Henry M. Jackson Hydroelectric Project

(FERC No. 2157)

Noxious Weed Management Plan

Prepared for:

Public Utility District No. 1 of Snohomish County
Everett, Washington

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1.0 PURPOSE

Public Utility District No. 1 of Snohomish County (District) has developed a Noxious Weed Management Plan (plan) for the Henry M. Jackson Hydroelectric Project, FERC 2157 (Project). The plan describes the District's strategy for controlling and containing the spread of Class A, Class B Designate, and Snohomish County Selected noxious weeds occurring within the Jackson Project boundary ("Project lands") as revised under the new license, throughout the term of the new license. The plan also describes the District's ongoing and proposed future voluntary management of other noxious weeds on Project lands.

The Noxious Weed Management Plan is based on the District's ongoing weed management activities at the Project and incorporates by reference existing District programs and plans. The plan includes management methods for new species and sites detected on Project lands during the 2007 Noxious Weed Inventory. The plan includes the following elements:

- A list of Washington State Class A, Washington State Class B Designate and Snohomish County Selected noxious weeds, updated annually to reflect changes in State and County lists.
- A summary of Washington State Class A, Washington State Class B Designate, Snohomish County Selected, and other target species of noxious weeds occurring within the Project boundary based on ongoing weed management work and the 2007 Noxious Weed Inventory.
- A summary of ongoing weed management activities on Project lands.
- Treatment options and recommendations for established and new infestations of target weed species, including management goals, measurable objectives, and priorities for treatment.
- Prevention strategies (*e.g.*, weed prevention practices for ground disturbing work, revegetation methods, and education information for Project employees).
- Monitoring and implementation schedules.
- Annual consultation with Snohomish County Noxious Weed Control Board and other stakeholders.
- Annual updating provided to the consulted organizations listed below, within the Terrestrial Resource Management Plan (TRMP) reports, of updates to the noxious weed list, a summary of weed management actions taken since the previous report, and consultation with Snohomish County Noxious Weed Control Board and other stakeholders.
- Periodic (five-year) review of plan accomplishments and update of lists and appendices, prepared in consultation with the stakeholders listed below. This information will be provided to FERC as part of the TRMP five-year report.
- Estimated costs.

The Noxious Weed Management Plan is being developed in consultation with the Jackson Project Terrestrial Resources Stakeholders, specifically including the City of Everett (City), Snohomish County Noxious Weed Control Board, Washington State

Department of Natural Resources (DNR), U.S. Fish and Wildlife Service (USFWS), Washington Department of Fish Wildlife (WDFW) and U.S. Forest Service (USFS).

2.0 REGULATORY AUTHORITY AND DEFINITIONS

Federal: The major federal authorities for management of non-native plants are the Plant Protection Act (Title IV of the Agricultural Risk Protection Act of 2000), the Amendment to the Federal Noxious Weed Act of 1974, and Executive Order 13112 on Invasive Species (1999).

Washington State: Washington Weed Law (RCW 17.10) requires that noxious weeds be controlled to limit adverse economic effects on agricultural, natural, and human resources of the state. Noxious weeds are plants that, when established, are highly destructive, competitive, or difficult to control by cultural or chemical practices. The State Noxious Weed Control Board coordinates noxious weed control activities throughout the state via local weed districts and county noxious weed control boards. Management goals for noxious weed species may range from complete eradication to containment of the species within a currently infested area.

The State Noxious Weed Control Board updates its list of noxious weeds annually and categorizes the species into three classes (WAC 16-750). Federal noxious weed lists are incorporated in the state list.

Class A species are those noxious weeds not native to the state that are of limited distribution or are unrecorded in the state. Eradication of all Class A species is required by state law. State Class A species are listed on all County Class A weed lists.

Class B species are those noxious weeds not native to the state that are of limited distribution or are unrecorded in a region of the state, and that pose a serious threat to the region. These species are treated differently in different regions of the state, based on their distribution. In regions where a Class B species is of limited distribution or unrecorded, the species is designated by the state for 'control', which is defined under state law as prevention of seed production (WAC 16-750). In regions where a Class B species is already widespread (Class B non-designate species), control is decided at the local weed board level, with containment as the primary goal.

Class C weeds may be widely established in Washington, or may be of particular interest to the agricultural industry. Control of these species is a local weed board option.

The State of Washington also maintains a monitor list of non-native species. Species may be included on the list for a variety of reasons including the need for information on distribution and biology, the need to verify occurrence, and the need to monitor reoccurrence. There is no regulatory or legal authority associated with the monitor weed list.

The Revised Code of Washington (RCW 17.10.140; 17.10 240) specifically addresses the landowner's duty to control the spread of noxious weeds on managed forest lands: forest

lands used solely for the planting, growing, or harvesting of trees, and which are typified, except during a single period of five years following clear-cut logging, by canopies so dense as to prohibit growth of an understory. On these lands, Class A weeds must be eradicated and Class B designates must be controlled and prevented from spreading. Other noxious weeds listed on the county weed list with locally mandated control priorities must be addressed only within a one thousand foot buffer strip of adjacent land uses, and for a single five-year period following harvest of trees.

Snohomish County: The Snohomish County Noxious Weed Control Boards administers state weed laws at the local level on private, county, and state lands. The county weed board also adopts rules and regulations as necessary to administer the County's noxious weed control program. Local weed boards are provided flexibility to determine local weed priorities for Class B non-designate and Class C species, and are responsible for enforcement of weed control responsibilities to ensure resource protection and uniform standards. Although primary responsibility for weed management is assigned to the landowner, the county weed board facilitates implementation of management activities through technical assistance and education on noxious weed species, prevention strategies, and management methods. Appendix 1 presents the current list of noxious weed species in Snohomish County and will be updated whenever a new list is released.

Public Utility District No. 1 of Snohomish County: The Vegetation Management Program (VMP; District 2003) documents the roles, responsibilities, and criteria used to address vegetation management throughout District operations, including the Jackson Project lands. The VMP was designed to provide a safe, economical, and environmentally responsible program of vegetation management using an integrated pest management approach with minimal negative impacts to the environment and human health. A key premise of the VMP is that the District will seek alternatives to the use of herbicides. The VMP is regularly reviewed and updated; the current revision is dated October 2003. This Noxious Weed Management Plan has been developed and will be implemented in compliance with the requirements of the VMP.

City of Everett: City of Everett policy does not allow the use of chemical pesticides within the Lake Chaplain Watershed, where they may conceivably make their way to waters traveling to the reservoir, or the reservoir itself. Within the Spada Watershed, the City of Everett strongly encourages the use of all other means of noxious weed management.

Definitions: This Noxious Weed Management Plan uses the following definitions based on WAC 16-750.

Control (per WAC 16-750) means to prevent all seed production (and to prevent the dispersal of the following propagules of aquatic noxious weeds - turions, fragments, tubers, and nutlets).

Contain means to confine a noxious weed and its propagules to an identified area of infestation.

Eradicate means to eliminate a noxious weed within an area of infestation.

Prevent the spread of noxious weeds means to contain noxious weeds.

3.0 RESPONSIBILITIES

Staff responsibilities for the overall implementation of the District Vegetation Management Plan, including noxious weed management aspects, are defined in the VMP (District 2003). Responsibilities for implementation of the Noxious Weed Management Plan reflect the current VMP, and will be updated to comply with subsequent amendments to the VMP. Any modifications to the Noxious Weed Management Plan that are necessary to comply with the VMP will be reported in the annual updates and documented in the TRMP five-year report submitted to FERC.

District biologists will oversee the implementation of the Noxious Weed Management Plan and prepare reports of management activities. The term "District biologist," includes wildlife biologists that are employed by or under contract to the District. The term District implies that work may be done by someone other than a wildlife biologist, who is directly supervised by a wildlife biologist. The District will be responsible for coordination with District crews implementing weed management methods and training of crews in the use of the most appropriate control and prevention measures. As the FERC licensee, the District will be responsible for documenting weed management activities on all Project lands.

Documentation of weed management activities will be compiled annually by the District, with updates to GIS databases made at least annually as well. A summary of each year's weed management efforts will be sent to the Snohomish County Noxious Weed Board coordinator and other consulted parties. Management activities and updates will be discussed within the annual updates prepared as part of the TRMP reporting process. Review meetings will continue to be offered by the District upon request by the Snohomish County Noxious Weed Board coordinator, the City, DNR, USFWS, WDFW or USFS at any time.

4.0 NOXIOUS WEED MANAGEMENT PLAN

4.1 Background

Integrated pest management is defined by the U.S. Department of Agriculture (National Information System for Regional IPM Centers 2008) as follows:

> "Integrated pest management is socially acceptable, environmentally responsible, and economically practical plant protection."

A more detailed definition is provided in the Healthy Schools Act of 2000 (Assembly Bill 2260):

> "…a pest management strategy that focuses on long-term prevention or suppression of pest problems through a combination of techniques such as monitoring for pest presence and establishing treatment threshold levels, using non-chemical practices to make the habitat less conducive to pest development, improving sanitation, and employing mechanical and physical controls. Pesticides that pose the least possible hazard and are effective in a manner that minimizes risks to people, property, and the environment, are used only after careful monitoring indicates they are needed according to pre-established guidelines and treatment thresholds."

Integrated weed management is based on the principle that a combination of management strategies is often more effective than a single type of treatment. An integrated approach allows selection of the best-suited preventative, cultural, physical, mechanical, chemical, and biological methods for the conditions present at an individual site. In addition, the economic, environmental, and social costs of the selected weed management methods are balanced against the legally required management level and the benefits of weed management. The proposed weed management strategies are designed to be compatible with other resource management objectives for the area; for the Jackson Project these include:

- Maintenance of specified water quality parameters for public drinking water supply;
- Fish and wildlife management objectives;
- Forest stand management;
- Recreation use and scenery values;
- Public access to Project lands

This plan lists the noxious weeds at the Jackson Project and describes their occurrence and threats. A summary of available management methods is provided for each weed species. A recommendation for management of the species is presented, based on the methods most suitable for use on Project lands. The specific treatment applied in any given year will be based on the recommended methods, but may be modified at the time of treatment to reflect site conditions, weather, growth rates, improved techniques and other variables. A set of prevention measures to reduce the opportunity for reintroduction and spread of noxious weeds is included in the plan.

4.1.1 Summary of Noxious Weeds at the Jackson Project

Ongoing weed management activities at the Jackson Project address noxious weeds at Project facilities, recreation areas, and along Project roads. Non-native hawkweeds, tansy ragwort, invasive knotweed, bull thistle and Canada thistle are targeted for control by District weed managers on Project lands. In addition, Scotch broom and herb Robert are managed voluntarily by the District at selected locations on Project lands. Wild carrot, although not specifically targeted for management, is controlled at several Project locations where roadside mowing is performed to control other species.

In order to obtain a comprehensive list of weeds occurring at the Project, a noxious weed inventory was conducted in 2007 (District and City of Everett 2008). The study area included surface lands within the FERC Project boundary; areas where Project operations, or Project-related maintenance, land use practices, or human activities could promote the introduction, establishment, and/or spread of noxious weeds; National Forest System lands within the riparian corridor between Culmback Dam and the Diversion Dam; and selected District and City of Everett properties outside the FERC Project boundary.

Nineteen species of weeds were recorded during the inventory, including seven species currently requiring control per Washington State and/or Snohomish County regulations. Table 1 presents the Class A, Class B designate, and County selected noxious weeds known to occur and currently under management on Project lands. The table also displays five weed species that currently are managed voluntarily by the District at selected locations; the Forest Service requests management of these five species on all Project lands in order to protect nearby National Forest System lands. One Class C species for which the County requests management is also presented. This table represents the target weed species proposed for management on Project lands as of 2008.

Table 1. Noxious Weeds Occurring on Jackson Project Lands and 2008 Management Status

Scientific Name	Common Name	2008 Snohomish County Management Status
Centaurea biebersteinii	spotted knapweed	Class B Designate
Hieracium caespitosum	yellow hawkweed	Class B Designate
Polygonum spp. (invasive)	invasive knotweed	Class B Undesignated, County Selected
Senecio jacobaea	tansy ragwort	Class B Undesignated, County Selected
Cirsium arvense	Canada thistle	Class C, County Selected
Cirsium vulgare	bull thistle	Class C, County Selected
Hieracium spp. (non-native)	invasive hawkweed	Class C, County Selected
Cytisus scoparius [1]	Scotch broom	Class B Undesignated
Daucus carota [1]	wild carrot	Class B Undesignated
Geranium robertianum [1]	Herb Robert	Class B Undesignated
Buddleja davidii [1]	butterfly bush	Class C
Lamiastrum galeobdolon [2]	yellow archangel	Class C
Ilex aquifolia [1]	English holly	Not listed

Class B Designate: Control is required (prevention of all seed production)

County Selected: Control is required (prevention of all seed production)

Class B Undesignated: No specific management required

Class C: No specific management required

[1] No management required by State or County; District voluntarily manages selected sites; Forest Service requests management of these species on all Project lands, in addition to Class A, Class B Designates, and County-selected species

[2] No management required by State or County; County NWCB requests voluntary management of documented site

In addition to the species on Table 1, any species of Class A, Class B designate, or County selected noxious weeds that are reported on Project lands during a given year will be incorporated into the Noxious Weed Management Plan and managed in accordance with applicable Washington State law and County regulations. Appendix 2, Target Weed Species for the Jackson Project, is designed to be updated annually to reflect new species occurrences and changes in management status.

Table 2 shows the number of infestations recorded for each noxious weed species based on existing District data and the 2007 inventory, and displays the data by geographic area within the Project boundary. Figure 1 shows the locations of these infestations.

The Project Facilities tract, including the power pipeline right-of-way and Trout Farm Road site, exhibited the largest number of weed species. All but two of the species listed on Table 2 were observed in this geographic area. The Spada Lake area, including access roads and recreation sites, had the second largest number of species and the greatest number of recorded infestations. Four species on Table 2, invasive knotweed, butterfly bush, yellow archangel, and English holly, were not recorded in the Spada Lake geographic area. Only two species, bull thistle and yellow hawkweed, were recorded in the Williamson Creek area. Herb Robert was the single species from Table 2 that was recorded at the Lost Lake tract.

Spotted knapweed was found at one location along the South Shore Road and was treated (hand pulled) on the 2007 survey date. Knotweed is present at one location along the power pipeline right-of-way.

Bull thistle, Canada thistle, yellow hawkweed, other non-native hawkweeds, and tansy ragwort were observed along roadsides, particularly along portions of the South Shore Road at Spada Lake. They also occur at the Project Facilities tract and along the power pipeline right-of-way. Thistles and hawkweeds are present at Culmback Dam; bull thistle and yellow hawkweed were observed at a small number of locations along an abandoned forest road in the Williamson Creek tract.

The Class B undesignated species Scotch broom, wild carrot, and herb Robert were reported from disturbed roadsides and grassy areas in the Project Facilities geographic area, including the power pipeline right-of-way. A small number of infestations were recorded in the Spada Lake area.

The Class C species butterfly bush and yellow archangel were reported only from the Project Facilities geographic area. Butterfly bush is present along project roads and rights-of-way in this area. Yellow archangel was observed at a single site at the Trout Farm.

English holly, which is currently not listed as a noxious weed in Washington State, was documented at the Trout Farm river access sites and near the transmission line right-of-way at the Project Facilities tract.

Table 2. Summary of Weed Infestations on Project Lands by Geographic Area

Scientific Name	Common Name	Lost Lake	Project Facilities, Power Pipeline ROW, Trout Farm	Spada Lake Area, Rec Site 8, and Roads	Williamson Creek Area	Total number of weed infestations per species
Centaurea biebersteinii	spotted knapweed	0	0	1	0	1
Hieracium caespitosum	yellow hawkweed	0	5	3	1	9
Polygonum sp. (invasive)	invasive knotweed	0	1	0	0	1
Senecio jacobaea	tansy ragwort	0	7	6	0	13
Cirsium arvense	Canada thistle	0	7	20	0	27
Cirsium vulgare	bull thistle	0	12	25	4	41
Hieracium sp. (non-native)	invasive hawkweed	0	0	1	0	1
Cytisus scoparius	Scotch broom	0	7	1	0	8
Daucus carota	wild carrot	0	2	1	0	3
Geranium robertianum	Herb Robert	1	5	4	0	10
Buddleja davidii	butterfly bush	0	3	0	0	3
Lamiastrum galeobdolon	yellow archangel	0	1	0	0	1
Ilex aquifolia	English holly	-	4	-	-	4
Total number of weed infestations per geographic area		1	54	62	5	122

4.2 Weed Management Methods

4.2.1 Project-Specific Considerations

The District Vegetation Management Plan (District 2003) contains several items specific to the Jackson Project, including the following:

- "Mechanical tree and brush cutting equipment will be used to the maximum extent possible.

- Herbicides may be applied as necessary to control unwanted vegetation within the Project Facilities tract, including the transmission line right-of-way, the back slope of the powerhouse, and those portions of the power pipeline right-of-way that are outside of the City of Sultan's watershed, defined as the area between the Lake Bronson Camp chain link fence and the Sultan City chain-link fence line on the powerhouse access road. ."

This Noxious Weed Management Plan reflects the requirements of the current VMP. Any modifications to the Noxious Weed Management Plan that are necessary to comply with the VMP will be reported in the annual updates and documented in the TRMP five-year report submitted to FERC

Lake Chaplain Watershed

City of Everett policy currently does not allow the use of chemical pesticides within the Lake Chaplain Watershed, where they may conceivably make their way to waters traveling to the reservoir, or the reservoir itself. Outside of the drinking water watershed, herbicides may be applied after other methods of weed control have proven ineffective at controlling weeds per State and County requirements.

The Project Facilities tract is located outside of the Lake Chaplain watershed. Herbicides are currently used at selected sites in the Project facilities tract, in accordance with the herbicide use criteria provided in the VMP, State and County regulations, and label directions.

Spada Lake Watershed

Within the Spada Watershed, the City of Everett strongly encourages the use of all means of noxious weed management other than chemical pesticides.

Currently, no herbicides are applied to District lands in the Spada watershed. Given that the primary purpose of the Spada Reservoir is municipal drinking water supply, the use of herbicides for weed management on Project lands has been, and will continue to be, extremely restricted. However, the District acknowledges the challenge of managing noxious weeds over such a large area exclusively by manual and mechanical methods, and reserves the option to investigate the use of chemical herbicides when no other method of weed management is effective at achieving control as required by State and/or

County regulations, or when the available methods are cost prohibitive. The District will consult with the City of Everett on its findings.

4.2.2 Ongoing Weed Management Practices

Weeds at the Jackson Project are currently managed through a variety of methods implemented by District staff. Within the Spada Lake watershed, control measures consist primarily of mowing roadsides or hand pulling and clipping of flower heads, as appropriate. Mowing occurs 1-2 times per year along roadsides, and manual pulling/cutting occurs as flower heads develop throughout the growing season. Hand clipping and removal of seed heads has been conducted for several years on a patch of tansy ragwort and thistle along the road side between the South Shore and Nighthawk Recreation sites at Spada Lake.

The District voluntarily manages Scotch broom and butterfly bush along Project roads and facilities by grubbing out small plants, cutting back larger plants, and by hand clipping of flower heads. Wild carrot has been managed in some locations by roadside mowing. A small patch of herb Robert along the Lost Lake road has been treated by hand pulling for several years.

When necessary, and where allowed, herbicides are used to treat individual plants and populations, but every attempt is made to preserve the adjacent desirable vegetation. Recurring infestations along segments of the pipeline right-of-way outside of the Lake Chaplain Watershed are treated by herbicide application one or more times during the growing season, as necessary.

On selected areas where herbicides are not allowed, experimental techniques have been used. These include a large weed mat applied to the backslope at Culmback Dam to control scotch broom and burning of thistle and scotch broom at recreation site 8. Shading of weeds has also been tested on a limited and experimental basis.

Weed treatment locations are noted on a project map and GPS coordinates are recorded for the general areas where weed treatment occurs. This information is then entered into the District's GIS database.

Ongoing monitoring of weed populations is described in Section 6.

4.2.3 Management Methods for Noxious Weeds

Appendix 3 presents a summary of known weed infestations, weed habitat requirements, flowering time and reproductive characteristics, and available management methods for each weed species to be managed under this plan. A site-specific management recommendation, long-term management goal, and five-year management objectives are provided for each species.

- Appendix 3-1. Spotted knapweed (*Centaurea biebersteinii*)
- Appendix 3-2. Yellow hawkweed (*Hieracium caespitosum*) and other invasive hawkweeds (*Hieracium* spp.).

- Appendix 3-3. Invasive knotweed (*Polygonum* spp.)
- Appendix 3-4. Tansy ragwort (*Senecio jacobaea*)
- Appendix 3-5. Canada thistle (*Cirsium arvense*)
- Appendix 3-6. Bull thistle (*Cirsium vulgare*)
- Appendix 3-7. Scotch broom (*Cytisus scoparius*)
- Appendix 3-8. Wild carrot (*Daucus carota*)
- Appendix 3-9. Herb Robert (*Geranium robertianum*)
- Appendix 3-10. Butterfly bush (*Buddleja davidii*)
- Appendix 3-11. Yellow archangel (*Lamiastrum galeobdolon*)
- Appendix 3-12. English holly (*Ilex aquifolia*)

4.3 Pesticide Application and Management

Specifications for the application of pesticides (herbicides) on District lands, including herbicide toxicity ratings, applicator credentials, sensitive area restrictions, and materials storage, handling, and record keeping are provided in the District Vegetation Management Plan (District 2003).

5.0 PREVENTION

Prevention of the introduction and spread of weeds relies on early detection, effective treatment, ongoing education of land managers and the public about weed issues, and proper planning and management of ground- and habitat-disturbing activities.

