

BISHOP PROJECT
Addendum 1---WETLAND REPORT

THIS REPORT HAS BEEN PREPARED BY:

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RE: Wetland Delineation on Bishop Property..Cabin Creek..Kittitas County, WA

LOCATION:

The Bishop Property is located two (2) miles from the I-90 Cabin Creek Exit, directly across from the Cabin Creek U-Fish RV Park.

Legal: Parcel B, a portion of the S 1/2 of Section 36, T21N, R12E, W.M., in the County of Kittitas, State of Washington.

1. INTRODUCTION

Wetlands are transitional areas in the landscape that occur between upland and aquatic environments where the water table is at or near the land surface. These areas are valued for several functions, including high quality wildlife habitat, contributions to fisheries, inorganic and organic pollution control, flood water control, and recreation and educational value. Each wetland is unique, with varying values for the different functions. In order to protect water quality in the U.S., Congress enacted the Clean Water Act to “maintain and restore chemical, physical and biological integrity of the waters of the U.S.”.

This report is prepared to meet the requirements of Kittitas County Land Use Division, Ellensburg, WA.

The property in question was evaluated for the presence and quality of wetlands using standard accepted procedures and all available data bases.

2. SITE DESCRIPTION

A. Site Description

The property lies adjacent to the Yakima River, is second growth forest, with seasonal streams, with aquifer emanating from ponds located on the site and from the Yakima River during normal periods of controlled irrigation release of Lake Keechelus.

B. Site History and Current Land Use

The site was previously logged in the 1920's and 1930's, and within the last 10 years. It is now forested second growth. It is zoned Commercial Forest, but this property and adjacent property is used as forest recreation.

C. Topography

The property is relatively flat at approximately 2,495 feet in elevation.

3. CRITERIA FOR WETLAND DELINEATION

Presently accepted wetland identification is based on three mandatory criteria established in the Federal Interagency Committee for Wetland Delineation (1989), FICWD; the federal manual for identifying and delineating jurisdictional wetlands.

These criteria include;

- ... a predominance of hydrophytic vegetation,**
- ... the presence of hydric soils, and**
- ... evidence of wetland hydrology.**

A predominance of hydrophytic vegetation is defined by determining a plant species' frequency of occurrence. Plants growing within a wetland area (hydrophytic vegetation) have adapted to living in permanently or periodically inundated or saturated soils. The majority of plants growing in wetland areas possess physiological mechanisms that allow for productive growth, even during prolonged periods of anaerobic soil conditions. Wetland plants indicator status has been designated by the US Fish and Wildlife Service (Reed, 1988). The hydrophytic vegetation criteria is determined when more than 50 percent of the dominant vegetation is considered hydrophytic according to the indicator status.

Hydric soils are soils that have been developed under set site conditions. Hydric soils can be either organic or mineral in origin. Because of long-term wetness, hydric soils usually develop certain morphological features that can be observed in the field at any time of year. These features include organic horizons, gleying and low matrix chromas, with or without mottling. Gleyea soil colors are predominantly neutral gray to greenish or bluish gray. This gleyed nature is an indication that prolonged soil saturation has converted soil minerals to their reduced forms and anaerobic conditions. These reduced minerals are then removed from the soil by water movement. Mottles are blotches of different colors interspersed with the dominant matrix color. Mottles occur when soils are alternately saturated and drained as a result of seasonal fluctuations in the water table. Soil types can be identified by comparison of a soil sample to the Munsell Soil Color Chart,“ (SCS, 1988). These standardized charts identify the color components of hue, value and chroma. Hue is the main spectral color, value is the degree of lightness and chroma indicates color strength of purity. Chromas of two (2) or less are considered LOW and often indicate hydric soil conditions.

Wetland hydrology is the primary force in the creation of wetland areas and is defined as permanent or periodic inundation, or soil saturation for a significant portion of the growing season. Wetland hydrology creates anaerobic conditions in the soil, favoring the development of hydric soil indicators and proliferation of hydrophytic vegetation. Where wetland hydrology changes throughout the year, hydrologic indicators are used to define the hydrology criterion. These indicators may include visual observation of soil saturation within soil test holes, root rhizospheres, water marks, drift lines, sediment and deposition and surface scour.

4. SELECTION OF WETLAND DELINEATION

After reviewing the USGS topographic quadrangle map of the project area, an "on-site determination method" was selected to be used. Prior to and after initially visiting the site, a review of published information was undertaken to evaluate the potential presence of wetlands. (See Literature Reviewed)

5. METHODOLOGY

The Bishop property was investigated in May and June of 1995. Wetland delineation techniques as per the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, (January 1969), were utilized. Eastside Consultants, Issaquah, subsequently surveyed the wetlands.

