General Form and Invasives Plant Field Form Protocols (based on MBS;tf)

Fill out **one** form for each species. Required fields are marked above and below an asterisk. *

***Site ID.** Must be unique for each form. Format is Region number, Forest number, Ranger District number, examiner initials, weed site number. Example 060502AR001 = Pacific Northwest Region, Mt. Baker-Snoqualmie NF, Darrington RD, Ann Risvold, first site.

***Project.** Name of the invasive plant project.

***Date.** Date of invasive plant sighting, using MM/DD/YYYY format. 05/22/2002.

***Primary examiner.** Enter as last name, first name, middle initial.

***District.** Circle the appropriate ranger district code.

***County.** Circle the appropriate county and code.

USGS 7.5' Quad Name and Code. Enter the quad name and code. Ex. Skykomish, F347121.

HUC code. Enter the watershed hydrologic unit code. Required for aquatic invasive plants only; optional for terrestrial and riparian invasive plants.

Ownership. Enter an appropriate code from the list below.

BLM	Bureau of Land Management
CGOV	County government
DOD	Department of Defense
F&G	State fish and game
MGOV	Municipal government
NPS	National Park Service
PRIV	Private
OTH	Other
TNC	The Nature Conservancy
TRIB	Tribal
UNIV	University
USFSWS	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service
USOT	U.S. other federal lands

Managed Area(s). Enter any management area names, such as wildernesses, research natural areas, ski areas, administrative sites, or other managed sites.

***Legal Description of Polygon Center.** Enter the township, range, section, $\frac{1}{4}$ $\frac{1}{4}$ section, and $\frac{1}{4}$ section of the center of the mapped polygon.

***UTMs of Polygon Center.** Enter the UTM easting and northing of the center of the mapped polygon. Circle GPS or GIS to document how UTM's were obtained. Give GPS model and estimated error for all GPS readings. PLGRs can give error estimate in Figure of Merit (FOM) or feet; other models use distance in feet. Ex. PLGR FOM1; Garmin GPS 12, EPE 23 ft.

Aspect. Enter the average aspect as degrees, OR enter ALL for sites with multiple aspects.

Average Slope. Enter the average slope as percent.

Elevation. Enter the minimum and maximum elevation in feet, OR enter the average elevation for small infestations.

***Dominant Life Form.** Circle the dominant life form at the site.

Dominant Species. Enter the NRCS PLANTS code and full scientific names of the dominant vegetation at the site, 3 species maximum. PLANTS database is available on the web at <http://plants.usda.gov/>.

Plant Association and Code. Enter the abbreviated plant association name and code from MBS field guide (Henderson, J., R. Leshner, D. Peter, and D. Shaw. 1992. Field guide to the forested plant associations of the Mt. Baker-Snoqualmie NF, USDA Forest Service, Technical Paper R6-ECOL-TP-028-91) Ex. TSHE/GASH-BENE. CHS135.

Seral Stage. Enter seral stage.

EM	Early midseral
ES	Early seral
LM	Late midseral
LS	Late seral
MS	Midseral

Site Comments. Give directions to site and a general site description. Include aerial photo numbers and dates here.

***Weed PLANTS code.** Give the NRCS plants code of the weed. Ex. POCU6. PLANTS database is available on the web at <http://plants.usda.gov/>.

***Scientific Name.** Give the full scientific name of the species. Ex. *Polygonum cuspidatum*.

Phenology, life form, and distribution. Circle the appropriate choice for the invasive species.

***Infested Area.** Enter the area in acres that is infested by the single invasive species above. Minimum area is 0.1 acre.

Gross Area. Enter the area in acres of a mapped area that contains both infested and uninfested acres. Minimum gross area is 1 acre.

***Weed Canopy Cover.** Circle the Daubenmire Cover Class of the single weed species in the infested area OR enter the estimated percent cover of the weed in the infested area.

Horizontal Distance to Water. Enter the estimated horizontal distance water in feet.

Vertical Distance to Water. Enter the estimated vertical distance water in feet.

Associated Species. Enter a maximum of 3 species that appear to be directly associated with the invasive species. Use the NRCS plants code and the scientific name of each.

Comments. Give general description of weed occurrence, presence/absence of biocontrols, treatment history, special management concerns, etc.

**Gifford Pinchot NF
Invasive Plant Inventory Form
Adapted from NRIS TERRA Forms (based on MBS form, tf)
Edited LS 2nov06**

Fill out one form for each weed per survey unit, and attach a map to each form. Site ID must be unique for each form.