5.1 Weed Prevention Practices for Construction and Maintenance Projects

One of the most effective tools for reducing the introduction and spread of weeds is careful planning and management of ground-disturbing activities conducted as part of construction, maintenance, or restoration projects. Weeds are readily spread from infested to non-infested areas on the tires, tracks, or blades of heavy equipment. Trucks, off-road vehicles, and even hand tools can transport weed propagules. Contaminated soil and rock fill, mulch, and seed also are often responsible for new weed infestations. Conversely, the availability of heavy equipment can be an opportunity for the weed manager to reduce existing populations at a reduced cost. The weed plan manager should be an active participant, with project engineers and design professionals, throughout the construction planning and implementation process. By incorporating weed prevention design considerations and practices, weed management costs can be reduced.

Weed prevention practices to be implemented at the Jackson Project are presented in Appendix 4.

5.2 Disposal of Weed Material

Plant material from noxious weed species must be disposed of in a way that ensures that no seeds, roots, or other portions of the plant capable of reproduction, are spread. Plant material should be bagged on site if any flowers or seeds are present; paper or plastic

bags can be used. Some species, particularly members of the aster family, can produce seed from immature heads on cut plants; these plants should be bagged even if only in bud. Plant material should be transported to a contained disposal site or an approved landfill. Alternatively, noxious weed material may be buried deeply below a 24-inch or greater layer of weed free soil or rock fill. This should be accomplished as close to the originating site of the weeds as possible, to avoid transport of the species to new areas. This method may not be 100 percent effective, as seed or other propagules may be inadvertently deposited in surface layers.

Soil excavated from sites with noxious weed populations should not be transported to other sites or used as topsoil, to avoid spreading weed seeds or other propagules. The soil can be disposed of at a contained site or an approved landfill. An alternative disposal method is to bury the weed contaminated topsoil as fill below a 24-inch or greater layer of weed-free topsoil, or beneath a similar depth of rock fill. Burial of weed material should be accomplished as close to the originating site of the weeds as possible, to avoid transport of the species to new areas. This method may not be 100 percent effective, as seed or other propagules may be inadvertently deposited in surface layers. Burial is not recommended for invasive knotweed due to its ability to resprout from extremely small pieces of plant material.

5.3 Education

Education and information programs can be used to expand knowledge of weed identification, weed transport, and basic weed prevention practices. Weeds are not transported only via construction activity: passenger vehicles, off-road vehicles, boats and trailers, livestock, and recreationists themselves are capable of inadvertently transporting weeds from one site to another. Education and information programs at the Jackson Project will include:

- Information for the public on identification of aquatic milfoil, and the prevention of its spread to Project waters via boats and trailers. Informational signs will be maintained at all Jackson Project boat launches.

- Training for District biologists in noxious weed identification, weed treatment methods, and weed prevention practices. In addition, weed crew leaders and field staff will continue to receive training in treatment methods and weed prevention practices, particularly proper disposal of weed material.

5.4 Revegetation

Revegetation of disturbed soils with fast-growing, desirable plant species, is a primary method of preventing weed establishment. Soil disturbance can stimulate germination of weed seed that has accumulated in the soil as well as provide substrate for newly introduced seed. Short term erosion control vegetation can provide protection against weed establishment; however, erosion control seed mixes often are comprised of non-native, and sometimes persistent or invasive, species. In developed, human-maintained habitats, such as landscaped areas, non-native species may be appropriate and acceptable.

However, in native plant communities, it is often desirable to revegetate with a seed mix comprised of natives or non-native, non-invasive species that will not outcompete native species.

The District will revegetate sites where Project-related activities result in substantial areas of habitat and soil disturbance, and where revegetation is practicable (*e.g.*, sites such as rock quarries and the fluctuation zone of the reservoir are not included). Revegetation actions will reflect consideration of each site's vegetative condition and future land use, adjacent land uses, habitat management objectives, and site maintenance requirements.

The use of native plants will be considered for sites located in relatively undisturbed, native plant-dominated communities. Non-invasive, non-native plant species will be used where their use is consistent with current and expected future land uses (*e.g.*, landscaped sites, frequently disturbed sites, managed forest stands) and where necessary to achieve objectives associated with site management and maintenance activities (*e.g.*, forage production, erosion control, temporary cover, soil conditioning, and weed suppression.).

Specific revegetation guidelines and plant community objectives currently exist for the power pipeline right-of-way and other facilities in the Project Facility Lands tract as part of terrestrial resource management. The Project Facility Lands Tract Resource Management Plan (District 2001) and the associated Right-of-Way Management Standard Operating Procedures (District 1997) will continue to direct revegetation activities at these sites and will be updated as needed.

Three seed mixes suitable for general revegetation of native habitats on Jackson Project lands are provided in Appendix 5. These seed mixes were developed by the U.S. Forest Service (2005) for use in erosion and weed control on decommissioned roads and are based on commercially available seed. The species are non-native, non-invasive, and relatively short-lived, allowing native plants to recolonize the reseeded sites over time.

6.0 MONITORING AND REPORTING

6.1 Site-Specific Monitoring

Monitoring of weed populations on Project lands is conducted by District staff. Project lands that are open to the public are regularly patrolled via the road network during the growing season. Locations of weed infestations are noted by District staff and treatment measures are implemented. Roads and pipeline rights-of-way are patrolled several times during the growing season to identify areas where weed control is required.

Currently, District staff note the locations of weed infestations on Project maps and enter the location data into the District's GIS database. The dates and specific information related to implementation of control measures are also documented. Weed monitoring and treatment activities are reported to WDFW, USFWS and the Tribes as part of the WHMP reporting process.

Under this new plan, monitoring of specific weed sites and treated areas within the Project boundary will be continued. New weed sites detected on Project lands during the 2007 inventory will be monitored after treatment, as described in the individual species management methods. Sites where the risk of regrowth and potential for spread are higher, such as heavily visited recreation sites, are scheduled for more frequent monitoring than those sites where those risks are low due to, for example, overstory shading and lack of human disturbance.

A summary of scheduled monitoring activity is provided in Section 9.

6.2 General Monitoring

Incidental observations of weeds on Project lands are reported by staff conducting other activities on Project roads, at Project facilities, and on other Project lands. A primary source of weed information is the District biologists' regular field review of forested stands and wetlands within wildlife habitat management tracts. Monitoring and patrolling of Project roads and recreation facilities also result in new observations of weed species. Currently, the river corridor is not regularly patrolled for weeds, but weeds are identified during annual fish surveys. Several known locations of Scotch broom on gravel bars below the Powerhouse and down to the mouth of the river are managed voluntarily each year. Because weed infestations are most readily eradicated when they are small, early detection is key to successful weed management. Incidental observations of target weed species will be reported by District biologists and other field staff, using a standard District form. Weed sightings will be referred to a trained weed manager so that treatment action can be implemented as soon as possible. Field staff will be instructed to carry a simple digging tool and plastic bags, so that individual plants can be removed from the site immediately. These 'spot treatments' will also be reported to the weed manager so that the sites can be monitored in the future for regrowth.

Incidental observations of target weeds will be included in the Annual Report. In addition to the target weed species listed in Table 2, any species of Class A, Class B designate, or County selected noxious weeds that are reported on Project lands during a given year will be incorporated into the Noxious Weed Management Plan and managed in accordance with applicable Washington State law and County regulations.

6.3 Reporting

As part of the TRMP reporting process, an annual update will be prepared summarizing the noxious weed treatment and monitoring activities of the previous year and any updates to the Noxious Weed Management Plan or its appendices. This summary and update of weed management activities will be distributed to the parties consulted regarding weed management, as listed in this plan under Section 7.0 Consultation, below.

Periodic (five-year) review of plan accomplishments and update of lists and appendices, prepared in consultation with the parties consulted and listed below will be provided to FERC as part of the TRMP five-year report.

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7.0 CONSULTATION

The Noxious Weed Management Plan was developed in consultation with the Terrestrial Resources Stakeholders. Specific entities with regulatory authority and major land owners/managers with holdings abutting the Jackson Project also were consulted during the development of the Plan. These entities include the Snohomish County Noxious Weed Board, the City, DNR, USFWS, WDFW and USFS.

8.0 MODIFICATION OF MANAGEMENT PLAN

The Noxious Weed Management Plan is intended to guide the management of noxious weeds throughout the term of the license. Modifications to the plan may be proposed by the licensee after consultation with the parties listed in Section 7.0 Consultation and will be reported as part of the TRMP reporting process and provided to the Snohomish County Noxious Weed Board coordinator, the City, DNR, USFWS, WDFW and USFS.

Weed management is dynamic in terms of regulatory requirement, weed occurrence, site conditions, and treatment methodology. Specific elements of the plan require annual review and update, including the list of target noxious weed species required to be managed and the list of weed species occurring within the Project boundary. The list of sites to be treated and/or monitored and the list of available treatments and prevention practices also will require periodic review and update, although not necessarily on an annual basis.

8.1 Annual Review of Noxious Weed List

Each year, within 60 days after the County's issuance of its annual updated weed list, the District will update the list of target noxious weed species (Appendix 2) to be managed under the plan in consultation with the Snohomish County Noxious Weed Control Board and other consulted parties, as noted in Section 7.0 Consultation. The updated list of target species will include newly-listed and documented Class A, Class B designate, and County selected noxious weed species, as well as those species managed voluntarily by the District per agreement with the consulted parties.

8.2 Update of Species-Specific Management Methods

Each year, the District will review individual species management methods (Appendix 3) and will revise the appendices as needed to incorporate new species occurrences within the Project boundary and changes to state and county management requirements.

8.3 Five-Year Plan Review

Every five years, the District will review the weed management plan in consultation with the parties listed in Section 7.0 Consultation. The five-year review will provide an opportunity to modify the plan to reflect changing management priorities and the results of ongoing treatment and monitoring. Individual species management methods (Appendix 3) will be revised to incorporate new treatment methods, revised site priorities, and revised management recommendations for Project lands. These

modifications will be reflected in the implementation and monitoring schedules for the next five-year period.

9.0 IMPLEMENTATION AND MONITORING SCHEDULE

Within the first five years after license issuance, the District will implement treatment at all new weed sites on Project lands that were identified during the 2007 inventory. This activity will include treatment of 43 new sites:

- Invasive hawkweeds: 2 sites
- Tansy ragwort: 2 sites
- Canada thistle: 8 sites
- Bull thistle: 8 sites
- Scotch broom: 5 sites
- Wild carrot: 2 sites
- Herb Robert: 9 sites
- Butterfly bush: 2 sites
- Yellow archangel: 1 site
- English holly: 4 sites

Monitoring of Project roads, facilities, and treated weed sites will be conducted annually by District personnel. Newly treated sites as well as those weed sites currently under management on Project lands will be monitored and retreated as necessary. As of summer 2008, a total of 79 sites were under active management by the District, including one knotweed site along the power pipeline right-of-way. Proposed monitoring for each species is described in detail in Appendix 3. The majority of sites are scheduled for annual inspection at a minimum; a few remote sites with small infestations are scheduled for monitoring every other year. District personnel will typically survey the most disturbed and weed-prone Project habitats, such as the Powerhouse, power pipeline right-of-way, and Culmback Dam area, three to four times per growing season.

In addition to monitoring of known weed infestations, District Biologists and other field personnel will conduct general monitoring of Project lands. During the course of field activity, personnel will note and report the occurrence of new infestations of target weed species on Project lands. General monitoring will be conducted each year, with most activity occurring during the spring/summer/early fall field season.

10.0 LITERATURE CITED

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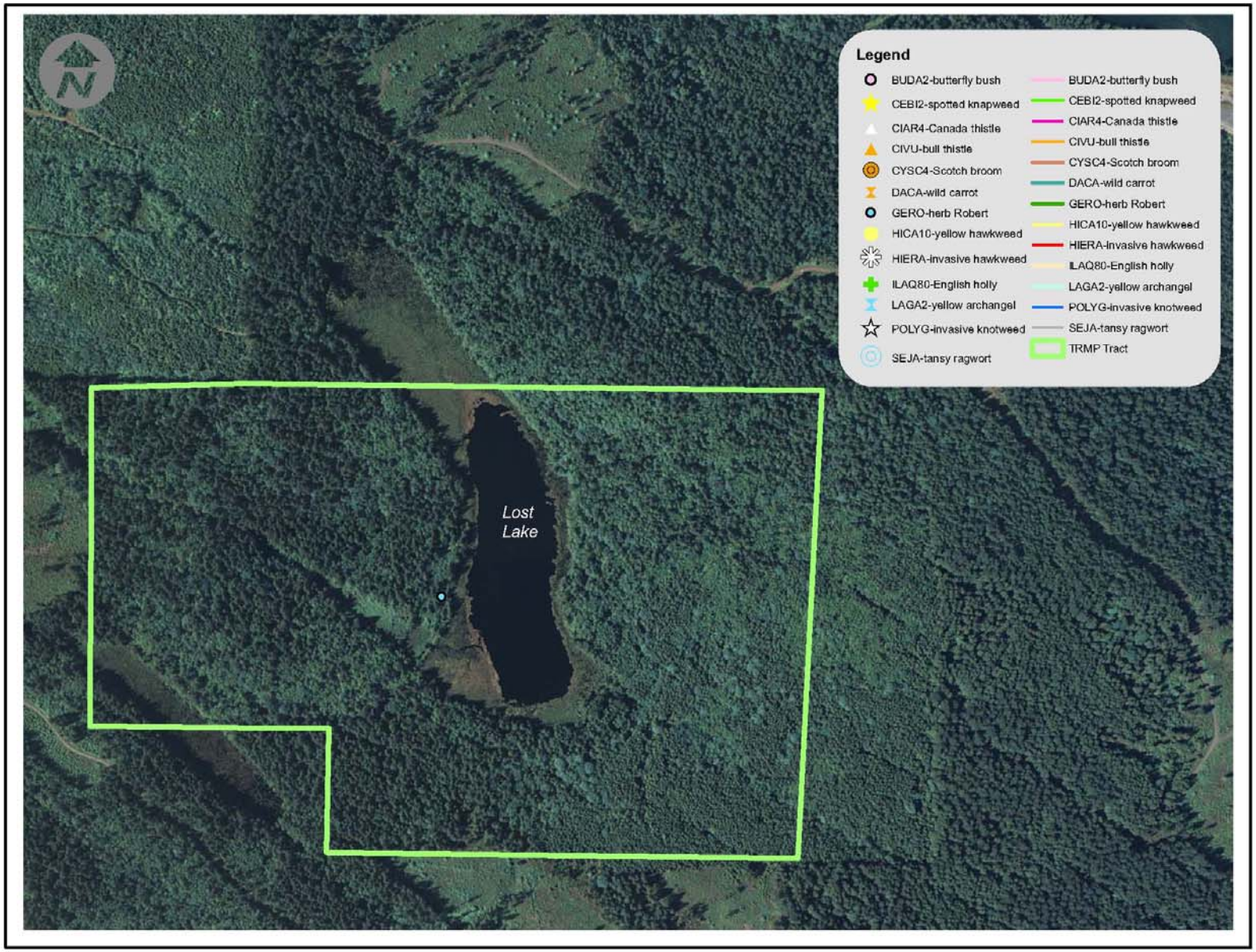

Figure 1 Noxious Weed Locations on the Lost Lake Tract (Map 1 of 6)

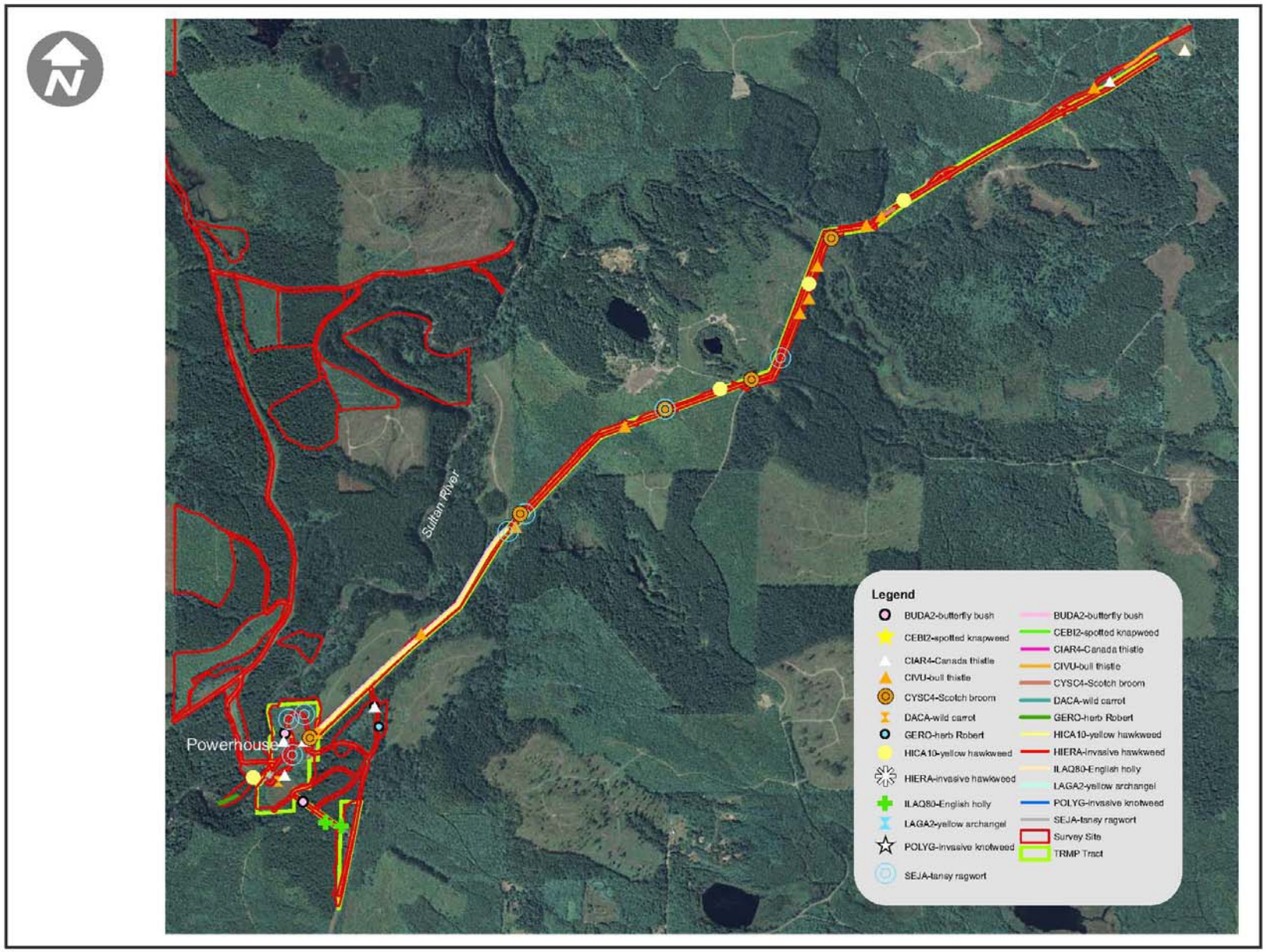

Figure 1 Noxious Weed Locations on the Project Facilities Land Tract (Map 2 of 6)

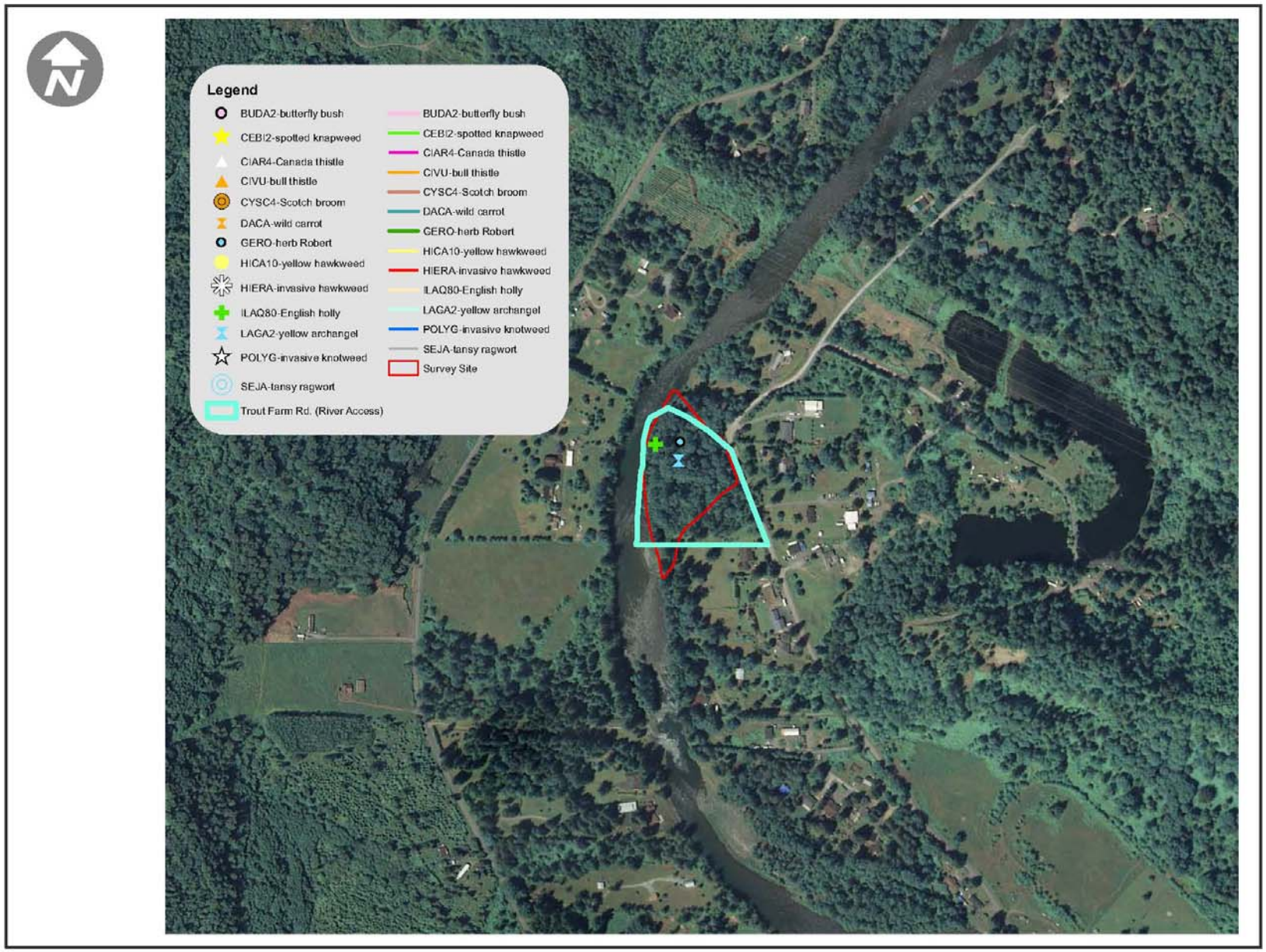

Figure 1 Noxious Weed Locations on the Trout Farm Rd. River Access Site (Map 3 of 6)