The three technical criteria for delineating a wetland include the parameters of; hydric soils, hydrophytic vegetation and hydrology. These three criteria must be present in order for an area to be classified as a wetland. The method chosen to make a wetland determination depends upon the complexity of the site and the impact of the determination.

Routine on-site methodology was used to evaluate the status of wetlands on this property. The routine method is designed for the evaluation of areas equal to or less than five acres in size, or larger areas with homogenous vegetation and/or a clear wetland/upland boundary.

The wetlands can be classified as a Palustrine Emergent, Year-round Saturated.

6. RESULTS OF WETLAND ANALYSIS

A. Soils

N/A--See Health Department report.

B. Vegetation

Attached is the Washington State Wetlands Flora Checklist for the Bishop property, plus detailed data forms for the three wetlands.

C. Hydrology and Water Quality

Source of the property's hydrology (water) occurs from sheet flow (sub-surface water movement) originating up-slope from the Yakima River and the adjacent property gravel pits. Periods of non-natural high water flow also occur when up-stream Keechelus Dam releases water for down-stream agricultural and flood control needs. Most of the water on the property flows southeast. The water quality is high, due to absence of any development within two (2) or more miles in the watershed up-slope from the property. Other than the

proposed access road, natural trails and building site, no additional site disturbance is planned.

D. Wetlands Functions and Values

The site would have a high classification of functions and values due to the large size of the property and its year-round wetlands and seasonal streams. The Bishop Project is making a minimal impact on the wetlands functions and values, because of the small acreage (less than 4%) for road area and building site.

E. Offsite Wetlands

Directly across Cabin Creek Road (also known as U-Fish Road) from the property is the U-Fish Trout Pond and RV complex. Up-slope and down-slope are similar wetlands and seasonal streams. The Yakima River lies adjacent to the property.

F. Description of On-Site Wetlands

The wetlands in question are essentially one contiguous forested wetland. As defined by the US Fish and Wildlife Service (USFWS) in "Classification of Wetlands and Deepwater Habitats of the United States" (1992) a forested land "...is characterized by woody vegetation that is 6 m tall or taller. All water regimes are included except subtidal...forested wetlands are most common in...those sections of the West where moisture is relatively abundant, particularly along rivers and in the mountains."

G. Recommended Wetland/Stream Category

As per the Department of Ecology representative, these wetlands would be considered Class II with a buffer of 75-feet. The seasonal streams would be considered Class II as they contain anadromous fish, requiring a 75-foot buffer zone of natural vegetation. Wetlands Environmental, Inc. has delineated wetlands adjacent to the proposed road access and were surveyed by Eastside Consultants (see blueprint in original report).

7. PROPOSED ACTIVITY

A. Proposed Activity

1. A retreat lodge (1 building) and garage/barn (1 building) is planned on less than two (2) acres of the property, including road access.
2. Road access to the building is addressed by three (3) alternatives:

Alternative A. Road to the building site along the route as surveyed by Eastside Consultants, as specified by Bishop and shown in the blueprint/road profile (see original report).

1) Installation of:

- One (1) 24" culvert at the beginning of the north portion of the property...the first crossing.
- Two (2) 36" culverts...the second crossing.
- Two (2) 36' culverts...the third crossing to maintain seasonal stream overflow from the Yakima River onto the property and its wetlands...the third crossing.
- One (1) 24" culvert to be located at the building site..the fourth crossing.

Alternative B.

- 1) In place of the two (2) 36" culverts at the third crossing, a railroad flat car is proposed as a bridge to provide minimal, if any, impact on stream flow in this area.
- 2) A portion of the existing road be utilized, which goes around the west end of the "new pond" (see blueprint), and would have even less impact to the surrounding habitat, due to its present existence.

Alternative C.

- 1) It was original proposed that an easement be requested across a small portion of U.S. Forest land, but this has been denied, so this is not a feasible alternative.

It is the opinion of Wetlands Environmental that Alternative B offers the better solution for access.

4. As per request of the Bureau of Indian Affairs Yakima Tribal local fisheries biologist, larger trees cut will be placed in the Yakima River to enhance fish habitat. This will be accomplished with direction of local fisheries biologists.
5. Re-vegetation with natural flora will be accomplished, as necessary, with direction and supervision from Department of Fish and Wildlife biologists.