*Site ID 1: _____	Sample Type: <u>INPA</u>
Site ID 2: _____	Use multiple site ID's on one form when there are multiple weed species present in same area.
Site ID 3: _____	
Site ID 4: _____	
*Project <u>Packwood Lake Hydroelectric Project</u>	
*Date (MM/DD/YYYY): <u>08/23/2006</u>	
*Primary Examiner (Last, First, Middle Initial): <u>Beck, Kathryn</u>	
*Region 06, Forest 03, District (Circle)	Mt. Adams Mount St Helens Cowlitz Valley
WA State	*County (Circle) <u>Lewis</u> Skamania Cowlitz Pierce
USGS 7.5' Quad Name <u>Tatoosh Lakes 7.5'</u> Quad # _____	
Watershed HUC code _____ *Ownership <u>Private</u>	
*HUC required for aquatic weeds	
Managed Area(s) _____	

*Legal Description of Polygon Center <u>T 13N R 9E S 11 NW 1/4 of NE 1/4 Willamette Mer.</u>	
*UTMs of Polygon Center _____ Must use Geodetic Datum NAD 83 CONUS	
Circle one:	GPS GIS easting _____ Zone 10 northing _____
GPS Model _____ Error _____	

Aspect (deg) 0 OR ALL Average Slope (%) 0
Elevation (ft) _____ min _____ max OR 1200' average

Circle *Dominant Life Form	AL Algae	LC Lichen	SS Subshrub
	FB Forb	NP Nonvascular plant	TR Tree
	GR Graminoid	SH Woody shrub	
3 Dominants	PLANTS Code	Scientific Name.	
	<u>ACMA3</u>	<u>Acer macrophyllum</u>	
	<u>ALRU2</u>	<u>Alnus rubra</u>	
	<u>RUID</u>	<u>Rubus idaeus</u>	
Plant Association <u>N/A</u>	Plant Assn Code _____	Seral Stage _____	

Site Comments (Directions, description, aerial photo # and aerial photo date etc.)
 _ From approximately 2 miles northeast of the town of Packwood on Highway 12, walk along Lake Creek to the north to its confluence with the Cowlitz River. Plants are growing in a forested muddy side channel of the Cowlitz River approximately 100 feet upstream of Lake Creek. It is a previously known population that the LCNWCB has been treating for several years with glyphosate. At the time of the observation, it had six non-reproductive stems, which were approximately 1.5 feet tall.

*Weed PLANTS Code _POCU6_ *Weed Scientific Name _Polygonum cuspidatum_

Circle one each for phenology, life form, and distribution of the weed.

Phenology		Forbs and Shrubs	
	Grasses		
G1	Leaves Partially Developed, no heads	F1	Vegetative, rosette, pre flowering
G2	Inflorescence inside the sheath	F2	Flowering
G3	Inflorescence partially or fully extended	F3	Fruiting
G4	Seeds maturing or mature	F4	Senescent or dormant
G5	Senescent or dormant		
RG	Regrowth		
Life Form			
AL	Algae	NP	Nonvascular plant
FB	Forb	SH	Woody shrub
FU	Fungus	SS	Subshrub
GR	Graminoid	TR	Tree
LC	Lichen	UN	Unknown
LI	Woody liana	VI	Herbaceous vine
Distribution			
CL	Clumpy	SE	Scattered even
SP	Scattered patchy	LI	Linear

*Infested Area (acres)1: 0.1
 Infested Area (acres) 2
 Infested Area (acres) 3
 Infested Area (acres) 4 Gross area (ac) 0.1

Infested area is REQUIRED. Minimum size is 0.1 acre. Use Gross Area ONLY when portions of polygon are uninfested. Minimum Gross Area ≥ 1 acre.

Gross Area x % of land occupied by weeds = Infested Area.

Daubenmire Cover Class	*Weed Canopy Cover of Infested Area		site 1: <u>T</u> site 2: _____ site 3: _____ site 4: _____
	OR	Estimated percent (%) cover	
T 0-1%	4	50.1-75.0%	
1 1-5.0%	5	75.1-95.0%	
2 5.1-25%	6	95.1-100%	
3 25.1-50.0%			(use multiple sites when there are more than one weed species present)

Horizontal Distance to Water (ft) _5' Vertical Distance to Water (ft) _10'
 as crow flies, not slope distance. At large sites, record nearest distance.

Associated Species	PLANTS Code	Scientific Name
	<u>_ACMA3_</u>	<u>_Acer macrophyllum_</u>
	<u>_ALRU2_</u>	<u>_Alnus rubra_</u>
	<u>_RUID_</u>	<u>_Rubus idaeus_</u>

Comments: ___ A small population of Japanese knotweed was observed along a forested, muddy side channel on the Cowlitz River approximately 100 feet upstream of Lake Creek. It is a previously known population that the LCNWCB has been treating for several years with glyphosate. At the time of the observation, it had six non-reproductive stems, which were approximately 1.5 feet tall.