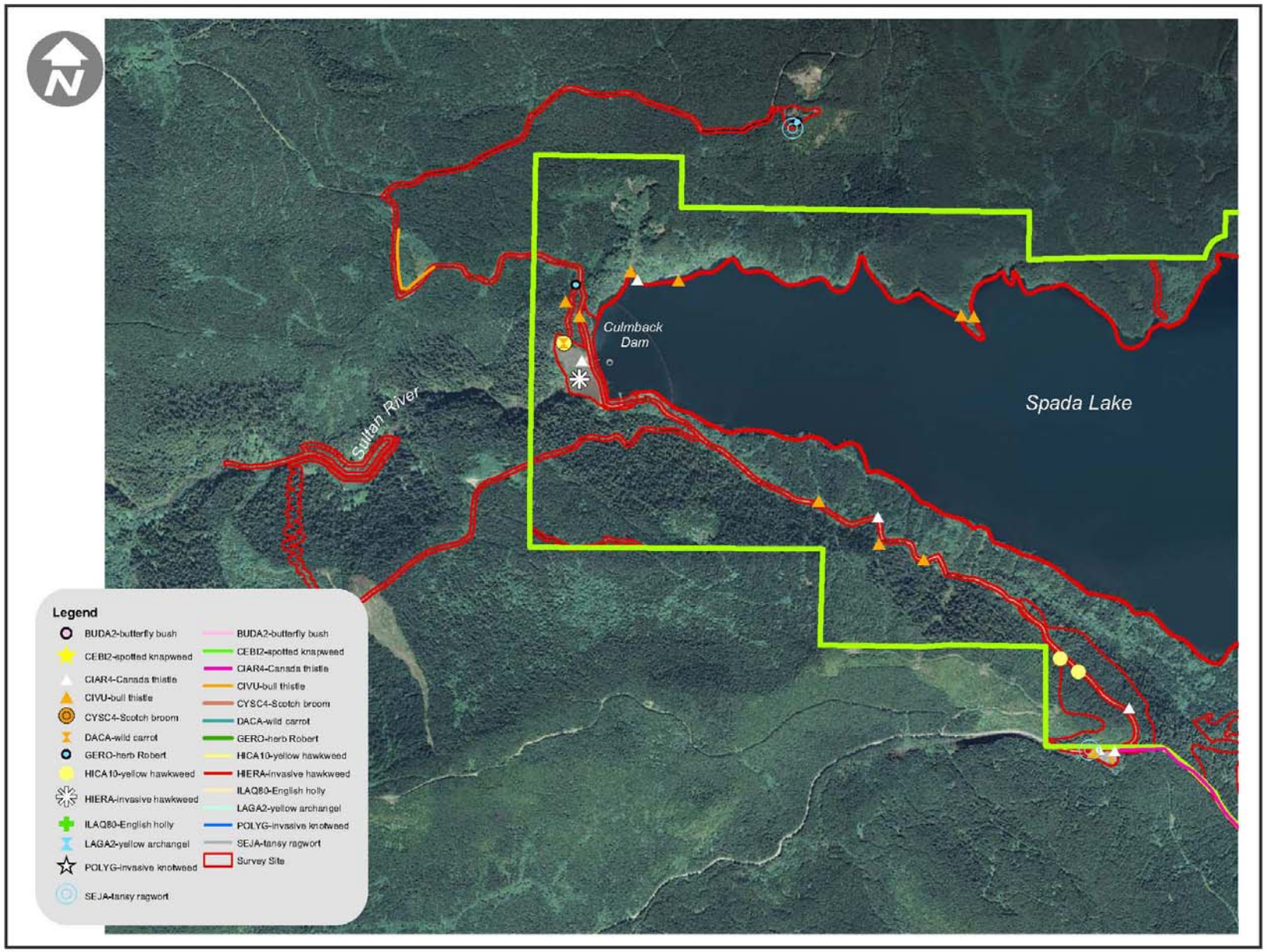

Figure 1 Noxious Weed Locations on the Spada Lake Tract and Recreation Sites (Map 4 of 6)

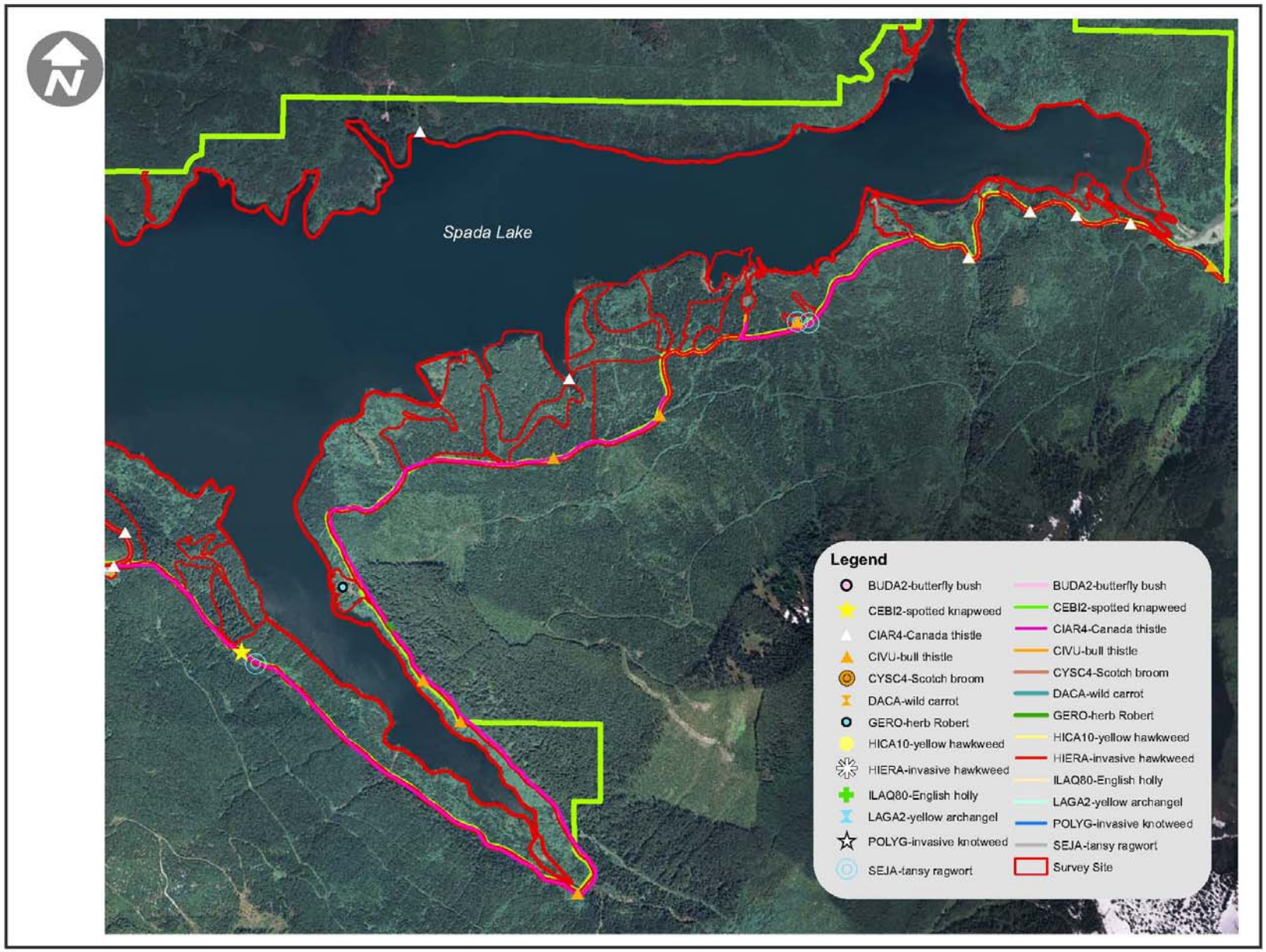

Figure 1 Noxious Weed Locations on the Spada Lake Tract and Recreation Sites (Map 5 of 6)

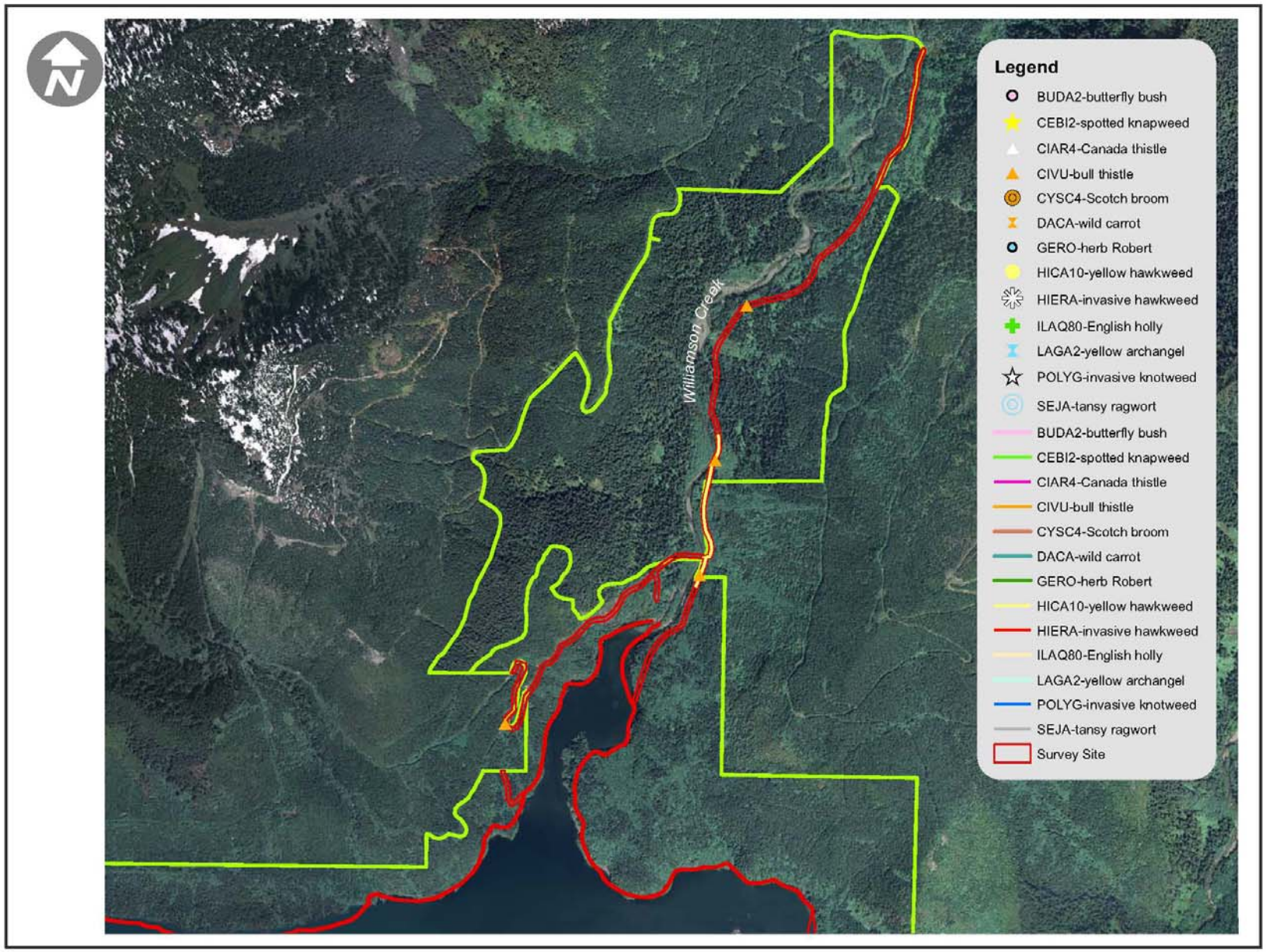

Figure 1 Noxious Weed Locations on the Spada Lake and Williamson Creek Tracts (Map 6 of 6)

Appendix 1. 2008 Washington State Noxious Weed List with Snohomish County Designations

Common Name	*Scientific Name*	Code
CLASS A		
velvetleaf	*Abutilon theophrasti*	ABTH
garlic mustard	*Alliaria petiolata*	ALPE4
thistle: Italian	*Carduus pycnocephalus*	CAPY2
slenderflower	*Carduus tenuiflorus*	CATE2
purple starthistle	*Centaurea calcitrapa*	CECA2
knapweed: bighead	*Centaurea macrocephala*	CEMA9
knapweed: Vochin	*Centaurea nigrescens*	CENI3
common crupina	*Crupina vulgaris*	CRVU2
spurge: eggleaf	*Euphorbia oblongata*	EUOB4
goatsrue	*Galega officinalis*	GAOF
reed sweetgrass	*Glyceria maxima*	GLMA3
Texas blueweed	*Helianthus ciliaris*	HECI
giant hogweed	*Heracleum mantegazzianum*	HEMA17
hawkweed: yellow devil	*Hieracium floribundum*	HIFL3
hawkweed: European	*Hieracium sabaudum*	HISA4
hydrilla	*Hydrilla verticillata*	HYVE3
dyers woad	*Isatis tinctoria*	ISTI
floating primrose-willow	*Ludwigia peploides*	LUPE5
wild four o'clock	*Mirabilis nyctaginea*	MINY
variable-leaf milfoil	*Myriophyllum heterophyllum*	MYHE2
kudzu	*Pueraria montana* var. *lobata*	PUMOL
sage: Mediterranean	*Salvia aethiopis*	SAAE
sage: meadow clary	*Salvia pratensis*	SAPR2
sage: clary	*Salvia sclarea*	SASC2
ricefield bulrush	*Schoenoplectus mucronatus*	SCMU10
thistle: milk	*Silybum marianum*	SIMA3
silverleaf nightshade	*Solanum elaeagnifolium*	SOEL
buffalobur	*Solanum rostratum*	SORO
johnsongrass	*Sorghum halepense*	SOHA
cordgrass: common	*Spartina anglica*	SPAN5
cordgrass: dense flower	*Spartina densiflora*	SPDE2
cordgrass: salt meadow	*Spartina patens*	SPPA
Spanish broom	*Spartium junceum*	SPJU2
spurge flax	*Thymelaea passerina*	THPA7
Syrian bean-caper	*Zygophyllum fabago*	ZYFA
CLASS B		
Russian knapweed	*Acroptilon repens*	ACRE3
camelthorn	*Alhagi maurorum*	ALMA12
blackgrass	*Alopecurus myosuroides*	ALMY
indigobush	*Amorpha fruticosa*	AMFR
bugloss: annual	*Anchusa arvensis*	ANAR16
bugloss: common	*Anchusa officinalis*	ANOF
wild chervil	*Anthriscus sylvestris*	ANSY
hoary alyssum	*Berteroa incana*	BEIN2
white bryony	*Bryonia alba*	BRAL4
fanwort	*Cabomba caroliniana*	CACA
thistle: plumeless	*Carduus acanthoides*	CAAC
thistle: musk	*Carduus nutans*	CANU4

Common Name	***Scientific Name***	**Code**
longspine sandbur	*Cenchrus longispinus*	CELO3
knapweed: diffuse	*Centaurea diffusa*	CEDI3
knapweed: brown	*Centaurea jacea*	CEJA
knapweed: meadow	*Centaurea jacea x nigra*	CEJAN
knapweed: black	*Centaurea nigra*	CENI2
yellow starthistle	*Centaurea solstitialis*	CESO3
knapweed: spotted	*Centaurea stoebe (C. biebersteinii)*	CESTM (CEBI2)
rush skeletonweed	*Chondrilla juncea*	CHJU
poison hemlock	*Conium maculatum*	COMA2
houndstongue	*Cynoglossum officinale*	CYOF
yellow nutsedge	*Cyperus esculentus*	CYES
Scotch broom	*Cytisus scoparius*	CYSC4
spurge laurel	*Daphne laureola*	DALA11
wild carrot	*Daucus carota*	DACA6
blueweed	*Echium vulgare*	ECVU
Brazilian elodea	*Egeria densa*	EGDE
spurge: leafy	*Euphorbia esula*	EUES
spurge: myrtle	*Euphorbia myrsinites*	EUMY2
common fennel	*Foeniculum vulgare*	FOVU
herb-Robert	*Geranium robertianum*	GERO
hawkweed: polar	*Hieracium atratum*	HIAT2
hawkweed: orange	*Hieracium aurantiacum*	HIAU
hawkweed: yellow	*Hieracium caespitosum*	HICA10
hawkweed: queen-devil	*Hieracium glomeratum*	HIGL3
hawkweed: smooth	*Hieracium laevigatum*	HILA4
hawkweed: mouseear	*Hieracium pilosella*	HIPI
common catsear	*Hypochaeris radicata*	HYRA3
policeman's helmet	*Impatiens glandulifera*	IMGL
kochia	*Kochia scoparia (Bassia scoparia)*	KOSC (BASC5)
perennial pepperweed	*Lepidium latifolium*	LELA2
lepyrodiclis	*Lepyrodiclis holosteoides*	LEHO7
oxeye daisy	*Leucanthemum vulgare*	LEVU
Dalmatian toadflax	*Linaria dalmatica* ssp. *dalmatica*	LIDAD
water primrose	*Ludwigia hexapetala (L. grandiflora)*	LUHE5 (LUGRH)
loosestrife: garden	*Lysimachia vulgaris*	LYVU
loosestrife: purple	*Lythrum salicaria*	LYSA2
loosestrife: wand	*Lythrum virgatum*	LYVI3
parrotfeather	*Myriophyllum aquaticum*	MYAQ2
Eurasian watermilfoil	*Myriophyllum spicatum*	MYSP2
yellow floating heart	*Nymphoides peltata*	NYPE
thistle: Scotch	*Onopordum acanthium*	ONAC
common reed	*Phragmites australis*	PHAU7
hawkweed oxtongue	*Picris hieracioides*	PIHI
knotweed: Bohemian	*Polygonum bohemicum*	POBO10
knotweed: Japanese	*Polygonum cuspidatum*	POCU6
knotweed: Himalayan	*Polygonum polystachyum*	POPO5
knotweed: giant	*Polygonum sachalinense*	POSA4
knotweed: unid. invasive spp	*Polygonum sp.*	POINV
sulfur cinquefoil	*Potentilla recta*	PORE5
Austrian fieldcress	*Rorippa austriaca*	ROAU
grass-leaved arrowhead	*Sagittaria graminea*	SAGR
tansy ragwort	*Senecio jacobaea*	SEJA
lawnweed	*Soliva sessilis*	SOSE2
perennial sowthistle	*Sonchus arvensis* ssp. *arvensis*	SOARA2
cordgrass: smooth	*Spartina alterniflora*	SPAL

Common Name	*Scientific Name*	Code
swainsonpea	*Sphaerophysa salsula*	SPSA3
saltcedar	*Tamarix ramosissima*	TARA
puncturevine	*Tribulus terrestris*	TRTE
gorse	*Ulex europaeus*	ULEU
CLASS C		
jointed goatgrass	*Aegilops cylindrica*	AECY
absinth wormwood	*Artemisia absinthium*	ARAB3
butterfly bush	*Buddleja davidii*	BUDA2
hoary cress	*Cardaria draba*	CADR
hairy whitetop	*Cardaria pubescens*	CAPU6
thistle: Canada	*Cirsium arvense*	CIAR4
thistle: bull	*Cirsium vulgare*	CIVU
old man's beard	*Clematis vitalba*	CLVI6
field bindweed	*Convolvulus arvensis*	COAR4
smoothseed alfalfa dodder	*Cuscata approximata*	CUAP2
hairy willow-herb	*Epilobium hirsutum*	EPHI
babysbreath	*Gypsophila paniculata*	GYPA
English ivy: four cultivars only	*Hedera helix* 'Baltica', 'Pittsburgh', 'Star' ;*H. hibernica* 'Hibernica'	HEHE, HEHI12
spikeweed	*Hemizonia pungens*	HEPU5
Hawkweeds, except not listed as A or B, native spp.	*Hieracium* spp.	HISPP
black henbane	*Hyoscyamus niger*	HYNI
common St. Johnswort	*Hypericum perforatum*	HYPE
yellow flag iris	*Iris pseudacorus*	IRPS
yellow archangel	*Lamiastrum galeobdolon*	LAGA2
yellow toadflax	*Linaria vulgaris*	LIVU2
scentless mayweed	*Matricaria perforata*	MAPE2
fragrant water lily	*Nymphaea odorata*	NYOD
reed canarygrass	*Phalaris arundinacea*	PHAR3
curly-leaf pondweed	*Potamogeton crispus*	POCR3
cereal rye	*Secale cereale*	SECE
common groundsel	*Senecio vulgaris*	SEVU
white cockle	*Silene latifolia* ssp. *alba*	SILAA3
common tansy	*Tanacetum vulgare*	TAVU
hedgeparsley	*Torilis arvensis*	TOAR
spiny cocklebur	*Xanthium spinosum*	XASP2

Species in **bold** are Snohomish County Class B designates; **control is required**
Species in italic ***bold*** are Snohomish County Class B or C selected; **control is required**

Class A Weeds: Non-native species whose distribution in Washington is still limited. Preventing new infestations and eradicating existing infestations are the highest priority. **Eradication of all Class A plants is required by law**.