8. WILDLIFE

Wildlife is a product of habitat or vegetational stages and basically there are four stages: 1) dominate vegetation consisting primarily of grasses and forbes, 2) dominate vegetation consisting of shrub species, 3) dominate vegetation of second-growth coniferous or deciduous tree species, and 4) dominate vegetation comprised of mature old-growth timber or dense stands of second-growth that forms a closed canopy. Each vegetational stage will support a variety of wildlife species. Generally stages 2 and 3 will support a higher and more diverse wildlife community.

The property in question falls into vegetational stage 2 and 3 and supports an array of wildlife species. Following is a partial list of wildlife species (as classified by the Washington Administrative Code) that may inhabit the property during some portion of the year from a very brief transitory basis (i.e. to enter and exit the property within a few minutes, such as a bird passing through en-route to other habitat) to some species that might inhabit the property for an extended period of time. (NOTE: * indicates introduced species.)

I. Game Birds

- a) Band-tailed Pigeon (*Columba fasciata*)
- b) Ruffed Grouse (*Bonansa umbellus*)
- c) Blue Grouse (*Dendragapus obscurus*)

II. Predatory Birds

- a) Common Crow (*Corvus brachyrhynchos*)
- b) Common Raven (*Corvus corax*)
- c) * English/House Sparrow (*Passer domesticus*)
- d) * English Starling (*Sturnus vulgaris*)

III. Game Animals

- a) Black-tailed Deer (*Odocoileus hemionus columbianus*)
- b) Mule Deer (*Odocoileus hemionus hemionus*)
- c) *Rocky Mountain Elk (*Cervus elaphus*)
- d) Black Bear (*Ursus Americanus*)
- e) Snowshoe/Varying Hare (*Lepus americanus*)

IV. Furbearing Animals

- a) Long-tailed Weasel (*Mustela frenata*)
- b) Mink (*Mustela vison*)
- c) Muskrat (*Ondatra zibethicus*)
- d) Raccoon (*Procyon lotor*)
- e) River Otter (*Lutra canadensis*)

V. Protected Wildlife

- a) A variety of forest-associated songbirds
- b) Chipmunk (*Entomias sp.*)
- c) Douglas Squirrel (*Tamiasciurus dowglasii*)
- d) Red-tailed Hawk (*Buteo jamaicensis*)
- e) Sharp-shinned Hawk (*Accipter striatus*)
- f) Northern Goshawk (*Accipter gentilis*)
- g) Osprey (*Pandion haliaetus*)
- h) Great-horned Owl (*Bubo virginianus*)
- i) Belted Kingfisher (*Ceryle alcyon*)
- j) Pileated Woodpecker (*Dryocopus pileatus*)

VI. Other Wildlife

- a) Coyote (*Canis latrans*)
- b) Mountain beaver (*Aplodonita rufa*)
- c) * Virginia opossum (*Didelphis virginiana*)
- e) A variety of amphibians, reptiles, and slugs/snails

9. MITIGATION

Impact of road and site construction will amount to approximately 19,500 square feet of wetland. This will be replaced at a 2:1 ratio as per Kittitas County requirements. It should be noted that this amount is less than one-half acre of the total Bishop property of 50 acres.

Buffer averaging (increasing a buffer in another wetland to compensate for restrictive constraints on a certain wetland) will be accomplished on Wetland 3.

The pond to be created will be approximately 19,600 square feet, this accounting for over one-half of the 39,000 square feet of wetland to be replaced.

Revegetation will account for 80 percent of the natural cover to be replaced. Large, natural debris (tress, stumps etc.) accumulated associated with road and site construction will be placed at strategic locations in the Yakima River to provide for fisheries habitat, as per request of Yakima Indian Nation fisheries biologists.

A monitoring program, extending for three years will be employed to ascertain compliance with efforts to revegetate natural and man-made flora in impacted areas of development. An annual report on these observations will be submitted no later than January 30 following commencement of construction activities. This report will be sent to the Shorelands and Water Resources Program administrators at the Washington State Department of Ecology regional Office in Yakima.

10. CONCLUSIONS AND RECOMMENDATIONS

Impact of Development

Less than 4 percent of the 50 acres will be disturbed. And, this amounts to only 1 percent of the total wetlands on the property. Any foot trails developed will have natural surface. It is in the opinion of Wetlands Environmental, Inc. that the Bishop Project will have minimal impact on the overall ecosystem of the property.

Impact on Down-Slope Wetlands/Sensitive Areas

There is no development down-slope for eight to ten miles to the town of Easton. The septic system for the building(s) will be designed according to standard procedures for installation on property such as this site.