Directions for the Gifford Pinchot NF Invasive Plant Inventory Form.

Adapted from TERRA Rangeland General Form and Invasives Plant Field Form Protocols (based on MBS;tf)

Fill out one form for each species. Required fields are marked above and below an asterisk. *

***Site ID.** Must be unique for each form. Format is Region number, Forest number, Ranger District number, examiner initials, weed site number. Example 060502AR001 = Pacific Northwest Region, Mt. Baker-Snoqualmie NF, Darrington RD, Ann Risvold, first site.

***Project.** Name of the invasive plant project.

***Date.** Date of invasive plant sighting, using MM/DD/YYYY format. 05/22/2002.

***Primary examiner.** Enter as last name, first name, middle initial.

***District.** Circle the appropriate ranger district code.

***County.** Circle the appropriate county and code.

USGS 7.5' Quad Name and Code. Enter the quad name and code. Ex. Skykomish, F347121.

HUC code. Enter the watershed hydrologic unit code. Required for aquatic invasive plants only; optional for terrestrial and riparian invasive plants.

Ownership. Enter an appropriate code from the list below.

BLM	Bureau of Land Management
CGOV	County government
DOD	Department of Defense
F&G	State fish and game
MGOV	Municipal government
NPS	National Park Service
PRIV	Private
OTH	Other
TNC	The Nature Conservancy
TRIB	Tribal
UNIV	University
USFSWS	U.S. Fish and Wildlife Service
USFS	U.S. Forest Service
USOT	U.S. other federal lands

Managed Area(s). Enter any management area names, such as wildernesses, research natural areas, ski areas, administrative sites, or other managed sites.

***Legal Description of Polygon Center.** Enter the township, range, section, ¼ ¼ section, and ¼ section of the center of the mapped polygon.

***UTMs of Polygon Center.** Enter the UTM easting and northing of the center of the mapped polygon. Circle GPS or GIS to document how UTM's were obtained. Give GPS model and estimated error for all GPS readings. PLGRs can give error estimate in Figure of Merit (FOM) or feet; other models use distance in feet. Ex. PLGR FOM1; Garmin GPS 12, EPE 23 ft.

Aspect. Enter the average aspect as degrees, OR enter ALL for sites with multiple aspects.

Average Slope. Enter the average slope as percent.

Elevation. Enter the minimum and maximum elevation in feet, OR enter the average elevation for small infestations.

***Dominant Life Form.** Circle the dominant life form at the site.

Dominant Species. Enter the NRCS PLANTS code and full scientific names of the dominant vegetation at the site, 3 species maximum. PLANTS database is available on the web at <http://plants.usda.gov/>.

Plant Association and Code. Enter the abbreviated plant association name and code from MBS field guide (Henderson, J., R. Lesher, D. Peter, and D. Shaw, 1992. Field guide to the forested plant associations of the Mt. Baker-Snoqualmie NF, USDA Forest Service, Technical Paper R6-ECOL-TP-028-91) Ex. TSHE/GASH-BENE, CHS135.

Seral Stage. Enter seral stage.

EM	Early midseral
ES	Early seral
LM	Late midseral
LS	Late seral
MS	Midseral

Site Comments. Give directions to site and a general site description. Include aerial photo numbers and dates here.

***Weed PLANTS code.** Give the NRCS plants code of the weed. Ex. POCU6. PLANTS database is available on the web at <http://plants.usda.gov/>.

***Scientific Name.** Give the full scientific name of the species. Ex. *Polygonum cuspidatum*.

Phenology, life form, and distribution. Circle the appropriate choice for the invasive species.

***Infested Area.** Enter the area in acres that is infested by the single invasive species above. Minimum area is 0.1 acre.

Gross Area. Enter the area in acres of a mapped area that contains both infested and uninfested acres. Minimum gross area is 1 acre.

***Weed Canopy Cover.** Circle the Daubenmire Cover Class of the single weed species in the infested area OR enter the estimated percent cover of the weed in the infested area.

Horizontal Distance to Water. Enter the estimated horizontal distance water in feet.

Vertical Distance to Water. Enter the estimated vertical distance water in feet.

Associated Species. Enter a maximum of 3 species that appear to be directly associated with the invasive species. Use the NRCS plants code and the scientific name of each.

Comments. Give general description of weed occurrence, presence/absence of biocontrols, treatment history, special management concerns, etc.