Class B Weeds: Non-native species presently limited to portions of the State. Species are designated for control in regions where they are not yet widespread. Preventing new infestations in these areas is a high priority. In regions where a Class B species is already abundant, control is decided at the local level, with containment as the primary goal.

Class C Weeds: Noxious weeds which are already widespread in Washington or are of special interest to the state's agricultural industry. The Class C status allows counties to enforce control if locally desired. Other counties may choose to provide education or technical consultation.

Appendix 2. Jackson Project 2008 Target Noxious Weed Species

Scientific Name	Common Name	2008 Snohomish County Management Status
Centaurea biebersteinii	spotted knapweed	Class B Designate
Hieracium caespitosum	yellow hawkweed	Class B Designate
Polygonum spp. (invasive)	invasive knotweed	Class B Undesignated, County Selected
Senecio jacobaea	tansy ragwort	Class B Undesignated, County Selected
Cirsium arvense	Canada thistle	Class C, County Selected
Cirsium vulgare	bull thistle	Class C, County Selected
Hieracium spp. (non-native)	invasive hawkweed	Class C, County Selected
Cytisus scoparius [1]	Scotch broom	Class B Undesignated
Daucus carota [1]	wild carrot	Class B Undesignated
Geranium robertianum [1]	Herb Robert	Class B Undesignated
Buddleja davidii [1]	butterfly bush	Class C
Lamiastrum galeobdolon [2]	yellow archangel	Class C
Ilex aquifolia [1]	English holly	Not listed

Class B Designate: Control is required (prevention of all seed production)

County Selected: Control is required (prevention of all seed production)

Class B Undesignated: No specific management required

Class C: No specific management required

[1] No management required by State or County; District voluntarily manages selected sites; Forest Service requests management of these species on all Project lands, in addition to Class A, Class B Designates, and County-selected species

[2] No management required by State or County; County NWCB requests voluntary management of documented site

Appendix 3. Species-Specific Management Methods for the Jackson Project 2009

Appendix 3-1
Management Methods for Spotted Knapweed
(*Centaurea biebersteinii*)

Known Sites : One site was documented along the South Shore Road of Spada Lake during the 2007 inventory. A single, isolated population, occupying approximately 100 square feet was recorded. All plants were pulled on the survey date of 08-23-07.

Habitat and Threats: Spotted knapweed typically grows in well-drained soils in disturbed, open habitats including meadows, vacant lands, road side ditches, pasturelands, and railroad grades. It is an aggressive, allelopathic invader of pasturelands, and provides low palatability as livestock forage.

Reproduction and Flowering Period: Spotted knapweed reproduces solely by seed. Fall seedlings are able to overwinter as rosettes and produce flowering stalks the following summer. Seed can live in the soil for up to seven years. Each plant can produce up to about 1,000 seeds over an extended flowering period from May through September. In the Project vicinity, flowering is most likely to occur between June and early September.

Identification: Spotted knapweed is a taprooted perennial that grows up to five feet tall. The stems and leaves are green with a silver-gray appearance created by numerous small hairs. Stems are upright and branched; leaves range from lobed to deeply divided. The flowers are pink to lavender and relatively small. The bracts are veined and the upper bract margin is tipped with black and fringed with short spines.

Available Management Methods:
***Prevention*:** Specifying weed-free fill, mulch, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned before moving to or from infested areas. Check for basal leaf rosettes in the spring, and treat early to prevent flowering.

Manual: Hand pulling, digging or grubbing of plants is effective for small populations. Hand pulling is most effective when soils are moist. A digging tool should be used on mature plants and rosettes in dry soils to completely remove the root, which will otherwise resprout. If removal is conducted after flowering commences, plants should be bagged and destroyed to prevent seed set and/or dispersal.

Mechanical: Mechanical methods such as rototilling and plowing are effective on spotted knapweed, but are not appropriate for the small, roadside infestation at the Project. Mowing is effective at removing the flowering heads, but seeds can set from the cut heads and plants likely will flower again in the same season. Mowing will not kill the basal rosette and may induce flowering below the level of the mower blade.

Cultural: Disturbance of soil and desired vegetation in the vicinity of the known infestation should be minimized to reduce the opportunity for germination of seed in the soil. Mulching of areas where spotted knapweed has been removed also will help reduce

seed germination. Large patches of bare soil patches should be seeded or planted with desired plant species if not expected to revegetate naturally.

Chemical: Several selective broadleaf herbicides are effective on spotted knapweed. Due to the small size of the population, the availability of effective manual methods, and the District directive to avoid herbicide use in the watershed whenever practicable, herbicide treatment is not recommended for this isolated infestation.

Biological: Due to the small size of the population and the availability of effective manual methods, biological methods are not appropriate for this site. Biological methods are most effective on very large populations where other methods are not available or effective.

Management Recommendation for Spotted Knapweed at the Jackson Project: Hand pull, dig, or grub out individual plants. Pull plants when soil is moist to facilitate removal of entire root; in dry soil conditions, use a digging tool to remove the entire root. Bag any stalks with buds, flowers, or seeds, and remove from site.

Keep soil disturbance to the minimum possible while removing plants to reduce the potential for germination of seed. Actively revegetate any sites where weed removal activities result in soil disturbance of one square meter or more. Use preventative measures to reduce introduction of spotted knapweed seed onto Project lands.

Long-Term Management Goal: Spotted knapweed is a Class B designate; control (per WAC 16-750) is required in Snohomish County. Control and elimination of the known population within the Project boundary is the Project-level goal.

Five-Year Management Objectives:

- Initial treatment implemented in 2007.
- Monitor site annually in summer and retreat as necessary.
- After two consecutive monitoring events show no presence of the species, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

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Table 3-1.1 Spotted Knapweed Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Watershed	Survey Site	Ownership	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
EKD1210C	SPADA LK	SPADA	ROAD REC SITE 1 TO 3	DISTRICT	100	2	L	PULLED	

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-2
Management Methods for Yellow Hawkweed and other Invasive Hawkweeds (*Hieracium caespitosum; Hieracium* spp.)

Known Sites: Nine yellow hawkweed sites and one invasive hawkweed site have been documented within the Project boundary. These sites include five in the Project Facilities area, four in the Spada Lake area, and one at Williamson Creek.

Sites along the power pipeline right-of-way and at Culmback Dam have been treated during ongoing weed management activities conducted by the District. Treatment of the Williamson Creek infestations was initiated in 2008.

Habitat and Threats: Hawkweeds typically grow in full sun or partial shade in well-drained soils of roadsides, fields, pastures, and other disturbed habitats. Hawkweeds can be found in partial shade in forest openings and edges. Most non-native hawkweeds reproduce by stolons as well as seed, and can rapidly spread to form dense mats, outcompeting native pasture species.

Reproduction and Flowering Period: Hawkweeds produce numerous small seeds from flowers that begin to bloom in May and June; flowering and seed production can continue through September. In the Project vicinity, flowering is most likely to occur between June and September. When mowed, the plants will send up a shorter flower shoot, and stolon production is stimulated. After repeated mowings, a dense, low mat of predominantly basal leaves and short flowering stems is produced.

Identification: Non-native hawkweeds hybridize freely and can be difficult to identify to species. Typically, non-native hawkweeds have stolons and few stem leaves, while natives tend not to produce stolons and have leafy stems. Refer to Wilson (2006) for a key to invasive and native hawkweeds of the Pacific Northwest.

Available Management Methods:
***Prevention*:** Specifying weed-free fill, mulch, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles, equipment, and personal gear should be cleaned regularly when moving to or from infested areas. Check for basal leaf rosettes in the spring, and treat early to prevent flowering.

***Manual*:** Hand pulling, digging or grubbing of plants is effective for small populations. Pull plants after bolting but before flowering, for best results. Hand pulling is most effective when soils are moist. A digging tool should be used on mature plants and rosettes in dry soils to completely remove the fibrous root, which will resprout from very small fragments. Viable seed can be produced from flowers after pulling, so plants in bud, flower, and seed should be bagged for removal from the site. If plants are already in seed, cut seed heads and bag before digging up roots, to avoid spreading the lightweight seeds.

***Mechanical*:** Mowing is not effective for long-term management of invasive hawkweeds, as they are perennial and most reproduce by stolons. Mowing will remove the flowering stalks, but most species will respond by flowering again soon after mowing. Mowing will not kill the basal rosette and may induce flowering below the level of the mower blade.

Cultural: Disturbance of soil and desired vegetation in the vicinity of known infestations should be minimized to reduce the opportunity for germination of seed in the soil. Application of mulch to sites where hawkweed has been manually removed will help to reduce germination of seed. Large patches of bare soil (one square meter or more) that are not expected to revegetate naturally with native seed source should be seeded or planted with desired species.

Shade cloth could be used experimentally to determine its effectiveness at killing hawkweed; it has been demonstrated to kill knotweed infestations. Because the shade cloth will kill associated plants, this treatment is more appropriate for dense hawkweed patches than sparse hawkweed infestations mixed with patches of native habitat. Shade cloth should be placed to cover the infestation plus a border of one to two feet and left in place for one to two growing seasons. The status of the infestation should be monitored periodically to determine if roots and stolons have been killed and to remove any stolons extending out around the edges. To prevent reinfestation of the open soil, treated sites should be revegetated with desirable species. Shrubs can be planted through the shade cloth if a biodegradable product is used; otherwise a grass/forb seed mix appropriate for roadsides should be planted and mulched after removal of the cloth.

Chemical: Several selective broadleaf herbicides are effective on hawkweeds, using spring and early summer applications. Plants sprayed during flowering may still produce viable seed, so flower head clipping and bagging is advised.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Selective herbicide use is retained as an available treatment method under this plan, in the event that large populations of hawkweed require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: There are no biological controls available for hawkweeds at this time.

Management Recommendation for Invasive Hawkweeds at the Jackson Project: Several species of non-native hawkweeds are listed on the Snohomish County noxious weed list, ranging from Class A to Class C, County selected. The most common invasive hawkweed observed during the 2007 inventory at the Jackson Project was yellow hawkweed, a Class B designate species. Several unidentifiable specimens, and possible hybrids, were also collected. No Class A species of hawkweed were identified. It is recommended that all unidentified, non-native hawkweeds at the site be targeted for

control per the WAC 16-750 requirements for a Class B designate or County selected species.

Hand pull, dig, or grub out individual plants. Pull plants when soil is moist to facilitate removal of entire root; in dry soil conditions, use a digging tool to remove the entire root. Remove plants prior to seed production to reduce opportunity for seed dispersal; if plants are in seed, cut and bag seed heads prior to digging out roots. Bag any stalks with buds, flowers, or seeds, and remove from site.

Keep soil disturbance to the minimum possible to reduce the potential for germination of seed. Actively revegetate any sites where weed removal activities result in soil or vegetation disturbance of one square meter or more. Use preventative measures to reduce introduction of hawkweed seed onto Project lands.

If hawkweed population control is not effective with manual, mechanical, or cultural treatments, consultation with the County NWCB, City of Everett, and other affected landowners/managers should be initiated to discuss the possible short-term use of herbicides.

Long-Term Management Goal: Yellow hawkweed is a Class B designate; other invasive hawkweeds are selected for control (per WAC 16-750) by the Snohomish County NWCB. Control of yellow hawkweed and unidentified non-native hawkweed populations (per WAC 16-750), with eventual reduction within the Project boundary, is the Project-level goal.

Five-Year Management Objectives:

- Continue treatment along Project roads, recreation sites, power pipeline right-of-way, and Project facilities.
- Initiate treatment at Williamson Creek site and DNR lands river access within one year.
- Continue to monitor treated sites annually and retreat as necessary.
- After two consecutive monitoring events show no presence of invasive hawkweed, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

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Callihan, R.H., L.M.Wilson, J.P. McCaffrey, and T. Miller. 1997. The hawkweeds. Pacific Northwest Extension Publication 499. July 1997. University of Idaho Cooperative Extension System, Oregon State University Extension Service, and Washington State University Cooperative Extension.

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Wilson, L.M., J. Gehrer, S. Brautigam, and G. Grosskopf. 2006. A new invasive hawkweed, *Hieracium glomeratum* (Lactuceae, Asteraceae), in the Pacific Northwest. Can.J.Bot. 84: 133-142.

Table 3-2.1 Invasive Hawkweed Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH8501C	PROJECT FACILITIES	DNR LANDS RIVER ACCESS	900	3	L		
EKD0810C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	2000	2	T	MOWED	Rosettes within mowed area
EKD0870C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	20	2	L	MOWED	Within mowed area; few plants in flower
EKD0910C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	100	2	L	MOWED	Mowed roadside; many rosettes, no flowers
SWH1941S	PROJECT FACILITIES	POWER PIPELINE ROAD PHOUSE TO HORSESHOE BEND		5	L	MOWED	
EKD1091U	SPADA LK	CULMBACK DAM & ROAD		2	T	NOT TREATED	Terraces, with HIAL2 and HIERA
EKD1121U	SPADA LK	CULMBACK DAM & ROAD		2	T	MOWED	Scattered on terraces, face of dam and road
EKD1161C	SPADA LK	CULMBACK DAM & ROAD	16	1	M	MOWED	
EKD1162C	SPADA LK	CULMBACK DAM & ROAD	6	1	T	MOWED	
SWH1831S	WILLIAMSON	WILLIAMSON RDS EAST		5	L		Scattered along road and into forest; HIERA also present; scheduled for initial treatment (hand pulling) in 2008

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-3
Management Methods for Invasive Knotweeds (*Polygonum* spp.)

Known Sites: One population of invasive knotweed is present within the Project boundary, in the Project Facilities tract along the power pipeline right-of-way. This infestation has apparently encroached onto Project lands from adjacent property. Initial treatment of this site with herbicide was implemented in 2007. The site is located on a segment of the power pipeline right-of-way outside of the Lake Chaplain and City of Sultan drinking water supply watersheds.

Habitat and Threats: Knotweed grows in a variety of open to partly shaded disturbed sites, particularly those with moist soils such as roadside ditches, wetland margins and riparian areas. It can rapidly spread rapidly, via rhizomes, seed, and stem fragments, and forms dense monocultures that exclude native understory species.

Reproduction and Flowering Period: Knotweeds spread via thick rhizomes. Stem fragments as small as one-half inch in length can sprout to form new plants. Some species reproduce by seed, although it is believed that some hybrids do not produce viable seed. Knotweed is a deciduous perennial; flowers are produced in mid- to late summer.

Identification: Invasive knotweeds are readily identified by the dense stands of tall, bamboo-like hollow stems with large leaves. Stems range from 4 to over 12 feet tall. Individual species and hybrids are difficult to distinguish and intermediate hybrids are suspected to occur.

Available Management Methods:

Prevention: Project personnel should be instructed on the identification of knotweeds, so that new infestations are detected, reported, and treated quickly. Soil and gravel imported to the Project should be acquired from a knotweed-free source. Vehicles and equipment should be cleaned regularly when working within, and between, infested areas.

Manual: Hand pulling generally is not recommended for invasive knotweeds, as rhizome fragments as small as one-half inch have been shown to resprout. Hand pulling or digging of small, isolated populations (about 50 stems maximum) in moist soil may be effective if great care is taken to remove all plant material including small stem fragments. Otherwise, hand pulling may actually contribute to the spread of the infestation.

Mechanical: Cutting has been shown to be effective in controlling knotweeds when performed on an almost weekly basis for several years. Repeated cutting, beginning before stem senescence, can reduce rhizome reserves. All plant material must be properly disposed of to avoid resprouting or rerooting. Mowing can be effective, if performed on a short interval over many years, on sites accessible to mowing equipment.

Bending of stems, rather than cutting, has been recommended to avoid disposal and resprouting issues.

Deep excavation of soil with knotweed has been successful on sites where soil excavation is desirable and heavy equipment is available. Because knotweed reproduces from very small pieces of rhizome and stem, extreme care must be taken while excavating and stockpiling knotweed contaminated soil.

Cultural: Knotweed is somewhat intolerant of deep shade. Shading of bent or cut stems with fabric can be moderately effective in slowing the spread of small knotweed infestations. The covering should extend 25 feet minimum beyond the edges of the infestation and should be kept in place for a minimum of one year, with frequent checking and removal of regrowth. Reseeding of the treated sites is recommended.

Chemical: Herbicides are effective in controlling knotweed, particularly when applied in late summer and fall when leaves are translocating nutrients to the rhizomes. Herbicide can be delivered by several methods: broadcast spraying of large, monotypic cultures, spot spraying, and stem injection. Late season herbicide application is most effective in combination with cutting or bending stems in the spring and early summer. Stem bending delays flowering and allows the herbicide to be applied later in the growing season on shorter stems. Follow-up treatment is often needed for one to two seasons.

Currently, herbicide application is available only for populations occurring on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Selective herbicide use is retained as an available treatment method under this plan, in the event that large populations of invasive knotweed require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: No biological control agents are currently registered for use on knotweed.

Management Recommendation for Invasive Knotweed at the Jackson Project:
At this time, only one small infestation of knotweed has been detected on Project lands and it has been successfully controlled. The site will be monitored and retreated until it is confirmed to have been eradicated.

The use of herbicides is very limited within the Project boundary, and new infestations of knotweed, should they be detected, will require immediate treatment with manual and/or mechanical methods. If new populations exceed the size for which manual, mechanical, or cultural treatments are effective, consultation with the County NWCB, City of Everett, and other affected landowners/managers should be initiated to discuss the possible short-term use of herbicides.

The District places a high priority on preventing invasive knotweed from becoming established within the Project boundary. It has the ability to rapidly invade stream corridors and, once established, is very difficult to eradicate without the use of herbicides. One small infestation has been treated on the power pipeline right-of-way and two small

infestations have been treated in the Lake Chaplain vicinity. New infestations of invasive knotweed may occur on Project lands in the future, given that established infestations are present in the general vicinity of the Project.

Long-Term Management Goal: Invasive knotweeds are Class B undesignated species that are selected for control (per WAC 16-750) by the Snohomish County NWCB. Control of this single invasive knotweed population (per WAC 16-750), with eventual eradication, is the Project-level goal.

Five-Year Management Objectives:

- Continue to monitor the site annually and retreat as necessary.
- After three consecutive monitoring events show no presence of invasive knotweed, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.
- Continue monitoring Project lands for new infestations and implement treatment as soon as possible.

References:

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Table 3-3.1 Invasive Knotweed Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
MSS####	PROJECT FACILITIES	POWER PIPELINE ROW				CUT AND SPRAYED	

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-4
Management Methods for Tansy Ragwort
(*Senecio jacobaea*)

Known Sites: Thirteen tansy ragwort sites were documented on Project lands during the 2007 weed inventory, including seven sites in the Project Facilities tract, and six at Spada Lake.

At the Project Facilities tract, five of seven sites were treated on the survey date. Sites along the power pipeline right-of-way were treated during ongoing weed management activities conducted by the District.

In the Spada Lake tract, four of six sites were treated on the survey date. Two sites were not treated by the surveyors; these include wetland 9-119 and the South Shore Road adjacent to the wetland. This area, located between recreation sites 3 and 4, has been treated annually for tansy ragwort and thistle by District staff for several years by hand clipping and removal of seed heads.

Habitat and Threats: Tansy ragwort typically grows in disturbed habitats from full sun to partial shade, including pastures, roadsides, trails, and cleared lands, and along their forested margins. Tansy ragwort spreads quickly in overgrazed pastures. The species contains toxic alkaloids that cause irreversible liver damage in livestock and wildlife; the effects are cumulative and prolonged ingestion results in mortality.

Reproduction and Flowering Period: Tansy ragwort is a taprooted biennial, or short-lived perennial, that dies after producing seed. Typically, a basal rosette is produced during the first year of growth and flowering commences during the second year. The plants can reach six feet in height and produce upwards of 100,000 seeds; seeds can remain viable for 10 years or more. In the Project vicinity, flowering is most likely to occur between June and September.

Identification: First season tansy ragwort plants form basal rosettes of divided leaves. Mature plants range from 18 inches to 4 feet in height, with leafy stems of divided leaves with curled margins. Leaves are dark green on top and whitish green underneath. Flowers have yellow petals and centers. Tansy ragwort is sometimes confused with common tansy; common tansy has uniformly dark green leaves, which are divided but flattened, and flowers with yellow button centers but no petals.

Available Management Methods:

***Prevention*:** Specifying weed-free fill, mulch, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned regularly when moving to or from infested areas. Check for basal leaf rosettes in the spring and treat early to prevent flowering.

***Manual*:** Hand pulling, digging or grubbing of plants is effective for small populations. Pull plants after bolting but before flowering, for best results. Hand pulling is most effective when soils are moist. A digging tool should be used on mature plants and

rosettes in dry soils to completely remove the root, which will resprout from very small fragments. Viable seed can be produced from flowers after pulling, so plants in bud, flower, and seed should be bagged for removal from the site.