Suggested Management/Development Considerations

As stated elsewhere in this report, as much of the property's habitat as possible will remain intact; re-forestation where necessary will be accomplished on impacted areas; fisheries habitat in the Yakima River will be enhanced; and, no additional road or building expansion is anticipated. As previously stated, every effort to minimize impact on the environment and enhance it will be accomplished.

10. LIMITATIONS AND USE OF THIS REPORT

This report is based largely upon three days of field survey on the site, plus an additional day with the Yakima Indian Tribe fisheries biologist, in addition to necessary literature reviews. Site conditions will vary seasonally. The results and conclusions of this report represent the professional opinion of biologists of Wetlands Environmental, Inc.

This report is based on readily observable conditions to locate existing wetlands on the subject site as part of preliminary planning process, as required by Kittitas County.



Douglas A. Bellingham
Wetlands Environmental, Inc.

September 10, 1996

Wetland 1

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD¹

Field Investigator(s): DA BELLINGHAM Date: 9/9/96
Project/Site: Cahoy Creek State: Wa County: Kittitas
Applicant/Owner: Bill Bishop Plant Community #/Name: _____

Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?

Yes _____ No (If no, explain on back)

Has the vegetation, soils, and/or hydrology been significantly disturbed?

Yes No (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator Status	Stratum	Dominant Plant Species	Indicator Status	Stratum
1. <u>Reeds Canary Grass</u>	<u>FACW</u>	<u>Forb</u>	11. _____	_____	_____
2. <u>Red Osier</u>	<u>FACW</u>	<u>Shrub</u>	12. _____	_____	_____
3. <u>Willow</u>	<u>FACW</u>	<u>Tree</u>	13. _____	_____	_____
4. <u>Slough Sedge</u>	<u>OBL</u>	<u>Forb</u>	14. _____	_____	_____
5. <u>Horsetail Rush</u>	<u>NI</u>	<u>Forb</u>	15. _____	_____	_____
6. <u>Red Alder</u>	<u>FAC</u>	<u>Tree</u>	16. _____	_____	_____
7. <u>Vine Maple</u>	<u>FACU</u>	<u>Tree</u>	17. _____	_____	_____
8. <u>Black Cottonwood</u>	<u>FAC</u>	<u>Tree</u>	18. _____	_____	_____
9. <u>Thimbleberry</u>	<u>NI</u>	<u>Shrub</u>	19. _____	_____	_____
10. <u>T. Black Berry</u>	<u>NI</u>	<u>Vine</u>	20. _____	_____	_____

Percent of dominant species that are OBL, FACW, and/or FAC 75%

Is the hydrophytic vegetation criterion met? Yes No _____

Rationale: _____

SEE Kittitas Co. Health Dept. Report SOILS

Series/phase: _____ Subgroup:² _____

Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____

Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____

Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____

Matrix Color: _____ Mottle Colors: _____

Other hydric soil indicators: _____

Is the hydric soil criterion met? Yes _____ No _____

Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes _____ No Surface water depth: _____

Is the soil saturated? Yes No _____

Depth to free-standing water in pit/soil probe hole: 4"

List other field evidence of surface inundation or soil saturation.

Water line & channel

Is the wetland hydrology criterion met? Yes No _____

Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes No _____

Rationale for jurisdictional decision: _____

¹ This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.

² Classification according to "Soil Taxonomy."

Wetland 2

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD¹

Field Investigator(s): DA BELLINGHAM Date: 9/9/96
Project/Site: Cabin Creek State: _____ County: Kittitas
Applicant/Owner: Bill Bishop Plant Community #/Name: _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?

Yes _____ No X (If no, explain on back)

Has the vegetation, soils, and/or hydrology been significantly disturbed?

Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species	Indicator		Dominant Plant Species	Indicator	
	Status	Stratum		Status	Stratum
1. <u>Salmon Berry</u>	<u>FAC</u>	<u>Shrub</u>	11. _____	_____	_____
2. <u>Hardhack</u>	<u>FACW</u>	<u>"</u>	12. _____	_____	_____
3. <u>Slough Sedge</u>	<u>OBL</u>	<u>Forb</u>	13. _____	_____	_____
4. <u>Canary grass</u>	<u>FACW</u>	<u>"</u>	14. _____	_____	_____
5. <u>Red Alder</u>	<u>FAC</u>	<u>TREE</u>	15. _____	_____	_____
6. <u>VINE Maple</u>	<u>FACW</u>	<u>TREE</u>	16. _____	_____	_____
7. _____	_____	_____	17. _____	_____	_____
8. _____	_____	_____	18. _____	_____	_____
9. _____	_____	_____	19. _____	_____	_____
10. _____	_____	_____	20. _____	_____	_____