***Mechanical*:** Mowing, by itself, is not effective for long-term management of tansy ragwort. Mowing will remove the flowering stalks, and if performed early in the bolting phase, can slow the occurrence of flower production. However, seeds can set from cut stalks that are already in flower and mowed plants likely will flower again in the same season. Mowing will not kill the basal rosette and may induce flowering below the level of the mower blade.

Cultural: Disturbance of soil and desired vegetation in the vicinity of the known infestation should be minimized to reduce the opportunity for germination of seed in the soil. Application of mulch to sites where tansy has been manually removed will help to reduce germination of seed. Large patches of bare soil (one square meter or more) that are not expected to revegetate naturally with native seed source should be seeded or planted with desired species.

Chemical: Several selective broadleaf herbicides are effective on tansy ragwort.

Currently, herbicide application is available only for populations occurring on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Selective herbicide use is retained as an available treatment method under this plan, in the event that large populations of tansy ragwort require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: Biological methods are available for tansy ragwort, including the ragwort flea beetle, the ragwort seed fly, and the cinnabar moth; these controls are most effective on very large weed populations. Due to the small size of the weed populations and the availability of effective manual methods, biological methods are not proposed for use at the Jackson Project.

Management Recommendation for Tansy Ragwort at the Jackson Project:
Hand pull, dig, or grub out individual plants. Pull plants when soil is moist to facilitate removal of entire root; in dry soil conditions, use a digging tool to remove the entire root. Remove plants prior to seed production to reduce opportunity for seed dispersal. Bag any stalks with buds, flowers, or seeds, and remove from site.

Keep soil disturbance to the minimum possible to reduce the potential for germination of seed. Actively revegetate any sites where weed removal activities result in soil disturbance of 1 square meter or more. Use preventative measures to reduce introduction of tansy ragwort seed onto Project lands.

Long-Term Management Goal: Tansy ragwort is a Class B undesignated species selected for control (per WAC 16-750) by the Snohomish County NWCB. Control of

populations (per WAC 16-750), with eventual reduction within the Project boundary, is the Project-level goal.

Five-Year Management Objectives:

- Continue treatment at Wetland 9-119 and adjacent roads: Hand pull tansy and along South Shore Road site and within wetland. This site is designated as highest priority for treatment due to its location within a wetland and proximity to lands managed for late successional forest.
- Continue treatment along Project roads, recreation sites, power pipeline right-of-way, and Project facilities.
- Initiate treatment at two new sites at Project Facilities tract within one year.
- Continue to monitor these sites annually and retreat as necessary.
- Monitor two treated sites along North Shore Road on a two-year schedule; retreat as necessary.
- After two consecutive monitoring events show no presence of tansy ragwort, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

King County Noxious Weed Control Board. 2006. Noxious Weed Control Program web page, tansy ragwort best management practices bulletin. http://dnr.metrokc.gov/wlr/lands/weeds/pdf/tansy_ragwort-control.pdf. January 2006. King County Noxious Weed Control Board, Seattle, WA.

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Table 3-4.1 Tansy Ragwort Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
EKD0800C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	100	2	L	MOWED	Three plants within mowed area
EKD0850C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	5000	2	T		Both sides of road; 10+ plants
EKD0991C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1	1	M	PULLED	
EKD0992C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1	1	M	PULLED	
KWS0461C	PROJECT FACILITIES	POWERHOUSE	100	1	T	PULLED	One plant
KWS0462C	PROJECT FACILITIES	POWERHOUSE	100	1	T	PULLED	Two plants
KWS0463C	PROJECT FACILITIES	POWERHOUSE	1875	2	M		Numerous plants, moderately dense infestation
SWH0690C	SPADA LK	NORTH SHORE RD	100	1	T	PULLED	Two plants
SWH0620C	SPADA LK	NORTH SHORE REC SITE	1	1	T	PULLED	Single plant at overlook area
EKD0360C	SPADA LK	REC SITE 1 OLNEY	4	1	T	PULLED	One plant in flower
EKD1220C	SPADA LK	ROAD REC SITE 1 TO 3	100	1	L	PULLED	
SWH1641C	SPADA LK	ROAD REC SITE 3 TO 4	5000	2	L	CLIPPED	At wetland 9-119
EKD0411U	SPADA LK	WETLAND 9-119, 105; 9-184	2.7 ac	3	L	CLIPPED	9-119, scattered throughout, largest patches near road

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-5
Management Methods for Canada Thistle
(*Cirsium arvense*)

Known Sites: The 2007 weed inventory documented Canada thistle at 27 survey sites on Project lands, including 7 in the Project Facilities tract and 20 in the Spada Lake tract. The majority of sites are located in habitats with regular human disturbance such as roads, facilities, and recreation areas. However, Canada thistle was also recorded along the Spada Reservoir shoreline and in one wetland. Most infestations were 100 square feet or less; the largest was estimated at 3,000 square feet (0.07 acre).

Canada thistle infestations along roadsides at the Project are managed by mowing, pulling, and clipping. In the Project Facilities tract, infestations at the powerhouse and along the power pipeline right-of-way that are located outside the Lake Chaplain watershed are treated with herbicide. Canada thistle at Culmback Dam is typically cut prior to flowering. District staff have clipped flower heads of Canada thistle at wetland 9-119 for several years.

Habitats and Threats: Canada thistle is a widespread invader of croplands, rangelands, pasture, roadsides, lawns, and other disturbed, open, moist habitats. It also spreads to undisturbed sites via rhizomes, where it competes effectively for light, moisture, and nutrients and forms extensive infestations. Canada thistle is tolerant of a wide range of soil types but is intolerant of shade.

Reproduction and Flowering Period: Canada thistle spreads primarily by rhizomes, which can grow up to 20 feet horizontally in one season. Roots have been shown to regenerate successfully from very small pieces of rhizome. Canada thistle spreads secondarily by seed, and a single plant produces an average of 1,500 seeds. Because Canada thistle plants are either male or female, a population that has developed from a single rhizome will not produce seed. Flowers are produced in the Project vicinity beginning in June and extending through late summer.

Identification: First year Canada thistle plants form a basal rosette of linear leaves with lobed, spiny edges. Mature plants have leafy stems with lobed, wave-edged, spiny leaves. Flower heads are typically smaller than other thistles, supporting terminal pink to lavender flowers. Because Canada thistle spreads by rhizomes, extensive colonies are a distinguishing characteristic of the species.

Available Management Methods:
***Prevention*:** Specifying weed-free fill dirt, hay, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned regularly when working in infested areas.

***Manual*:** Hand pulling, digging, or grubbing of plants is effective for very small populations and must be repeated for several years. The entire plant, including the roots, must be removed, to avoid resprouting of rhizome fragments. Pulling plants at the bud

stage is most detrimental to the plant. If flower heads have formed, they should be bagged and destroyed to prevent seed set and/or dispersal.

***Mechanical*:** Tillage of infested sites can be effective if repeated at 21-day intervals for at least two growing seasons. Because new plants sprout from rhizome fragments, less frequent tillage will lead to an increase in plants. Repeated mowings can be used to prevent seed set and to weaken stems, but generally does not kill the plants. This may be an effective short term control on low density infestations.

Cultural: Reseeding of tilled or herbicide-treated areas with fast-growing grasses and/or forbs can help establish a desired plant community. Shade cloth could be used experimentally to determine its effectiveness at killing Canada thistle. Because the shade cloth will kill associated plants, this treatment is more appropriate for dense patches of Canada thistle than for sparse infestations mixed with desirable native plant species. Shade cloth should be placed to cover the infestation plus a border of one to two feet and left in place for one to two growing seasons. The status of the infestation should be monitored periodically to determine if roots and stolons have been killed and to remove any stolons extending out around the edges. To prevent reinfestation of the open soil, treated sites should be revegetated with desirable species. Shrubs can be planted through the shade cloth if a biodegradable product is used; otherwise a grass/forb seed mix appropriate for roadsides should be planted and mulched after removal of the cloth.

***Chemical**:* Chemical control can be effective against Canada thistle, especially in combination with replanting of desired species. Herbicides that act only on broad-leaved species are recommended for sites where desirable grasses comprise a significant portion of the existing plant community. Multiple herbicide applications may be needed if a healthy plant community is not immediately re-established on the site; generally, herbicide application is most effective in the spring.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Selective herbicide use is retained as an available treatment method under this plan, in the event that large populations of Canada thistle require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

***Biological*:** Three biological controls are currently listed for Canada thistle in the Pacific Northwest Weed Management Handbook; two of these species are available in Washington. The two available agents received individual control ratings of ‘good’ and ‘undetermined’. Biological control agents are typically only cost-effective on very large (many acres in size) populations; results may be sporadic and localized. Biological agents may reduce the density and vigor of a population, but are not likely to eradicate it.

Management Recommendation for Canada Thistle at the Jackson Project:
Hand pull small populations, removing entire plant and bagging any flower/seed stalks. Pull plants when soil is moist to facilitate removal of entire root.

Larger infestations in open areas may be mowed to prevent seed production. Multiple mowings may be necessary during the growing season.

To reduce re-establishment of Canada thistle, revegetate any sites where removal activities result in ground or vegetation disturbance of one square meter or more. Mulch and/or reseed with desired fast-growing species such as grasses. Because Canada thistle is shade-intolerant, planting of trees and shrubs can be considered on a site-by-site basis.

If Canada thistle populations at specific locations are not effectively controlled with manual, mechanical, or cultural treatments, consultation with the County NWCB, City of Everett, and other affected landowners/managers should be initiated to discuss the possible short-term use of herbicides.

Long-Term Management Goal: Canada thistle is a Class C species selected for control (per WAC 16-750) by the Snohomish County NWCB. Control of Canada thistle (per WAC 16-750), with eventual reduction, is the Project-level goal. Sites located within managed timber stands, and located at least 1,000 feet from adjacent land uses, will not be treated (RCW17.10.140; 17.10 240). These infestations are expected to be eradicated over time as the forest canopy becomes more dense.

Five-Year Management Objectives:

- Continue ongoing mechanical treatment along Project roads, recreation sites 1 through 5, power pipeline right-of-way, and Project facilities. Continue to monitor these sites annually and retreat as necessary.
- Continue manual treatment at Wetland 9-119. This site is designated as highest priority for treatment due to its location within a wetland and proximity to lands managed for late successional forest.
- Initiate treatment of sites along Spada Lake shoreline and along North Shore Road within two years. Monitor and retreat as needed on a two-year schedule (5 sites).
- After two consecutive monitoring events show no presence of Canada thistle, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

King County Noxious Weed Control Board. 2007. Weeds Fact Sheets web page, Canada thistle fact sheet. http://dnr.metrokc.gov/wlr/lands/weeds/pdf/CanadaThistle_factsheet.pdf. April 2007. King County Noxious Weed Control Board, Seattle, WA

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Sheley, R.L. and J.K. Petroff (eds.) 1999. Biology and management of noxious rangeland weeds. Oregon State University Press, Corvallis, OR. 438p

Washington State Noxious Weed Control Board. 2008. Washington's Noxious Weed List Written Findings web page. Written findings of the WSNWCB for Canada

thistle. http://www.nwcb.wa.gov/weed_info/Cirsium_arvense.html . Washington State Noxious Weed Control Board, Olympia, WA.

Whatcom County Noxious Weed Control Board. 2008. Whatcom Weeds Fact Sheets web page, Canada thistle fact sheet. http://www.co.whatcom.wa.us/publicworks/pdf/weeds/canada_thistle2.pdf Whatcom County Noxious Weed Control Board, Bellingham, WA.

Table 3-5.1 Canada Thistle Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
EKD0942C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL		1	L	SPRAYED PRIOR TO FLOWERING	
EKD1010C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1000	4	M	SPRAYED PRIOR TO FLOWERING	
EKD0941S	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL		2	L	SPRAYED PRIOR TO FLOWERING	
KWS0451C	PROJECT FACILITIES	POWERHOUSE	100	1	L	SPRAYED PRIOR TO FLOWERING	1 patch of 6 plants
KWS0452C	PROJECT FACILITIES	POWERHOUSE	100	1	M	SPRAYED PRIOR TO FLOWERING	
KWS0453C	PROJECT FACILITIES	POWERHOUSE	200	1	M	SPRAYED PRIOR TO FLOWERING	
SWH1771C	PROJECT FACILITIES	SB NEAR HORSESHOE BEND KIOSK		2	T	SPRAYED PRIOR TO FLOWERING	
EKD1111C	SPADA LK	CULMBACK DAM & ROAD	100	2	M	CUT PRIOR TO FLOWERING	Within fenced enclosure maintenance shed on N side dam
EKD1151C	SPADA LK	CULMBACK DAM & ROAD	100	1	L	CUT PRIOR TO FLOWERING	
EKD1152C	SPADA LK	CULMBACK DAM & ROAD	100	1	T	CUT PRIOR TO FLOWERING	
EKD1153C	SPADA LK	CULMBACK DAM & ROAD	4	1	T	CUT PRIOR TO FLOWERING	
SWH0680C	SPADA LK	NORTH SHORE RD	100	1	T		
EKD0340C	SPADA LK	REC SITE 1 OLNEY	25	1	M		Trail N of registration parking area, west side of road
SWH0940S	SPADA LK	REC SITE 3 SOUTH SHORE		5	T		
EKD1201S	SPADA LK	ROAD REC SITE 1 TO 3		2	T	CUT PRIOR TO FLOWERING	
EKD1202S	SPADA LK	ROAD REC SITE 1 TO 3		5	T	CUT PRIOR TO FLOWERING	
EKD1203S	SPADA LK	ROAD REC SITE 1 TO 3		5	L	CUT PRIOR TO FLOWERING	
SWH1631S	SPADA LK	ROAD REC SITE 3 TO 4		5	T	CUT PRIOR TO FLOWERING	

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH1571C	SPADA LK	ROAD REC SITE 4 TO DNR	54	2	L	CUT PRIOR TO FLOWERING	
SWH1572C	SPADA LK	ROAD REC SITE 4 TO DNR	100	2	L	CUT PRIOR TO FLOWERING	
SWH1573C	SPADA LK	ROAD REC SITE 4 TO DNR	100	2	L	CUT PRIOR TO FLOWERING	
SWH1574C	SPADA LK	ROAD REC SITE 4 TO DNR	100	2	L	CUT PRIOR TO FLOWERING	
EKD0140C	SPADA LK	SPADA REZ NORTH SHORE	25	1	M		5-7 plants
EKD0260C	SPADA LK	SPADA REZ SOUTH SHORE	100	1	L		
SWH1381C	SPADA LK	SPADA REZ SOUTHWEST SHORELINE	225	2	L		
SWH1382C	SPADA LK	SPADA REZ SOUTHWEST SHORELINE	100	1	L		
EKD0421U	SPADA LK	WETLANDs 9-119, 9-105; UNIT 9-184		3	L		9-119, dense patches scattered throughout

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-6
Management Methods for Bull Thistle (*Cirsium vulgare*)

Known Sites: Bull thistle was documented at 41 sites within the Project boundary during the 2007 inventory. These sites include 12 in the Project Facilities tract, 25 in the Spada Lake tract, and 4 in the Williamson Creek tract. The majority of sites are located in habitats with frequent human disturbance such as roads, facilities, and recreation areas. Bull thistle was also recorded along the Spada Lake shoreline, in one wetland, and along abandoned forest management roads in the Williamson Creek tract. Most infestations were 100 square feet or less; the largest was estimated at 2,000 square feet (0.05 acre).

Bull thistle is controlled on Project lands primarily by hand pulling and mowing along roadsides. Along the power pipeline right-of-way, bull thistle is sprayed prior to flowering; at Culmback Dam it is typically cut prior to flowering. In wetland 9-119, bull thistle has been clipped for several years by District staff. Individual bull thistle plants encountered during the 2007 survey were hand pulled, including several along the Williamson Creek road.

Habitat and Threats: Bull thistle grows in a variety of soil types and is commonly found in disturbed soils. It occurs in meadows, open riparian areas, agricultural fields, pastures, roadsides, and other open habitats. Bull thistle is intolerant of heavy shade.

Reproduction and Flowering Period: Bull thistle is a biennial species that reproduces exclusively by seed. It forms a basal rosette during the first growing season, followed by a flowering stalk in mid-summer of the second season. Each plant can produce up to 4,000 seeds, but no rhizomes, root fragmentation, or other vegetative reproduction occurs.

Identification: Bull thistle is a biennial; basal rosettes are formed the first year and flowering heads form at the ends of branches during the second year. Leaves are hairy above and below, deeply lobed, and edged with sharp spines. Stems are also spiny. Although numerous individual plants may be present at an infested site, bull thistle does not spread by rhizomes, and does not form extensive colonies.

Available Management Methods:

Prevention: Specifying weed-free fill dirt, hay, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned regularly when working in infested areas.

Manual: Hand pulling or digging can be performed; this technique is most readily performed on young plants with a small taproot. The taproot must be cut at least an inch below the ground surface to kill the plant. The resulting disturbed soil may allow sprouting of bull thistle seeds. If flower heads have formed, they should be bagged and destroyed to prevent seed set and/or dispersal.

Mechanical: Cutting the flowering stems at the soil surface when in bud stage can result in some mortality; plants thus treated should be rechecked later in the growing season and the following season. Repeated mowing can be effective at preventing seed production, but will not necessarily kill the plant. Mowing should be performed once between the bolting and flowering stages and again one month later. Repeated cultivation can also be used to effectively control bull thistle.

Biological: The bull thistle gall fly has been used as a biological control in Washington with fair results. Whatcom County NWCB notes that this agent can reduce seed production up to 60 percent. Biological agents are typically only cost-effective for large infestations; they may reduce the density and vigor of a population, but are not likely to eradicate it.

Chemical*:* Herbicides can be effective in controlling bull thistle, especially in combination with replanting of desired species. Herbicides that act only on broad-leaved species are recommended for sites where desirable grasses comprise a significant portion of the existing plant community. For best results, herbicide should be applied to the rosette stage. When non-selective herbicides are used, apply to rosettes in fall when surrounding plants may be less susceptible to the herbicide.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Selective herbicide use is retained as an available treatment method under this plan, in the event that large populations of bull thistle require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Cultural**:** Reseeding of treated areas with fast-growing grasses and/or forbs can help establish a desired plant community. Bull thistle does not tolerate deep shade, and establishment of shrub and tree cover can reduce infestations.

Management Recommendation for Bull Thistle at the Jackson Project:
Remove individual plants in small infestations by digging the taproot completely out and bagging and destroying any flowering heads; remove plants before bud formation to reduce potential for seed formation.

Control larger infestations in open areas by mowing; repeated mowings may be necessary during the growing season.

To reduce re-establishment of bull thistle from seed, revegetate any sites where removal activities result in ground disturbance of one square meter or more. Mulch and/or reseed with desired fast-growing species such as grasses.

If bull thistle populations at specific locations are not controllable with manual, mechanical, or cultural treatments, consultation with the County NWCB, City of Everett,

and other affected landowners/managers should be initiated to discuss the possible short-term use of herbicides.

Long-Term Management Goal: Bull thistle is a Class C species selected for control (per WAC 16-750) by the Snohomish County NWCB. Control of bull thistle (per WAC 16-750), with eventual reduction, is the Project-level goal. Sites located within managed timber stands, and located at least 1,000 feet from adjacent land uses, will not be treated (RCW17.10.140; 17.10 240). These infestations are expected to be eradicated over time as the forest canopy becomes more dense.

Five-Year Management Objectives:

- Continue ongoing mechanical treatment along Project roads, recreation sites 1 through 5, power pipeline right-of-way, and Project facilities. Continue to monitor these sites annually and retreat as necessary.
- Continue manual treatment at Wetland 9-119. This site is designated as highest priority for treatment due to its location within a wetland and proximity to lands managed for late successional forest.
- Initiate treatment of sites along Spada Lake shoreline, along North Shore Road to Recreation Site 8, and one untreated site in the Williamson Creek tract within two years. Monitor and retreat as needed on a two-year schedule (6 sites).
- After two consecutive monitoring events show no presence of bull thistle, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

King County Noxious Weed Control Board. 2007. Noxious Weed Control Program web page, bull thistle best management practices bulletin. http://dnr.metrokc.gov/wlr/lands/weeds/pdf/bull-thistle-control.pdf . January 2007. King County Noxious Weed Control Board, Seattle, WA.

Oregon State University. 2008. Pacific Northwest Weed Management Handbook, online edition. http://pnwpest.org/pnw/weeds?01W_INTR06.dat

Whatcom County Noxious Weed Control Board. 2008. Whatcom Weeds Fact Sheets web page, bull thistle fact sheet. http://www.co.whatcom.wa.us/publicworks/pdf/weeds/bull_thistle2.pdf. Whatcom County Noxious Weed Control Board, Bellingham, WA.

Table 3-6.1 Bull Thistle Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
EKD0841C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	25	1	M	SPRAYED PRIOR TO FLOWERING	Plants outside mowed area, east side of road
EKD0842C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	25	1	M	SPRAYED PRIOR TO FLOWERING	Plants outside mowed area, east side of road
EKD0843C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	25	1	M	SPRAYED PRIOR TO FLOWERING	Plants outside mowed area, east side of road
EKD0891C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1	1	L	SPRAYED PRIOR TO FLOWERING	
EKD0892C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1	1	L	SPRAYED PRIOR TO FLOWERING	
EKD0952C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	300	1	M	SPRAYED PRIOR TO FLOWERING	
EKD0953C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	250	1	L	SPRAYED PRIOR TO FLOWERING	
EKD0981C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1	1	M	SPRAYED PRIOR TO FLOWERING	Single plant
EKD0982C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	1	1	M	SPRAYED PRIOR TO FLOWERING	
EKD0951S	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL		2	L	SPRAYED PRIOR TO FLOWERING	

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH1900C	PROJECT FACILITIES	POWER PIPELINE ROAD PHOUSE TO HORSESHOE BEND	1	1	T	PULLED	One plant
KWS0441U	PROJECT FACILITIES	POWERHOUSE		2	L	SPRAYED PRIOR TO FLOWERING	Largest patch d/s of bridge, 20' x 75'
EKD1131C	SPADA LK	CULMBACK DAM & ROAD	10	1	T	CUT PRIOR TO FLOWERING	
EKD1132C	SPADA LK	CULMBACK DAM & ROAD	100	1	T	CUT PRIOR TO FLOWERING	
EKD1133C	SPADA LK	CULMBACK DAM & ROAD	100	1	T	CUT PRIOR TO FLOWERING	
EKD1134C	SPADA LK	CULMBACK DAM & ROAD	100	1	T	CUT PRIOR TO FLOWERING	
EKD1041U	SPADA LK	CULMBACK DAM & ROAD		2	T	CUT PRIOR TO FLOWERING	Three small clumps
SWH0671S	SPADA LK	NORTH SHORE RD		5	L		Linear patch
EKD0350C	SPADA LK	REC SITE 1 OLNEY	50	2	L		Mowed island between road and parking
EKD0401S	SPADA LK	REC SITE 1 OLNEY		2	L		
SWH0930S	SPADA LK	REC SITE 3 SOUTH SHORE		5	T		
SWH3271C	SPADA LK	ROAD N OF CULMBACK DAM SECTION 6	1	2	L	PULLED	Recoded; duplicate to SWH127 RULA 08-14-2007 Road between 2005-4 and 1990-4
SWH3272C	SPADA LK	ROAD N OF CULMBACK DAM SECTION 6	1	1	T	PULLED	Recoded; duplicate to SWH127 RULA 08-14-2007 Road between 2005-4 and 1990-4
EKD1191C	SPADA LK	ROAD REC SITE 1 TO 3	100	2	T	CUT PRIOR TO FLOWERING	Scattered along entire road segment
EKD1192C	SPADA LK	ROAD REC SITE 1 TO 3	100	2	T	CUT PRIOR TO FLOWERING	
EKD1193C	SPADA LK	ROAD REC SITE 1 TO 3	100	2	T	CUT PRIOR TO FLOWERING	
EKD1194C	SPADA LK	ROAD REC SITE 1 TO 3	100	2	T	CUT PRIOR TO FLOWERING	
EKD1195C	SPADA LK	ROAD REC SITE 1 TO 3	100	2	T	CUT PRIOR TO FLOWERING	
SWH1551C	SPADA LK	ROAD REC SITE 4 TO DNR	100	1	T	CUT PRIOR TO FLOWERING	
SWH1552C	SPADA LK	ROAD REC SITE 4 TO DNR	100	1	T	CUT PRIOR TO FLOWERING	
SWH1553C	SPADA LK	ROAD REC SITE 4 TO DNR	100	1	T	CUT PRIOR TO FLOWERING	

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH1554C	SPADA LK	ROAD REC SITE 4 TO DNR	1500	2	L	CUT PRIOR TO FLOWERING	
SWH1391C	SPADA LK	SPADA REZ SOUTHWEST SHORELINE	100	2	T	PULLED	Three plants pulled
SWH1392C	SPADA LK	SPADA REZ SOUTHWEST SHORELINE	1	1	T		Steep bank; single plant not pulled
SWH1393C	SPADA LK	SPADA REZ SOUTHWEST SHORELINE	100	1	L		
SWH1394C	SPADA LK	SPADA REZ SOUTHWEST SHORELINE	100	1	L		
EKD0431U	SPADA LK	WETLAND 9-119, 9-105; UNIT 9-184		2	T		9-119, scattered throughout, esp. eastern 1/3
SWH1811C	WILLIAMSON	WILLIAMSON RDS EAST	10	1	T	PULLED	Two rosettes pulled
SWH1812C	WILLIAMSON	WILLIAMSON RDS EAST	10	1	T	PULLED	Single rosette pulled
SWH1813C	WILLIAMSON	WILLIAMSON RDS EAST	10	1	T	PULLED	Two plants pulled
SWH0720C	WILLIAMSON	WILLIAMSON RDS WEST	1	1	T	PULLED	

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-7
Management Methods for Scotch Broom
(*Cytisus scoparius*)

Known Sites: Seven Scotch broom infestations are present along roadsides and disturbed habitats in the Project Facilities tract. Sites include the access road to Horseshoe Bend, areas inside and outside the mowed portion of the power pipeline right-of-way, and grassy/shrub areas near the powerhouse. Scotch broom was also documented along the road and dam terraces at Culmback Dam in the Spada Lake tract.

Habitat and Threats: Scotch broom is a drought-tolerant shrub which produces large numbers of long-lived seeds. It is typically found in well-drained soils on sunny sites, but is tolerant of a wide range of soil conditions. Seeds are dispersed explosively from the plants, are transported by birds and ants, and may be unintentionally relocated through vehicle tires, heavy equipment, and in contaminated soils. Seeds and other parts of the plant are toxic to humans, horses, and other livestock. The species can invade open habitats and cleared forestland, excluding many native plant species. In large expanses of dense cover, it may increase the severity of fire events.

Reproduction and Flowering Period. The primary means of reproduction in Scotch broom is by seed. Flower production typically peaks between April and June, although small numbers of flowers can be produced at other times during the growing season. A single plant can produce up to 10,000 seeds, which mature in late summer. Seeds germinate in spring; however many seeds lay dormant in the soil and can remain viable for up to 60 years.

Identification: Scotch broom is an evergreen shrub that can reach a height of ten feet. Branches are upright, angled and dark green; leaves are three parted or single. Yellow flowers are produced in spring and early summer.

Available Management Methods:

Prevention: Specifying weed-free fill whenever possible will help to limit the introduction of seed source. Vehicles, equipment, and boots should be cleaned regularly when working in infested areas. Check for budding and early flowering plants in spring and treat before blooming.

***Manual*:** Hand pulling or grubbing can be effective for small infestations, particularly of young plants. Pull or dig up entire plant, including roots. A Weed Wrench™ or similar tool is recommended for medium to large plants with well-developed root systems. Seeds in the soil will resprout for several years, so repeated treatments will be necessary.

Mechanical: Tilling and bulldozing of large Scotch broom sites is discouraged due to the propensity for seed in the soil to germinate after soil disturbance. Cutting, mowing, or other mechanical methods can be used to manage flower and seed production, but the plants are not likely to be killed. Cutting late in the summer after seeding will use more of the plant's root reserves, and may reduce resprouting. Plants with a stem diameter of

greater than 2 inches are most susceptible to mortality through cutting. Surviving stems and seed in the soil will resprout for several years, so repeat treatment will be needed.

Cultural: Application of mulch to sites where Scotch broom has been treated will help to reduce germination of seed. Reseeding of treated areas with fast-growing grasses can help establish a desired plant community and reduce Scotch broom seed sprouting.

Chemical: A variety of chemical control options are available for Scotch broom, including both selective and non-selective herbicides. If non-selective herbicides are used, reseeding of the site with appropriate species is necessary for effective site restoration. Application of herbicide to cut stems reduces resprouting.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Herbicide application is retained as an available treatment method under this plan, in the event that large populations of Scotch broom require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: Goats will graze on Scotch broom plants and chickens will consume the seeds. Initial testing is being conducted in Washington State on two insect biological agents, a beetle and a seed weevil, for their effectiveness against Scotch broom. Results of these tests are preliminary.

Disposal Considerations: Scotch broom seeds are long-lived and tolerant of extremely high temperatures. Plant parts, including seeds, should be disposed of in a landfill or other contained disposal facility.

Management Recommendation for Scotch Broom at the Jackson Project:
Hand pull stems less than ½ inch diameter. For small infestations, use Weed Wrench™ or equivalent tool to remove plants with stem diameters between 1/2 and 2 inches. For larger infestations, and plants with stems greater than 2 inches diameter, cut or mow to remove top of plant. On sites located outside of the Lake Chaplain and City of Sultan watersheds, stem cutting and/or mowing may be followed with herbicide treatment of cut stems wherever permissible in accordance with regulations and label directions.

Repeat treatment at least once each year for several years, until resprouting plants have been killed and seed bank is diminished.

Minimize soil disturbance to the extent practicable during treatment to reduce the potential for seed germination. Actively revegetate sites where Scotch broom removal results in ground disturbance of one square meter or more. Use preventative measures to reduce introduction of Scotch broom seed into the area.

Long-Term Management Goal: Scotch broom is a Class B undesignated species in Snohomish County, but is a weed of concern to the City of Everett and U.S. Forest Service. Containment and eventual reduction of Scotch broom populations is the Project-level goal.

Five-Year Management Objectives:

- Continue treatment of Scotch broom at known locations.
- Initiate treatment at newly detected sites within three years.
- Continue to monitor these sites annually and retreat as necessary.
- After two consecutive monitoring events show no presence of Scotch broom at a site, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

King County Noxious Weed Control Board. 2008. Noxious Weed Control Program web page, Scotch broom best management practices bulletin. http://dnr.metrokc.gov/wlr/lands/weeds/pdf/scotch-spanish-broom-control.pdf. January 2008. King County Noxious Weed Control Board, Seattle, WA.

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Oregon State University. 2008. Pacific Northwest Weed Management Handbook, online edition. http://pnwpest.org/pnw/weeds?01W_INTR06.dat

Washington State Noxious Weed Control Board. 2001. Washington's Noxious Weed List Written Findings web page. Written findings of the WSNWCB for Scotch broom. http://www.nwcb.wa.gov/weed_info/written_findings/CLASS%20B%20PDFs/Cytisis%20scoparius,%20partial%202001.pdf. Washington State Noxious Weed Control Board, Olympia, WA.

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Whatcom County Noxious Weed Control Board. 2008. Whatcom Weeds Fact Sheets web page, Scotch broom fact sheet. http://www.co.whatcom.wa.us/publicworks/weeds/factsheets.jsp. Whatcom County Noxious Weed Control Board, Bellingham, WA.

Table 3-7.1 Scotch Broom Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
EKD0791C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	400	2	M	MOWED	Within mowed area
EKD0792C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	10	1	L	PULLED	Outside mowed area; one plant
EKD0901S	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL		2	L		Stream nearby
EKD0902C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	25	1	L		
EKD1000C	PROJECT FACILITIES	POWER PIPELINE HORSESHOE BEND TO TUNNEL	100	3	M		
SWH1911S	PROJECT FACILITIES	POWER PIPELINE ROAD PHOUSE TO HORSESHOE BEND		5	T		Scattered along road, not on pipeline
KWS0510C	PROJECT FACILITIES	POWERHOUSE	3000	2	L		Scattered from comm. tower area down to road
EKD1081U	SPADA LK	CULMBACK DAM & ROAD		2	T	CUT/ WEED MAT INSTALLED	Terraces and roads, not base of dam

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-8
Management Methods for Wild Carrot (*Daucus carota*)

Known Sites: Wild carrot was documented at three locations during the 2007 weed inventory of Project lands. In the Project Facilities tract, wild carrot is present along the power pipeline access road between the powerhouse and Horseshoe Bend; it is also present in the grassy roadside habitats and terraces near the powerhouse. Wild carrot was observed on the terraces at Culmback Dam in the Spada Lake tract. Currently, wild carrot is not monitored or managed by the District, although some sites where it occurs are mowed regularly.

Habitat and Threats: Wild carrot, also known as Queen Anne's lace, is an herbaceous biennial which occasionally behaves as an annual or short-lived perennial. It is found in meadows, pastures, roadsides, and other disturbed, herbaceous-dominated habitats. Wild carrot can invade open habitats, outcompeting many native grasses and forbs. It can also contaminate hay and can taint milk in dairy cows. A primary threat posed by wild carrot is to commercial carrot crops; because they are the same species, wild carrot can damage carrot crops through shared diseases and insect pests, and loss of seed production through hybridization.

Reproduction and Flowering Period: Wild carrot typically forms rosette in the first growing season and a flowering stem the following season. It can reproduce rapidly, germinates readily after rain and producing seeds within six weeks. Flowering peaks in July in Washington and seeds are produced from mid-summer through mid-winter. Seeds have been shown to germinate in vegetated habitats as well as in disturbed soils. Taproots extend deep into the soil and will resprout if not completely removed.

Identification: A member of the parsley family, wild carrot is readily identifiable by its large, flat-topped umbels comprised of numerous small white flowers. The stems range from 1 to 4 feet in height and are uniformly green. Leaves are finely divided and fern-like. The entire plant is covered with short, stiff hairs.

Available Management Methods:

Prevention: Specifying weed-free fill whenever possible will help to limit the introduction of seed source. Vehicles, equipment, and boots should be cleaned regularly when working in infested areas. Check for rosettes and early flowering plants in spring and again after significant rainfall events throughout the growing season.

Manual: Hand pulling or grubbing can be effective for small infestations. Pull or dig up entire plant, including roots. Seeds in the soil will resprout for several years, necessitating repeated treatment.

Mechanical: Cutting, mowing, or other mechanical methods can be effective in preventing flowering in young plants, 7 to 10 inches tall. The plants may not be killed and follow-up treatment will likely be required. Seed in the soil will resprout for several years; therefore, repeated follow-up hand pulling of young plants will be needed. On

sites where tillage is feasible, repeated plowing and planting of a cultivated crop will help deplete the soil seed source and kill young seedlings.

Cultural: Establishment of healthy populations of native and/or desirable non-native grasses and forbs can be effective in reducing re-establishment of wild carrot populations.

Chemical*:* Herbicides have been shown to be more effective on wild carrot seedlings than on older plants. Repeated applications may be necessary to kill older plants and new seedlings germinating from the seed bank.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Herbicide application is retained as an available treatment method under this plan, in the event that large populations of wild carrot require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: Wild carrot is the same species as commercial carrot. For this reason, the use of biological control agents is not an option.

Management Recommendation for Wild Carrot at the Jackson Project:
Hand pull rosettes and small plants and dig out larger plants, being careful to remove the entire taproot. Repeat treatment at least once each year for several years, until resprouting plants have been killed and seed bank is diminished. Along roadsides, mow or weed whack established plants to prevent flowering and seed set.

On well-established infestations on sites located outside of the Lake Chaplain and City of Sultan watersheds, supplement pulling or cutting by application of herbicide to new seedlings, in accordance with regulations and label directions.

Minimize soil disturbance to the extent practicable during treatment to reduce the potential for seed germination. Actively revegetate sites where wild carrot removal results in ground disturbance of one square meter or more. Use preventative measures to reduce introduction of wild carrot seed into the area.

Long-Term Management Goal: Wild carrot is a Class B undesignated weed and currently is not required to be controlled in Snohomish County. Containment and eventual reduction of wild carrot populations is the Project-level goal.

Five-Year Objectives:

- Continue treatment of wild carrot at known locations.
- Initiate treatment at newly detected sites within three years.
- Continue to monitor these sites annually and retreat as necessary.

- After two consecutive monitoring events show no presence of wild carrot at a site, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

Oregon State University. 2008. Pacific Northwest Weed Management Handbook, online edition. http://pnwpest.org/pnw/weeds?01W_INTR06.dat

Washington State Noxious Weed Control Board. 2005. Washington's Noxious Weed List Written Findings web page. Written findings of the WSNWCB for wild carrot. http://www.nwcb.wa.gov/weed_info/Written_findings/Daucus_carota.html . November 1999. Washington State Noxious Weed Control Board, Olympia, WA.

Whatcom County Noxious Weed Control Board. 2008. Whatcom Weeds Fact Sheets web page, wild carrot fact sheet. http://www.co.whatcom.wa.us/publicworks/pdf/weeds/wild_carrot_t.pdf . Whatcom County Noxious Weed Control Board, Bellingham, WA.

Table 3-8.1 Wild Carrot Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH1930C	PROJECT FACILITIES	POWER PIPELINE ROAD PHOUSE TO HORSESHOE BEND	75	1	L		Scattered along road and pipeline; four large patches
KWS3331U	PROJECT FACILITIES	POWERHOUSE		2	T		Upper terraces and scattered sites
EKD1101U	SPADA LK	CULMBACK DAM & ROAD		2	T	CUT	Terraces

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-9
Management Methods for Herb Robert
(*Geranium robertianum*)

Known Sites: Herb Robert was documented at ten survey sites during the 2007 weed inventory. One infestation along the Lost Lake Road has been treated for several years by hand pulling. In the Project Facilities tract, herb Robert was detected at two locations near the Horseshoe Bend kiosk and one site on DNR lands river access site downstream of the powerhouse. Two infestations were recorded at the Trout Farm site. In the Spada Lake area, herb Robert was present at the North Shore recreation site, along the road north of Culmback Dam in Section 6, and along the road between recreation sites 1 and 3, including an infestation within recreation site 2.

Habitats and Threats: Herb Robert is an herbaceous geranium that may grow as a winter or spring annual, a biennial, or a perennial. It initially colonizes disturbed open areas along roadsides, forest openings, and dry rocky outcrops, but has been shown to rapidly invade adjacent, undisturbed habitats. Aided by its mechanically-dispersed seeds, herb Robert can invade undisturbed forest understory, outcompeting native species and forming a dense ground cover.

Reproduction and Flowering Period: Herb Robert reproduces by seeds. Seeds are ejected from the drying capsules and may travel distances of 15 to 20 feet. Each seed is attached to sticky thread which can cling to animals or people, increasing dispersal distances. Seed production can be prolific under 50-60 percent canopy cover, but is usually lower under closed canopies. In western Washington, two peaks of flower production are typical. Overwintering rosettes flower in early to mid-summer; seeds germinating in the spring flower primarily during mid- to late summer. However, individual plants may be seen flowering at almost any time of year in lowland areas of western Washington.

Identification: Herb Robert is an annual or biennial, herbaceous species with deeply divided leaves and dark red stems, both covered densely with hairs. Flowers are pink to lavender. A distinguishing characteristic of the species is its musty odor when leaves are pulled or crushed.

Available Management Methods:
***Prevention*:** Specifying weed-free fill dirt, hay, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned regularly when working in infested areas.

Manual: Hand pulling is effective and easily performed due to the shallow root systems of herb Robert. To be most effective, plants should be pulled at least twice a year, prior to each of the primary flowering seasons, early to mid-summer and mid- to late summer.

Mechanical: Mechanical cutting can be effective in controlling herb Robert on sites accessible to mowing and/or weed whacking equipment. Desirable species growing

intermixed with herb Robert are likely to be affected by mowing, and for this reason mowing is most suitable for large patches of the weed, or sites dominated by herb Robert and other weed species. Cutting should be performed prior to each of the primary flowering seasons, early to mid-summer and mid- to late summer.

Cultural: On sites where herb Robert treatment results in patches of bare ground, reseeding with fast-growing grasses and/or forbs can help speed the establishment of a desired plant community. Mulch is also useful in reducing the germination of herb Robert seeds in the soil.

Chemical: Herbicides are very effective in controlling herb Robert, but will also affect desirable species growing with the weed. Herbicide application is most suitable for large, dense infestations.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Herbicide application is retained as an available treatment method under this plan, in the event that large populations of herb Robert require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: No biological controls are currently available for herb Robert. Because this weed is so closely related to many horticultural geranium species, it is not likely that biological controls will be developed.

Management Recommendation for Herb Robert at the Jackson Project:
Hand pull small populations of herb Robert where it is growing interspersed with desirable native species. For best results, pull plants prior to each of the primary flowering seasons, early to mid-summer and mid- to late summer. On sites where herb Robert has formed extensive, dense patches, use mechanical cutting methods if site access conditions allow.

To reduce re-establishment of herb Robert from seed, actively revegetate sites where treatment activities result in ground disturbance of one square meter or more. Reseed with desired fast-growing species such as grasses and apply mulch. Use preventative measures to reduce introduction of herb Robert seed into the area.

Long-Term Management Goal: Herb Robert is a Class B undesignated species in Snohomish County. Containment of existing populations, with eventual reduction, is the goal for Project lands.

Five-Year Management Objectives:

- Continue to monitor Lost Lake infestation and retreat as needed.
- Initiate treatment at nine additional sites within the Project boundary within four years.

- Monitor treated sites annually and retreat as necessary.
- After two consecutive monitoring events show no presence of herb Robert at a site, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

King County Noxious Weed Control Board. 2007. Noxious Weed Control Program web page, herb Robert weed alert. http://dnr.metrokc.gov/wlr/lands/weeds/pdf/Herb_Robert_Factsheet.pdf. October 2007. King County Noxious Weed Control Board, Seattle, WA.

King County Noxious Weed Control Board. 2008. Noxious Weed Control Program web page, herb Robert best management practices bulletin. http://dnr.metrokc.gov/wlr/lands/weeds/pdf/Herb-Robert-Control.pdf. January 2008. King County Noxious Weed Control Board, Seattle, WA.

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Washington State Noxious Weed Control Board. 2008. Washington's Noxious Weed Information web page. Weed information for herb Robert. http://www.nwcb.wa.gov/weed_info/Geranium_robertianum.html . Washington State Noxious Weed Control Board, Olympia, WA.

Whatcom County Noxious Weed Control Board. 2008. Whatcom Weeds Fact Sheets web page, herb Robert fact sheet. http://www.co.whatcom.wa.us/publicworks/pdf/weeds/herb_robert2.pdf . Whatcom County Noxious Weed Control Board, Bellingham, WA.