Percent of dominant species that are OBL, FACW, and/or FAC 90%

Is the hydrophytic vegetation criterion met? Yes X No _____

Rationale: _____

See Kittitas Co Health Dept. Report SOILS

Series/phase: _____ Subgroup:² _____

Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____

Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____

Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____

Matrix Color: _____ Mottle Colors: _____

Other hydric soil indicators: _____

Is the hydric soil criterion met? Yes _____ No _____

Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 6-8"

Is the soil saturated? Yes _____ No _____

Depth to free-standing water in pit/soil probe hole: _____

List other field evidence of surface inundation or soil saturation.

Is the wetland hydrology criterion met? Yes X No _____

Rationale: Water lines channel, running water

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____

Rationale for jurisdictional decision: _____

¹ This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.

² Classification according to "Soil Taxonomy."

Wetland 3

DATA FORM
ROUTINE ONSITE DETERMINATION METHOD¹

Field Investigator(s): DA BELLINGHAM Date: 9/9/96
Project/Site: Cabin Creek State: _____ County: Kittitas
Applicant/Owner: Bill Bishop Plant Community #/Name: _____
Note: If a more detailed site description is necessary, use the back of data form or a field notebook.

Do normal environmental conditions exist at the plant community?
Yes _____ No X (If no, explain on back)
Has the vegetation, soils, and/or hydrology been significantly disturbed?
Yes X No _____ (If yes, explain on back)

VEGETATION

Dominant Plant Species		Indicator Status	Stratum	Dominant Plant Species		Indicator Status	Stratum
1.	<u>Slough Sedge</u>	<u>OBL</u>	<u>Forb</u>	11.	_____	_____	_____
2.	_____	_____	_____	12.	_____	_____	_____
3.	_____	_____	_____	13.	_____	_____	_____
4.	_____	_____	_____	14.	_____	_____	_____
5.	_____	_____	_____	15.	_____	_____	_____
6.	_____	_____	_____	16.	_____	_____	_____
7.	_____	_____	_____	17.	_____	_____	_____
8.	_____	_____	_____	18.	_____	_____	_____
9.	_____	_____	_____	19.	_____	_____	_____
10.	_____	_____	_____	20.	_____	_____	_____

Percent of dominant species that are OBL, FACW, and/or FAC 100%
Is the hydrophytic vegetation criterion met? Yes X No _____
Rationale: _____

SEE Kittitas Co Health Dept Reports SOILS

Series/phase: _____ Subgroup:² _____
Is the soil on the hydric soils list? Yes _____ No _____ Undetermined _____
Is the soil a Histosol? Yes _____ No _____ Histic epipedon present? Yes _____ No _____
Is the soil: Mottled? Yes _____ No _____ Gleyed? Yes _____ No _____
Matrix Color: _____ Mottle Colors: _____
Other hydric soil indicators: _____
Is the hydric soil criterion met? Yes _____ No _____
Rationale: _____

HYDROLOGY

Is the ground surface inundated? Yes X No _____ Surface water depth: 12-14"
Is the soil saturated? Yes _____ No _____
Depth to free-standing water in pit/soil probe hole: _____
List other field evidence of surface inundation or soil saturation.
Open Water
Is the wetland hydrology criterion met? Yes X No _____
Rationale: _____

JURISDICTIONAL DETERMINATION AND RATIONALE

Is the plant community a wetland? Yes X No _____
Rationale for jurisdictional decision: _____

¹ This data form can be used for the Hydric Soil Assessment Procedure and the Plant Community Assessment Procedure.

² Classification according to "Soil Taxonomy."

WASHINGTON STATE WETLANDS FLORA CHECKLIST

JOB NUMBER : 04-05-96
CLIENT : William Bishop
DATE OF SURVEY : May and June 1995
BY : Douglas A. Bellingham