Table 3-9.1 Herb Robert Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH0350C	LOST LAKE	LOST LAKE RD AND REC SITE	350	5	L	PULLED	One linear patch, pulled by District staff in August 2007
SWH0800S	PROJECT FACILITIES	DNR LANDS RIVER ACCESS		5	L		
SWH1761C	PROJECT FACILITIES	SB NEAR HORSESHOE BEND KIOSK		2	L		
SWH1762C	PROJECT FACILITIES	SB NEAR HORSESHOE BEND KIOSK		ND	ND		
EKD0471C	PROJECT FACILITIES	TROUT FARM RD RIVER ACCESS	400	2	L		
EKD0472C	PROJECT FACILITIES	TROUT FARM RD RIVER ACCESS	100	1	L		
SWH0600C	SPADA LK	NORTH SHORE REC SITE	600	1	L		About 30 plants at overlook site
EKD0370C	SPADA LK	REC SITE 2 SOUTH FORK	400	4	H		Dominant over 1/2 of picnic site and entering forest
SWH3250C	SPADA LK	ROAD N OF CULMBACK DAM SECTION 6	300	2	L		
EKD1241S	SPADA LK	ROAD REC SITE 1 TO 3		2	L		Both sides of road

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-10
Management Methods for Butterfly Bush
(*Buddleja davidii*)

Known Sites: Butterfly bush was recorded at three locations in the Project Facilities tract during the 2007 inventory. The largest infestation is along the transmission line right-of-way at the powerhouse; this site is mowed regularly. Butterfly bush is also present as scattered individuals in the powerhouse area and along the power pipeline access road between the powerhouse and Horseshoe Bend.

Habitat and Threats: Butterfly bush is an ornamental species from China that has escaped from cultivation. It spreads rapidly via its small, wind and water dispersed seeds, colonizing disturbed habitats such as roadsides, pastures, clear cuts, riparian areas, and gravel bars. It can become established in low nutrient soils and can form dense thickets that exclude native plants. Butterfly bush does not function as a host plant for native butterflies and may adversely affect butterfly populations by displacing native host plants.

Reproduction and Flowering Period: Butterfly bush reproduces very effectively by seeds. Flowering occurs from mid-summer to fall and plants may produce seed the first year. Mature plants may produce upwards of three million seeds, which can remain viable and dormant in the soil for many years. Butterfly bush also reproduces vegetatively, as stem segments can form adventitious roots. Cut stumps will resprout readily.

Identification: Butterfly bush is a deciduous shrub that may reach 10 to 15 feet in height. Leaves are lance-shaped, green above with whitish hairs providing a green-gray appearance below. Flowers are produced on terminal spikes and are typically lavender. White, pink and other color varieties also occur.

Available Management Methods:

Prevention: Specifying weed-free fill, hay, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned regularly when working in infested areas.

Manual: Hand pulling, digging, or grubbing of plants is effective for small populations. The disadvantage of this method is that soil disturbance stimulates the sprouting of seeds; treatment must be repeated for several years.

Mechanical: Clipping or cutting of flowering heads is recommended as the most effective means of preventing seed production. Flowering heads must be bagged and disposed of at an approved landfill or other contained disposal site. Treatment must be repeated annually. Plants may also be cut to the base; however, this will not kill the plant, and seeds may be produced again the following year. If annual flower clipping is

selected as a long-term management method, plants can be maintained at a moderate height (4-5 feet) to facilitate access and clipping.

Tilling of infested sites is not recommended due to its stimulation of germination of the soil seedbank.

Cultural: Application of mulch around treated plants can help reduce seed germination. At sites where plants have been treated with herbicide or grubbed out, reseeding with fast-growing species can help quickly establish a desired plant community and suppress butterfly bush seed sprouting.

Chemical: Glyphosate-based herbicides without surfactants have been shown effective on small butterfly bush plants.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Herbicide application is retained as an available treatment method under this plan, in the event that large populations of butterfly bush require management in the future. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: Experimental studies have been conducted with seed weevils and a wasp species; however, no insect controls are currently available for use in the U.S.

Management Recommendation for Butterfly Bush at the Jackson Project:
Hand pull, dig, or grub out small plants, being careful to remove the entire root system. Large, established shrubs should be treated by clipping and bagging flowerheads annually. Plants may be pruned to a manageable size to facilitate flower head removal. All flowerheads and other plant material should be bagged and disposed of at an approved landfill or other contained disposal facility.

To reduce re-establishment of butterfly bush, revegetate any sites where treatment activities result in ground disturbance of one square meter or more. Reseed with desired fast-growing species and mulch.

Long-Term Management Goal: Butterfly bush is a Class C weed and currently is not selected for control in Snohomish County. Containment of existing populations on Project lands, and eventual reduction, is the District's goal for butterfly bush.

Five-Year Objectives:

- Continue to monitor treated sites annually, and hand pull or dig out seedlings.
- Initiate treatment at new sites within three years.
- After two consecutive monitoring events show no presence of butterfly bush at a site, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

Oregon State University. 2008. Pacific Northwest Weed Management Handbook, online edition. http://pnwpest.org/pnw/weeds?01W_INTR06.dat

Washington State Noxious Weed Control Board. 2006. Washington's Noxious Weed List Written Findings web page. Written findings of the WSNWCB for butterfly bush. http://www.nwcb.wa.gov/weed_info/Written_Findings1/Buddleja_davidii_wf.pdf Washington State Noxious Weed Control Board, Olympia, WA.

Washington State Noxious Weed Control Board. 2008. Washington's Noxious Weed Information web page. Weed information for butterfly bush. http://www.nwcb.wa.gov/weed_info/buddleja_davidii.html. Washington State Noxious Weed Control Board, Olympia, WA.

Whatcom County Noxious Weed Control Board. 2008. Whatcom Weeds Fact Sheets web page, butterfly bush fact sheet. http://www.co.whatcom.wa.us/publicworks/pdf/weeds/butterflybush_t.pdf Whatcom County Noxious Weed Control Board, Bellingham, WA.

Table 3-10.1 Butterfly Bush Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
SWH1921S	PROJECT FACILITIES	POWER PIPELINE ROAD PHOUSE TO HORSESHOE BEND		5	T		Scattered along road, not on pipeline
KWS0471U	PROJECT FACILITIES	POWERHOUSE		2	L		Scattered across site; numerous seedlings
EKD0561C	PROJECT FACILITIES	POWERHOUSE TLINE AREA	4000	2	L	MOWED	Mowed and resprouting

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-11
Management Methods for Yellow Archangel
(*Lamiastrum galeobdolon*)

Known Sites: Yellow archangel was located at the Trout Farm river access site during the 2007 weed inventory. Two patches totaling approximately 2400 square feet were reported.

Habitat and Threats: Yellow archangel is a member of the mint family introduced from Europe as an ornamental. It is an herbaceous perennial groundcover, tolerant of a wide range of soil types, moisture regimes, and light exposures. Yellow archangel invades open and forested habitats, outcompeting native species to form large, dense patches.

Reproduction and Flowering Period: Vegetative reproduction by stolons is the primary means of the rapid spread of yellow archangel. It also reproduces by stem fragments and by seed. Flowering extends between April and June. Yellow archangel can grow prostrate, upright, or as a vine.

Identification: Yellow archangel has opposite, oval, toothed leaves that are variegated from green to silvery-gray. The yellow, hooded flowers are borne in pairs at the base of leaves. The plant contains aromatic oils which are released when foliage is bruised. It forms dense patches of groundcover in both shade and sun.

Available Management Methods:
Prevention: Specifying weed-free fill, hay, and seed whenever possible will help to limit the introduction of seed source to the area. Vehicles and equipment should be cleaned regularly when working in infested areas.

Manual: Hand pulling can be effective for small infestations and sites where yellow archangel grows intermixed with desirable species. Because the roots and stems will readily resprout, sites treated by hand pulling will likely require several repeat treatments. Pull plants when the soil is moist.

Mechanical: Clipping or mowing will reduce flowering, but will not kill the plants. Cutting can be effective when used in combination with herbicide application. Yellow archangel is susceptible to trampling.

Cultural: Several sources suggest experimentation with sheet mulching to determine its value as a means of control. Weed cloth, or heavy cardboard covered with 4 or more inches of arborists chips or other heavy mulch, would be applied to fully cover the infestation for one or more growing seasons. The covering should extend beyond the edges of the infestation one or more feet and the edges should be monitored for stolon growth. Once the plants are killed, the site should be revegetated.

Chemical: A variety of selective and non-selective herbicides can be effective on yellow archangel. Summer or fall application, when temperatures are above 54 degrees, have shown most effective in British Columbia. Follow-up treatment may be needed.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Herbicide application is proposed as an available treatment method under this plan, as the only currently known infestation is located outside of the Lake Chaplain watershed. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Biological: No biological controls are available for yellow archangel.

Management Recommendation for Yellow Archangel at the Jackson Project:
Hand pull small, localized infestations. Mow or weed whack larger infestations on sites where herbicide application is not permissible; cover with sheet mulch after cutting. Monitor treated sites several times during the growing season and retreat as necessary. It may take more than one growing season to kill the plants; sheet mulch will need to be checked periodically and maintained in good condition. Reseed the site after the plants have been killed.

Herbicide application is recommended, where allowable, for treatment of the populations that occupy an area of more than a few square meters. Conduct a site inspection and consult with the County NWCB to determine which herbicide to use and application strength.

To reduce re-establishment of yellow archangel, revegetate any sites where treatment activities result in ground disturbance of one square meter or more. Reseed with desired fast-growing species and cover with mulch.

Long-Term Management Goal: Yellow archangel is a Class C weed and currently is not required to be controlled in Snohomish County. It was noted as a species of concern by the county in the 2007 inventory. Control and eventual reduction of the known Trout Farm population is the Project-level goal.

Five-Year Objectives:

- Initiate treatment of yellow archangel at the Trout Farm site within one year.
- Monitor the treated site annually; retreat as necessary.
- After two consecutive monitoring events show no presence of yellow archangel at the site, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

King County Noxious Weed Control Board. 2008. Noxious Weed Control Program web page, yellow archangel weed alert.

http://dnr.metrokc.gov/wlr/lands/weeds/pdf/Yellow_Archangel_FactSheet.pdf . February 2008. King County Noxious Weed Control Board, Seattle, WA.

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Table 3-11.1 Yellow Archangel Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover	2007 Treatment	Survey Notes
EKD0490C	PROJECT FACILITIES	TROUT FARM RD RIVER ACCESS	2400	4	M		Two main patches beneath large ACMA trees

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 3-12
Management Methods for English Holly (*Ilex aquifolium*)

Known Sites: English holly was reported at four sites during the 2007 weed inventory. Three of the infestations are in the vicinity of the powerhouse transmission line; the fourth is at the Trout Farm river access site. The District currently manages this species at several locations within the Project Facilities tract, including the power pipeline right-of-way.

Habitat and Threats: English holly is an evergreen tree introduced from Europe as an ornamental. It has naturalized widely in lowland forests of western Washington State. It can invade native forest stands and form dense thickets that block light from the understory and suppress the growth of native species.

Reproduction and Flowering Period: Reproduction in English holly is primarily by seeds, which are dispersed by birds. Holly also reproduces by suckering and by layering of branches. Holly flowers in early to mid summer; male and female flowers are found on separate plants. Berries mature on the female plants in winter.

Identification: English holly is a small evergreen tree or multi-stemmed shrub. Holly is readily identifiable by its dark green, waxy, shiny leaves, from 1-3 inches in length and typically edged with spines. Some varieties, and mature leaves, may be spineless; variegated varieties also occur. Berries are bright red.

Available Management Methods:
Prevention: Prevention of the spread of holly consists primarily of control of existing plants to prevent seed production. Soil from infested areas should not be reused; equipment and tools used in infested areas should be cleaned after use.

Manual: Small holly plants can be pulled or dug out of the ground; removal is easiest when the soil is moist. Root fragments will resprout, so complete removal of the root is desirable. Due to the extensive root system of English holly, removal of large plants by digging is not effective.

Mechanical: Plants cut off at the base will resprout; repeated cuttings may eventually kill the plant. Use of heavy equipment to dig up large plants is not practical, due to the cost of access, difficulty of removing all roots, and the extent of soil disturbance.

Cultural: Application of mulch around treated plants can help reduce seed germination. At sites where plants have been cut at the base or grubbed out, reseeding with fast-growing species can help quickly establish a desired plant community and suppress re-establishment of holly from seed in the soil.

Biological: No biological controls for English holly are available.

Chemical: Foliar herbicide applications to English holly typically are not effective due to the waxy cuticle on the leaves. Application of herbicide to cut stumps, or via frilling of the stem, can be an effective means of control.

Currently, herbicide application is available only for populations occurring on selected locations on Project Facilities lands that are outside of both the City of Everett drinking water supply watershed (Lake Chaplain) and the City of Sultan drinking water supply watershed. Herbicide application is retained as an available treatment method under this plan, as cut stump application is a very effective means of killing English holly. Snohomish County NWCB and the Pacific Northwest Weed Management Handbook should be consulted for specific herbicide application recommendations.

Management Recommendation for English Holly at the Jackson Project:
Hand pull, dig, or grub out small plants, being careful to remove the entire root system. Weed Wrench™ or equivalent tool may be used. Plants are removed more readily when soils are moist. Treat large plants by cutting near the base of trunk/stems prior to berry maturation. Plant material may be left to decompose on site as long as mature berries are not present. Retreatment of cut stumps will be necessary, as they will sucker and resprout aggressively. In those areas where herbicide use is approved, apply herbicide to cut stumps to reduce or eliminate resprouting.

To reduce re-establishment of English holly from seed in the soil, revegetate and/or mulch any sites where treatment activities result in ground disturbance of one square meter or more.

Long-Term Management Goal: English holly currently is not listed on the Washington State Noxious Weed List. Containment, and eventual reduction, of existing populations on Project lands is the District's goal for English holly.

Five-Year Objectives:

- Initiate treatment of English holly at four new sites within five years.
- Monitor treated sites annually; retreat as necessary.
- Beginning in Year 1, record new infestations of English holly on Project lands in weed database, incorporate new sites into management plan; treat new sites within five years of observation.
- After two consecutive monitoring events show no presence of English holly at a site, reduce monitoring frequency and continue to evaluate site as part of ongoing general monitoring.

References:

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Table 3-12.1 English Holly Occurrences at the Jackson Project, 2007

GISID	Geographic Subarea	Survey Site	Area (ft^2)	Distribution	Cover		Survey Notes
EKD0521C	PROJECT FACILITIES	POWERHOUSE TLINE AREA	100	1	L		
EKD0522C	PROJECT FACILITIES	POWERHOUSE TLINE AREA	100	1	L		
EKD0523C	PROJECT FACILITIES	POWERHOUSE TLINE AREA	100	1	L		
EKD0510C	PROJECT FACILITIES	TROUT FARM RD RIVER ACCESS	100	1	M		GPS recorded 40' NW of infestation

Distribution of weed within affected area:
1 = single plant/small clump
2 = scattered patches
3 = dense patches
4 = dominant cover
5 = linear

Estimated canopy cover of weed within affected area:
Trace = 0-1%
Low = 1-25%
Mod = 26-50%
High = 51-75%
Very High = 76-100%

Appendix 4
Weed Prevention Practices for the Jackson Project

- Consider weed risk factors during planning of proposed ground and habitat disturbing projects, such as road and facility maintenance, road and facility construction and decommissioning, fish and wildlife restoration projects, and recreation developments. Consult weed inventory maps to determine known occurrences of regulated noxious weed species within the Project boundary.

- Clarify the roles and responsibilities of all parties involved in day-to-day maintenance performed by District staff.

- Utilize performance bonds, responsibility clauses, or accountability statements for contractors and subcontractors to effect weed management to a desired condition.

- Seek to minimize ground and habitat disturbance, and removal of overstory shrubs and trees, to reduce opportunity for weed establishment, when feasible and not required for other project purposes or safety.

- When feasible, incorporate weed removal into projects involving excavation; utilize heavy equipment to remove weed infestations, provided that appropriate disposal sites can be secured.

- When feasible, defer disturbance of weed-infested sites until weed treatments have been implemented and allowed appropriate time to take effect. When work in untreated, weed-infested areas is necessary, work from the outer edges of the infestation inward if possible, to avoid spreading the infestation.

- Specify in all contracts that heavy equipment, hand tools, personal vehicles, and off-road vehicles brought onto the Project for construction or maintenance projects outside of the road prism, be free of all dirt, mud, and plant parts.

- Specify in all contracts that all heavy equipment, including mowing equipment, excavators, trucks, personal vehicles, and off-road vehicles used in a weed-infested site be power washed to remove dirt, mud, and plant parts before leaving the area to avoid spreading the infestation. Hand tools, small power tools, and personal gear should also be inspected and manually cleaned to remove all dirt, mud, and plant parts before being transported from the site. To the extent practical, District staff will inspect all District equipment brought onto Project lands and remove dirt, mud and plant parts as needed. Exception to this practice may be made during emergency repairs.

- District biologists will work with District staff and contractors conducting construction and maintenance work in weed-infested areas to, when feasible, schedule the work to reduce potential spreading of weeds. This may involve conducting the work outside the flowering/seed production season, or controlling

weeds prior to work being conducted. When this is not feasible, equipment will be washed down prior to leaving each weed-infested area.

- Dispose of noxious weed plant material and weed-contaminated soils in a way that ensures that no seeds, roots, or other portions of the plant capable of reproduction, are spread. Material may be disposed of at an approved landfill or contained disposal site. District staff will coordinate with District Biologists regarding appropriate weed disposal.

- Provide contractors, survey crews, inspectors, and visitors weed awareness information and weed transport prevention techniques.

- Specify that contractors use regulated commercial gravel pits and fill sources to reduce the potential for weed transport onto Project lands. Specify that non commercial gravel pits and fill sources will be inspected to identify weed-free sources; treat weeds at infested sites prior to use or transport.

- To the extent practicable, require that all mulch be weed free. The Washington Wilderness Hay and Mulch (WWHAM) program now provides a list of growers whose hay and straw crops have been certified to North American Weed Management (NAWMA) standards. WWHAM/ NAWMA hay and straw bales will have a self-adhesive, tamper-proof WWHAM certification tag attached to the bale twine, or will have at least one strand of purple and yellow proprietary twine encircling the bale. A list of WWHAM producers and sellers is provided at: http://www.nwcb.wa.gov/WWHAM/WWHAM_suppliers.htm .

- Specify in all construction specifications that all seed used on site is certified 'free of noxious weeds'.

- Actively revegetate all disturbed sites, using a native seed mix; or a non-native seed mix based on non-invasive species. Apply mulch to conserve moisture and protect seed and soil. The Mt. Baker-Snoqualmie National Forest has developed a set of seed mixes for temporary site revegetation using commercially available, non-invasive species (refer to Appendix 5). These seed mixes include relatively short-lived species that are intended to be replaced over time by natural seeding of natives.

Appendix 5
USDA-FS Mt. Baker-Snoqualmie National Forest Non-Native Seed Mixes for Road Decommissioning

Source: U.S. Forest Service. 2005. Proposed treatment of invasive plants and new invaders strategy (Forest Plan Amendment #26), Environmental Assessment and Decision Notice, June 3, 2005. USDA Forest Service, Mt. Baker-Snoqualmie National Forest, Mountlake Terrace, WA.

Table 4. Desirable Non-Native Seed Mixes for Mount Baker-Snoqualmie National Forest sites ≤ 3500 feet elevation.

Droughty: Soil lacks moisture in mid-summer	Not Droughty: Soil has moisture in mid-summer	
Seed Mix A	Soils Saturated - Seed Mix B	Soils Not Saturated - Seed Mix C
Soft white winter wheat @ 50 lbs/acre	White oats @ 60 lbs/acre	Tufted hairgrass* @ 4 lbs/acre
Slender wheatgrass @ 20 lbs/acre	Tufted hairgrass* @ 4 lbs/acre	Annual ryegrass @ 10 lbs/acre
Annual ryegrass @ 20 lbs/acre	Annual ryegrass @ 10 lbs/acre	Winter triticale @ 60 lbs/acre
Austrian winter peas @ 5 lbs/acre	Alsike clover @ 2 lbs/acre	Alsike clover @ 2 lbs/acre

Goal = 170 seeds per square foot
*In areas adjacent to wetlands, eliminate tufted hairgrass and increase sowing rate of annual ryegrass to 60 lbs/acre.

Appendix 6

Stakeholder Consultation

Relicensing stakeholders were consulted prior to the submittal of the Notice of Intent to relicense (NOI) and Pre-application Document (PAD), and again during the scoping and study proposal process. They were informed of study progress and received drafts and final versions of the terrestrial resources studies (See the Updated Study Report for more information). On 8 September 2008, a meeting was held for the Jackson Project Relicensing Terrestrial Resources Group (TRG) to review the terrestrial study reports and to discuss proposed Protection, Mitigation and Enhancement (PM&E) measures for terrestrial resources, including a proposed Noxious Weed Management Plan (NWMP). A PowerPoint presentation was given at the meeting and paper copies of the presentation and of draft Noxious Weed PM&E measure were distributed to those in attendance. Digital copies were also emailed to all TRG members. Meeting minutes are included in Appendix 7. The USFS and Tulalip Tribes provided comments (see below), which were incorporated into the Noxious Weed PM&E measure and the draft NWMP.

The Preliminary License Proposal (PLP) that was filed with the FERC on 31 December 2008 included the proposed Noxious Weed PM&E measure, a draft of the NWMP, and a discussion of the terrestrial resources in the Project area. Written comments regarding the NWMP were received from the FERC and the USFS (See Appendix A of the FLA) and were incorporated into the NWMP and FLA as requested.

A meeting for the TRG was held on 23 February 2009 to discuss the terrestrial PM&E measures and the NWMP that were presented in the PLP and solicit input on preparation of the draft TRMP. Meeting minutes and comments are included in Appendix 7.

Table 6-1. Stakeholder comments on the Noxious Weed Management Plan, and District responses to comments.

STAKEHOLDER COMMENT	DISTRICT RESPONSE
US Forest Service, Ann Risvold via email dated September 9, 2008	
Because the Forest Service has national policy to restore and maintain native plant communities, we are concerned not only with State and County listed noxious weeds, but also un-listed, non-native, invasive plants. That's why focusing only on the State and County weed lists is of concern. Nevertheless, there are some Class C weeds that are so thoroughly wide-spread that we do not try to control or eradicate them because it would be so overwhelming. Of the invasive plants found during the noxious weed surveys, these are the ones we would want to see control work done on - Any Class A weeds; any current B designates; any current County selected species; and then scotch broom, wild carrot, herb Robert, butterfly bush, yellow archangel, and English holly. So that means, for instance, that if knotweed becomes un-selected in Snohomish County, we would still be very concerned about it. We have in fact put years and much money into knotweed control as have our many partners.	The USFS comments on noxious weed species were incorporated into the draft Noxious Weed Management Plan that was filed with the PLP.
I like the idea of annually updating the weed plan to consider changes to the weed lists and to monitor treatment methods and success, but I also think it would be good to make a provision in the plan that all interested parties will conduct a thorough review of the entire document, perhaps on a 5 year rotation, to make more substantive changes. After 5 years, I would hope that some populations would be eliminated or greatly reduced, and that may be our opportunity to make some other populations a higher priority.	The USFS comments on the review intervals were incorporated into the draft Noxious Weed Management Plan that was filed with the PLP.
I admit I'm still uneasy about the City's blanket ban on herbicides. There are so much data and information on the effects of herbicides that should moderate the worry.	The City of Everett's herbicide policy and the District's use of herbicides on lands within the Project boundary were discussed in the draft Noxious Weed Management Plan that was filed with the PLP.

US Forest Service, Ann Risvold via email dated September 22, 2008	
I looked over the PME for noxious weeds and I think it looks good. The only other thing that comes to mind is revegetation of sites after weed treatment, once we are confident that a particular population has been eradicated. Long term success of weed treatment typically includes a revegetation component to prevent re-infestation. Do you need these comments in letter form rather than e-mail?	Comment noted. Revegetation is addressed in Section 5.4 of the final NWMP.
Tulalip Tribes, via letter dated October 10, 2008	
The following recommendations are meant to serve as a starting point for the discussion and development of Protection, Mitigation and Enhancement measures (PMEs) designed to protect terrestrial resources. The PMEs include those for implementation of a Terrestrial Resource Management Plan (TRMP), formalization of a Noxious Weed Plan, and development of a Marbled Murrelet Habitat Protection Plan. These recommendations should be considered preliminary and will need to be refined further under the direction of the Terrestrial Resources Work Group (or its successor).	Comment noted. The District thanks the Tulalip Tribes for their comments, and welcomes further involvement in PME development.
The Tulalip Tribes appreciates the opportunity to provide Project input, and is generally satisfied with the information contained within the Terrestrial Resources PMEs. Recommendations that follow reflect our ideas to further promote the success of the Project.	Comment noted.
Abbreviated terms should be specified at first use for the following: Page 1 Paragraph 1: “WDFW” and “USFWS” Page 1 Paragraph 2: “FERC” Page 1 Paragraph 3: “PME”. Additionally, on page 3 *Description of the Action*, TRMP and WHMP were specified previously in the document.	The District agrees with these suggested acronyms. All abbreviations and acronyms will be defined at their first use in the NWMP.
The Tulalip Tribes are pleased to see the formalization of current weed management methods into a Jackson Project Noxious Weed Plan, and is looking forward to the opportunity for review. The Tulalip Tribes would like to ensure that the plan includes objectives and strategies for immediate reclamation of disturbed areas in addition to general avoidance of ground	The draft Noxious Weed Management Plan that was filed with the PLP addressed management for specific weed species and sites, and included weed prevention methods and revegetation methods for disturbed soils.

disturbance activities, and an objective to minimize establishment of noxious weeds rather than only containing and controlling.	
The *Description of Action* section lists providing education information for Project employees; the Tulalip Tribes would like to emphasize continual training for Project employees, including recognition of noxious weed species, in addition to an internal reporting and tracking mechanism of weed infestations.	The draft Noxious Weed Management Plan that was filed with the PLP included ongoing training for District staff, including weed identification. Monitoring of existing infestations and reporting of new weed occurrences also were addressed.
US Forest Service on PLP (including Draft Noxious Weed Plan), via letter dated March 31, 2009	
45. Knotweed is missing from the bullet list of sites and species to be treated. Knotweed should be included in the bullet list of sites and species to be treated in Section 9.0, Implementation and Monitoring, as it is referred to in the rest of the noxious weed sections (PLP, p. 16). **Recommendation:** Knotweed should be included in the bullet list of sites and species to be treated, as it is referred to in the rest of the noxious weed sections.	The bulleted list of sites and species referred to in Section 9.0 addresses new weed sites that were discovered during the 2007 survey, but not treated that season. The knotweed site has been treated by the District, and therefore is discussed in the second paragraph of Section 9.0. This paragraph has been revised to specifically call out knotweed as one of the managed sites that will continue to be monitored and retreated as necessary.
46. Management methods for invasive knotweeds should be more aggressive. The Five-Year Management Objectives for invasive knotweed describe a reduced monitoring frequency after two consecutive monitoring events show no presence of knotweed (PLP, p. 35). It is not at all unusual for knotweed to appear dead for two or more years and then show up again. Knotweed is highly resistant to a quick eradication. **Recommendation:** The PUD should conduct annual monitoring for at least three years before reducing the monitoring frequency.	The knotweed management objectives have been revised to show at least three years of annual monitoring before reducing monitoring frequency.

Appendix 7

Stakeholder Meeting Summaries

Jackson Project Relicensing
Terrestrial Resources Group

Monday, September 8, 2008

Meeting Summary

Start Time: 9:05 a.m.	**End Time:** 12:10 p.m.
Subject: Terrestrial Resource Group Meeting Summary	

Attendees:

- American Whitewater – Tom O'Keefe
- Biota Pacific – Marty Vaughn
- City of Everett – Julie Sklare
- District – Karen Bedrossian, Jeff Kallstrom, Bruce Meaker, Kim Moore, Dawn Presler
- FERC – David Turner (via conference phone)
- Meridian Environmental Inc – Pam Klatt
- North Cascades Conservation Council et al. – Rick McGuire
- Smayda Environmental Associates, Inc.– Kathy Smayda
- US Forest Service – Don Gay, Ann Risvold
- WA Dept of Fish and Wildlife – Rich Johnson

DISCUSSION ITEMS

Introductions

The group introduced themselves and their organizations.

Study Results Presentation

Karen, Kathy and Marty presented study results information contained in the attached slides.

Special Status Plant Survey discussion included the following:
Four lichens considered rare by the US Forest Service were located during the survey. Three of the species were in locations on non-NFS lands that are not impacted by the project. The fourth species was found on both NFS and private lands and is fairly common in the Project vicinity, despite its rare status. No special management methods were recommended by the FS for this species.

Noxious Weed Survey discussion included the following:
Blackberry is considered an invasive species, but it is not included on Snohomish County's noxious weed list. It is very common throughout the county. The District has a District-wide Vegetation Management Plan that covers general weed management for all District properties, including Jackson.

Wetland Survey discussion included the following:
Rich noted that the wetland rating system is misleading to persons unfamiliar with it. The rating system can somewhat counter-intuitively assign high scores to wetlands in the poor condition The pristine wetlands in the project area ended up with low ratings because of their limited opportunities for improving water quality and reducing flooding and erosion. Karen noted that reading the descriptions of the wetlands provides a better understanding of the quality of the wetland rather than reviewing the rating alone, that the system provided a standardized method of describing the wetlands, that the habitat scores and descriptions are useful, and that this system is the accepted method at both the state and county level. She and Bernice Tannenbaum discussed this issue with the author of the rating system while taking his wetlands rating class. (Note: this issue is addressed on the first page of the Western Washington Wetland Rating System ([Ecology Publication # 04-06-025.]).

- **Action:** Karen – per Rich's request, provide a cross reference for SP10 Amphibian wetland numbers with those from the SP9 Wetland Survey, since the two studies numbered the wetlands differently.

- **Action:** Dawn – resend link to SP9 and SP10 draft report appendices on web site.

Amphibian Survey discussion included the following:
Slide 21 should state that three (not four) state monitor species are potentially present. A fourth species, Oregon spotted frog, is listed as State Endangered, but its presence in the area is very unlikely.

Bull frogs (an invasive species) were found at Lost Lake, Chaplain Marsh and off-channel habitats along the lower Sultan River. While they are common in lowlands throughout western Washington, they were not found in the upper Sultan Basin.

Rich noted that there may be opportunities for management in the fluctuation zone and river channel to provide better habitat for amphibians; management activities could include timing and amount of flows/drawdown. Although, he is not necessarily saying the District should do so based on other resource needs/benefits. Karen noted that in the report conclusion it states that increase in flows on the river could have a negative impact on amphibians, and that existing conditions at the reservoir indicate that the amphibians are using areas outside the drawdown, so impacts from stranding are minimal.

Marbled Murrelet Survey discussion included the following:
The District has been operating as if the Culmback Dam West and East are occupied habitat since presence was first detected in the 1990s. Rich expressed gratitude that the District was treating the extent of occupancy as the entire survey area, as per PSG protocols.

Spotted Owl Survey discussion included the following:
The definition used during the study for suitable habitat is pretty broad since spotted owls have been found in non-typical or marginal habitat. Incidental potential sightings of spotted owls were treated as a possible sighting during the study and additional stations were added in those areas.

Karen noted that "owl detection" on the maps does not refer to spotted owls but to other species.

Marty discussed the latest research on the interaction of spotted and barred owls. They are competitors for the same habitat/food sources; this competition displaces the spotted owl. There is also some evidence of predation; however, the two species are not natural predators. There is some potential for spotted owl habitat improvement over the long term in the region, particularly on public lands, but the prospects for recovery of the species are still not good because of the presence of the barred owl.

Proposed Protection, Mitigation and Enhancement (PM&E) Measures Presentation

Karen, Kathy and Marty presented proposed PM&E information contained in the attached slides.

Noxious Weed Management Plan discussion included the following:
The District proposes a plan for the management of the 7 noxious weed species for which control must be provided under State and County regulations. The plan calls for an annual report and meeting, and review for additions/deletions from the County's list. The State gives authority for noxious weed control to the County governments.

During the discussion several stakeholders questioned why all noxious weeds would not be managed under the proposed plan. Karen stated that the plan will focus on the noxious weeds that are required to be controlled by state and county regulation. The survey included other noxious weeds and invasive species not listed as noxious weeds. The weed management plan will include general measures to prevent the introduction and spread of weeds, which will be effective both on the target weed species and other invasive species. The plan will bring prevention and management into the planning stages of ground-disturbing activities. Marty noted that the number of weeds for management is a concern due to the cost; managing for all invasive species, including those that have become widespread like blackberry and reed canarygrass, could be cost prohibitive.

The FS noted that they have concerns about the potential spread of weed species onto NFS lands, including several species not included in the draft weed management plan. They indicated that they recognize the difficulty of managing for species that are very common and widespread, such as blackberry and reed canarygrass, but would like to have other, less widespread species considered for addition to the plan. Ann Risvold indicated she will provide a list of FS weed species of concern to Karen.

Ann asked if the District uses herbicides. Karen responded that herbicides are not allowed in the watersheds due to water quality concerns as the water is for municipal drinking water supply. The two areas where knotweed is located are outside the watersheds and herbicides have been used, in combination with cutting, to treat those locations.

David noted that there are two options for the plan: 1) have a separate weed management plan or 2) incorporate the plan into the Terrestrial Resource Management Plan.

- **Action: Ann** – forward list of USFS weeds of concern to Karen.

- **Action**: Kathy – finalize draft Noxious Weed Plan for stakeholder review ASAP so it can be included in the PLP.

Marbled Murrelet Protection Plan discussion included the following:
The District proposes a plan for the protection of marbled murrelet habitat as it relates to road maintenance. Additional activities to be included in the plan are snag management and trails development; Marty will update accordingly for stakeholder review and comment. The District currently ensures protection of marbled murrelet habitat through the Washington Forest Practices Rules. Marty explained the implications of continuing to work through the Forest Practices Rules versus a PME with an incidental take statement for murrelets. A PME and incidental take statement are recommended because they would consolidate and clarify all murrelet habitat protection for District activities (including recreation trail development), and give the District more operational flexibility than the Forest Practices Rules.

A danger tree is one that is defined as having the potential to fall over a road or other facility where it could cause damage, restrict access or cause bodily harm.

Terrestrial Resources Management Plan discussion included the following:
The District is proposing a TRMP to cover the lands the District owns, including 1,745 additional acres around Spada Lake not covered in the original HEP analysis and 139 acres near Williamson Creek not currently in the WHMP or original HEP analysis. The City's lands on the Lake Chaplain Tract, which are used primarily for filtration plant/water supply purposes, as well as timber management, would not be in the TRMP, but would be managed under the current WHMP as an off-license agreement through which the District would maintain oversight of wildlife management activities. The City of Everett will no longer be a co-licensee for the project, and the preference is to continue managing the tract according to the WHMP, but under a separate, off-license agreement. Karen noted that the City of Everett had a timber management plan for the land prior to the preparation of the WHMP and proposed to include the Chaplain Tract in the WHMP as a means to provide more mitigation, while still harvesting timber. By implementing the harvesting plan in the WHMP rather than implementing the existing more aggressive timber management plan for the tract, wildlife habitat was improved. The value to the WHMP was measured by the HEP analysis as the difference between the two plans. The intention of including the lands in the WHMP was not to optimize the wildlife values, but to improve them over the original timber harvesting plan.

Rick expressed concern that there are differing beliefs on the management goals for these lands, the WHMP was outdated when it was written, more lands should be acquired, and the WHMP should be totally re-evaluated. He and Rich both suggested the WHMP places too much emphasis on management for deer. Rich expressed that he had very little disagreement with our current management but that he would like to see a change in management to less even-age stand management and focus on SP6 changes. Karen understands that there are differing philosophies on the management goals; however, the District is managing according to the goals established by the stakeholders under the WHMP's development and the objectives established by the State's current management plan, which includes managing habitat for deer. The WHMP emphasizes habitat for old-growth wildlife species because this was clearly a priority when it was written in the late 1980's, but it also includes management for deer because "in-kind" habitat mitigation was requested by the wildlife agencies as well. Don Gay, USFS asked if WDFW had had a recent change in policy to de-emphasize management for deer. Karen noted that a detailed response to NCCC comments was provided in the ICP response filed with FERC and that FERC made a determination on requests for modifications to study plans.

Rich expressed concern about not having regulatory authority over the Lake Chaplain lands if they are not in the project boundary. Enforcement efforts would be the obligation of the State rather than FERC. He did support the efforts currently underway at the Spada Lake Tract to promote late successional habitat. The District stated that the side agreement could include some oversight provisions, and that the side agreement warrants further discussion.

David Turner stated that the licensee needs to demonstrate to FERC that the Lake Chaplain lands are no longer needed within the project boundary for their original purpose (wildlife mitigation) or for any new purpose, such as recreation.

Tom asked if any lands would be added to the TRMP to replace the Lake Chaplain tract. Karen explained how the 1,745 acres at Spada Lake were added after the HEP analysis was conducted and 139 acres at Williamson Creek would be added, and how the total mitigation value and acreage would be more than adequate under the current FERC view of continuing project impacts.

- **Action: Rich** – identify specific habitat enhancement activities in SP6 that WDFW (including game management) would like to see occur on the mitigation lands so the District can begin analysis cost/benefit for the license application.

- **Action: Jeff** – develop bullet points or whitepaper on TRMP as it relates to an off license agreement relating to Lake Chaplain so Rich has something to give to his AG's Office for their review and approval of direction and for review by the TRG.

- **Action**: **Dawn** – route ICP response and FERC's study plan determination to TRG.

Next Steps for Process

The District will consider and update the PM&E documents based on comments received today at the meeting; the updated PM&Es will be routed via email for TRG review and comment next week. The TRG will have a 2-week comment period. The District seeks TRG input so what is proposed in the Preliminary Licensing Proposal (PLP) is close to/if not the final. In order for input into the PLP, Karen needs to have a "final" proposal ready for analysis by November 1.

Members can contact Karen via email and phone to discuss the proposals. A meeting will be scheduled for October 1, 9:00-11:00 to continue discussion of PM&E issues that do not get resolved between this and the next meeting.

- **Action: Marty** – forward the updated Marbled Murrelet PME to Don Gay for review.

END MEETING

Jackson Project Relicensing
Terrestrial Resources Group

Monday, February 23, 2009

Meeting Summary

Start Time: 2:05 p.m.	**End Time:** 3:40 p.m.
Subject: Terrestrial Resource Group Meeting Summary	
Attendees: • Biota Pacific – Marty Vaughn • City of Everett (City) – Julie Sklare • District – Karen Bedrossian, Jeff Kallstrom, Bruce Meaker, Kim Moore, Dawn Presler, Matt Love (outside counsel at VanNessFeldman) • Snohomish County (SnoCo) – Carly Summers (via phone) • Tulalip Tribes (Tribes) – Reid Allison • US Forest Service (USFS) – Kristen Bonanno (via phone) • WA Dept of Fish and Wildlife (WDFW) – Rich Johnson	

DISCUSSION ITEMS

Introductions

The group introduced themselves and their organizations.

Status of Relicensing; Settlement Process and Protocols

The entire Terrestrial Resources Group (TRG) was invited to this meeting. Since the attendees were familiar with the status of relicensing and the settlement process, these topics were not heavily discussed. The Confidentiality Agreement and Ground Rules are ready for signature by the agencies with an expectation of a required sign-off by each party by the March 11 Aquatic Resources Settlement Group meeting.

Review of PM&Es in PLP

Karen reviewed the PM&Es and Management Plans (in PLP Appendices) for terrestrial resources including the 1) TRMP, 2) Noxious Weed Plan, and 3) Marbled Murrelet Habitat Protection Plan.

TRMP – see handout

- Williamson Creek – additional acres (not in current WHMP) contain second-growth and wetland and are contiguous with Williamson Creek. Rich stated that WDFW prefers active management to accelerate habitat growth/diversity to allow for a variety of species.
- Lost Lake – no commercial harvest has been done there by the District but it is economically feasible to do so.

Noxious Weed Plan – no comments

Marbled Murrelet Habitat Protection Plan – received comments from Don Gay (USFS) which were incorporated into the version filed in the PLP. Tim Romanski provided comments to Karen on PLP version stating that USFWS is not likely to allow "take" for marbled murrelets. Access trail in upper river gorge area in marbled murrelet habitat could pose a problem. Karen will further discuss with Tim.

Issues

WDFW would like to see in TRMP:

- bigger gaps (1/4 acre), not necessarily more gaps, to provide a variety of habitat and not monocultural habitat
- Snag creation in mature growth areas, including larger diameter snags but in balance with the needs of marbled murrelets
- Fewer roads the better - better for wildlife
- Annual review good, but due to staffing concerns not sure if they will actively participate. 10 years for plan review too long to be proactive. 3-5 years may be better for plan review.
- Flexibility in the plan. Provide management concepts but not as detailed prescriptions as in current WHMP.

Karen and Biota are currently working on a draft TRMP. The District will provide a copy of the working draft to Rich and Mark Hunter by 16 March to be reviewed/commented on before Rich's one-month vacation that begins on 25 March. The TRG review of the TRMP will occur following that review.

WDFW expressed a desire to ensure that the general public continues to have the ability to access Project lands during state-approved hunting seasons. The Tribe expressed a similar interest for their members; no other terrestrial resource issues were identified. WDFW also mentioned concern that the Lake Chaplain Tract is managed for deer; however, the public is not allowed in the area for hunting.

Lake Chaplain Tract (LCT)

The City would like to have a meeting with WDFW and the City forester to discuss the management of the LCT. Rich said that he is interested in the meeting and site visit in March up to the 20th.

A list of issues Rich noted for the LCT were:

- Current clear cuts – he believes there is a short term gain but it is lost within 15 years when it doesn't provide browse any more and stays unproductive until the next cut.
- Minimize the use of clear cuts in favor of thinning
- Minimize size of clear cuts
- Lengthen seral stage (increase length of rotation)
- Minimize number of roads
- Develop corridors between the different habitat types
- Land not open to public should be managed for old growth

Rich would prefer management that targets critters losing habitat rather than target for deer. Karen pointed out that the WHMP was designed specifically to avoid and reduce the unproductive stages of clear cuts and that the overall wildlife habitat management program for Jackson Project will provide well over 100% of mitigation for late seral species. Rich would like for the District and City to look at the overall landscape. Karen said that mitigation was designed to make up for losses resulting from the Project (project nexus).

LCT management plan would be an off-license agreement signed by the District, City of Everett, WDFW and possibly the Tribes. USFS and Snohomish County indicated they were unlikely to be a signing party but would like to see drafts of the TRMP and LCT management plan.

Assignments:

Karen, Rich and Julie will set up a meeting for Rich and anyone else he wants to attend from WDFW to talk to the City forester in March.

Karen will send Rich and Mark Hunter a working draft version of the TRMP by 16 March so that Rich can review it prior to being gone during the month of April when the other stakeholders will be reviewing the draft plan.

Dawn will provide Karen with Justin Casing and Carly Summers' email addresses and will send terrestrial related emails to both Justin and Carly as requested by Carly.

END MEETING