PLANTS

* Introduced Species

Key To: National List of Plants that Occur in Wetlands

- NA = No Agreement: Regional panel not able to agree.
NO = Not Occur: Does not occur in this region, but occurs in another region.
NI = No Indicator: Insufficient information to determine indicator status.
OBL = Obligate Wetland: Occur almost always (99%) under natural conditions.
FACW= Facultative Wetland: Usually occur in wetlands (67-99%), but occasionally found in non-wetlands.
FAC = Facultative: Equally likely to occur in wetlands or nonwetlands (34-66%).
FACU= Facultative Upland: Usually occur in nonwetlands (67-99%), but occasionally found in wetlands (1-33%).
UPL = Obligate Upland: Occur in wetlands in another region, but occur almost always (99%) under natural conditions in nonwetlands in the region specified (Region 9 ... Washington and Oregon).
[nl] = Species not listed in the register. Scientific name verified with Vascular Plants of the Pacific Northwest. Hitchcock, et al., the definitive five volume treatise on Northwest plants.
(Species) in parenthesis with wetlands listing and no common name indicate Hitchcock does not list it, but that the National Wetlands List does. Flower species are not categorized, however all are wetland associated in varying degrees.

TREES (Canopy Layer)

<input type="checkbox"/> Alder, black	<i>Alnus glutinosa</i> (NO)
<input checked="" type="checkbox"/> Alder, red	<i>Alnus ruba</i> (FAC)
<input type="checkbox"/> Alder, Sitka	<i>Alnus sinuata</i> (FACW)
<input type="checkbox"/> Ash, Oregon	<i>Fraxinus latifolia/oregona</i> (FACW)
<input type="checkbox"/> Aspen, bigtooth	<i>Populus grandidentata</i> (NO)
<input type="checkbox"/> Aspen, quaking/trembling	<i>Populus tremuloides/tremula</i> (FAC+)
<input type="checkbox"/> Birch, western white	<i>Betula papyrifera commutata</i> (FACU)
<input type="checkbox"/> Birch, western low	<i>Betula papyrifera glandulifera</i> (FACU)
<input type="checkbox"/> Birch, northwestern white	<i>Betula papyrifera subcordata</i> (FACU)
<input type="checkbox"/> Cascara	<i>Rhamnus purshiana</i> (NI)
<input type="checkbox"/> Cottonwood, northern black	<i>Populus trichocarpa/balsamifera</i> (FAC)
<input type="checkbox"/> Crabapple, Pacific	<i>Malus diversifolia</i> [nl] <i>Malus fusca</i> (FACW)
<input type="checkbox"/> Crabapple, Western	<i>Pyrus fusca</i> [nl]
<input checked="" type="checkbox"/> Cedar, western red	<i>Thuja plicata</i> (FAC)
<input type="checkbox"/> Cedar, yellow	<i>Chamaecyparis nootkatensis</i> (FAC)
<input type="checkbox"/> Cherry, bitter	<i>Prunus emarginata</i> [nl]
<input type="checkbox"/> Dogwood, Pacific	<i>Cornus nuttallii</i> [nl]
<input type="checkbox"/> Dogwood (no common name/Hitch.)	<i>Cornus canadensis</i> (FAC-)
	<i>Cornus glabrata</i> (FACW)
<input type="checkbox"/> Elder, box	<i>Acer negundo</i> (FAC+)
<input checked="" type="checkbox"/> Fir, Douglas	<i>Pseudotsuga menziesii/taxifolia</i> [nl]
<input checked="" type="checkbox"/> Fir, grand	<i>Abies grandis</i> [nl]
<input type="checkbox"/> Fir, Pacific silver	<i>Abies amabilis</i> (FACU)
<input type="checkbox"/> Hawthorn, black	<i>Crataegus douglasii</i> (FAC)
<input type="checkbox"/> Hemlock, western	<i>Tsuga heterophylla</i> (FACU-)
<input type="checkbox"/> Larch, western	<i>Larix occidentalis</i> (FACU+)
<input type="checkbox"/> Madrone/Arbutus	<i>Arbutus menziesii</i> [nl]
<input checked="" type="checkbox"/> Maple, broadleaf/bigleaf	<i>Acer macrophyllum</i> (FACU)
<input type="checkbox"/> Maple, Douglas	<i>Acer glabrum douglasii</i> (FAC)
<input checked="" type="checkbox"/> Maple, vine	<i>Acer circinatum</i> (FACU+)
<input type="checkbox"/> Oak, Garry	<i>Quercus garryana</i> [nl]
<input type="checkbox"/> Pine, lodgepole	<i>Pinus contorta latifolia</i> (FAC-)
<input type="checkbox"/> Pine, ponderosa/western yellow	<i>Pinus ponderosa</i> (FACU-)
<input type="checkbox"/> Pine, western white	<i>Pinus monticola</i> (FACU)
<input type="checkbox"/> Spruce, Sitka	<i>Picea stchensis</i> (FAC)
<input checked="" type="checkbox"/> Willow, Pacific/western black/black	<i>Salix lasiandra</i> (FACW+)
<input type="checkbox"/> Yew, western	<i>Taxus brevifolia</i> (FACU-)
<input type="checkbox"/> Walnut, black	<i>Juglans nigra</i> (NO)

VINES (Shrub Layer)

<input type="checkbox"/> Blackberry, evergreen (white-purple)	<i>Rubus laciniatus</i> (FACU+)
<input type="checkbox"/> Blackberry, Himalayan (white)	<i>Rubus discolor</i> (FACU-)
<input checked="" type="checkbox"/> Blackberry, trailing (white)	<i>Rubus vitifolius</i> (NI)
<input type="checkbox"/> Cucumber, wild (white)	<i>Micrampelis oregana</i> [nl]
<input type="checkbox"/> Honeysuckle, purple (purple-red)	<i>Lonicera hispidula</i> [nl]
<input type="checkbox"/> Ivy, poison (white berries)	<i>Rhus radicans rydbergii</i> [nl]
<input type="checkbox"/> Morning glory (blue)	<i>Convolvulus</i> spp. [nl]

SHRUBS (Shrub/Sub-Canopy Layer)

<input type="checkbox"/> Azalea, false (copper)	<i>Menziesia ferruginea</i> (FACU+)
<input type="checkbox"/> Bamboo, false*	<i>Polygonum sachalinense</i> (NI)
<input type="checkbox"/> Box, false/myrtle leaf (greenish or red)	<i>Pachystima myrsinites</i> [nl]
<input type="checkbox"/> Broom, Scotch/Scots* (yellow)	<i>Cytisus scoparius</i> [nl]
<input type="checkbox"/> Ceanothus, redstem (white)	<i>Ceanothus sanguineus</i> (NI)
<input type="checkbox"/> Cranberry (pink)	<i>Vaccinium oxycoccus intermedium</i>
<input type="checkbox"/> Cranberry, high bush (white)	<i>Viburnum trilobum</i> (FAC+)
<input type="checkbox"/> Currant	<i>Ribes bracteosum</i> (FAC)
<input type="checkbox"/> Current	<i>Ribes hudsonianum</i> (OBL)
<input type="checkbox"/> Current, red flower (red)	<i>Ribes sanguineum</i> [nl]
<input type="checkbox"/> Currant, stink/blue (blue)	<i>Ribes bracteosum</i> (FAC)
<input checked="" type="checkbox"/> Devil's club (white/red berries)	<i>Opopanax horridus</i> (FAC)
<input checked="" type="checkbox"/> Dogwood, red osier (white)	<i>Cornus stolonifera</i> (FACW)
<input checked="" type="checkbox"/> Elderberry, blue (cream)	<i>Sambucus glauca</i> [nl]
<input type="checkbox"/> Elderberry, red (yellowish-white)	<i>Sambucus callicarpa</i> [nl]
<input type="checkbox"/> Gale, sweet (greenish catkins)	<i>Myrica gale</i> (OBL)
<input type="checkbox"/> Goat's beard (white, brown seeds)	<i>Aruncus sylvestris</i> [nl]
<input type="checkbox"/> Gooseberry, common/wild (greenish)	<i>Aruncus dioicus</i> (FACU+)
<input type="checkbox"/> Gooseberry, gummy (whitish)	<i>Ribes divaricatum</i> (NI)
<input type="checkbox"/> Gooseberry, swamp (whitish)	<i>Ribes lobbiai</i> [nl]
<input checked="" type="checkbox"/> Hardhack/Douglas spirea (pinkish)	<i>Ribes lacustre</i> (FAC+)
<input type="checkbox"/> Hazelnut/hazel (yellow catkins)	<i>Spiraea douglasii</i> (FACW)
<input type="checkbox"/> Honeysuckle, Oregon/orange (orange)	<i>Corylus cornuta californica</i> [nl]
<input type="checkbox"/> Honeysuckle, purple (purplish-red)	<i>Lonicera ciliosa</i> [nl]
<input type="checkbox"/> Honeysuckle (no common name/Hitch.)	<i>Lonicera hispidula</i> [nl]
<input type="checkbox"/> Honeysuckle (no common name/Hitch)	<i>Lonicera caerulea</i> (FAC+)
<input type="checkbox"/> Honeysuckle (no common name/Hitch)	<i>Lonicera conjugialis</i> (FAC)
<input type="checkbox"/> Huckleberry, evergreen (pink-white)	<i>Lonicera involucrata</i> (FAC)
<input type="checkbox"/> Huckleberry, dwarf (pinkish)	<i>Vaccinium ovatum</i> [nl]
<input checked="" type="checkbox"/> Huckleberry, red (red berries)	<i>Vaccinium caespitosum</i> [nl]
<input type="checkbox"/> Huckleberry, tall blue (pinkish)	<i>Vaccinium parvifolium</i> [nl]
	<i>Vaccinium ovalifolium</i> (UPL)

<input type="checkbox"/> Huckleberry, dwarf	<i>Vaccinium cespitosum</i> (FACU)
<input type="checkbox"/> Huckleberry/Common cranberry*	<i>Vaccinium macroparpon</i> (OBL)
<input type="checkbox"/> Huckleberry, mountain	<i>Vaccinium membranaceum</i> (FACU+)
<input type="checkbox"/> Huckleberry, western	<i>Vaccinium occidentale</i> (FAC+)
<input type="checkbox"/> Huckleberry/Wild cranberry	<i>Vaccinium oxycoccos</i> (OBL)
<input type="checkbox"/> Huckleberry/Grouseberry/Whortleberry	<i>Vaccinium scoparium</i> (FACU-)
<input type="checkbox"/> Huckleberry/Bog blueberry	<i>Vaccinium uliginosum</i> (FACW+)
<input type="checkbox"/> Kinnikinnick/bearberry pinkish)	<i>Arctostaphylos uva-ursi</i> (FACU-)
<input type="checkbox"/> Laurel	<i>Kalmia microphylla</i> (FACW+)
<input type="checkbox"/> Laurel, swamp (rose)	<i>Kalmia polifolia</i> (OBL)
<input type="checkbox"/> Mahonia/Oregon grape (yellow)	<i>Mahonia nervosa</i>
<input type="checkbox"/> Mahonia/Tall Oregon grape (yellow)	<i>Mahonia aquifolium</i>
<input type="checkbox"/> Manzanita, hairy (white)	<i>Arctostaphylos columbiana</i> [nl]
<input checked="" type="checkbox"/> Mock orange (white)	<i>Philadelphus gordonianus</i> [nl]
<input type="checkbox"/> Ninebark (white)	<i>Physocarpus capitatus</i> (FAC+)
<input type="checkbox"/> Oak, poison (greenish white berries)	<i>Rhus diversiloba</i>
<input checked="" type="checkbox"/> Oceanspray	<i>Holodiscus discolor</i> [nl]
<input type="checkbox"/> Raspberry, black/black cap	<i>Rubus leucodermis</i>
<input type="checkbox"/> Rhododendron, red (pink purple)	<i>Rhododendron macrophyllum</i> [nl]
<input type="checkbox"/> Rose, common wild (deep rose)	<i>Rosa nutkana</i>
<input type="checkbox"/> Rose, dwarf (deep rose)	<i>Rosa gymnocarpa</i>
<input type="checkbox"/> Rose, swamp (deep rose)	<i>Rosa pisocarpa</i>
<input checked="" type="checkbox"/> Salal (pink white)	<i>Gaultheria shallon</i> [nl]
<input checked="" type="checkbox"/> Salmonberry (red)	<i>Rubus spectabilis</i> (FAC)
<input checked="" type="checkbox"/> Snowberry, creeping/Maidenhairberry	<i>Gaultheria hispidula</i> (FACW)
<input type="checkbox"/> Tea, Labrador (white)	<i>Ledum groenlandicum</i> (OBL)
<input type="checkbox"/> Tea, Trapper's	<i>Ledum var. glandulosum</i> (FAC+)
<input type="checkbox"/> Tea	<i>Ledum var. columbianum</i> (OBL)
<input checked="" type="checkbox"/> Thimbleberry (white)	<i>Rubus parviflorus</i>
<input type="checkbox"/> Twinberry, black (yellow twin)	<i>Lonicera involucrata</i> (FAC)
<input type="checkbox"/> Twin flower (pink twin)	<i>Linnaea borealis</i> (FACU-)
<input type="checkbox"/> Wintergreen, alpine/matted	<i>Gaultheria humifusa</i> (FAC+)
<input type="checkbox"/> Wintergreen, Oregon/slender	<i>Gaultheria ovatifolia</i> ((FAC)

GRASSES/CLOVERS (Forb Layer)

<input checked="" type="checkbox"/> Fescue	<i>Festuca</i> spp. (FAC and FACU)
<input type="checkbox"/> Fescue, alta	<i>Festuca altaica</i> (UPL)
<input type="checkbox"/> Clover, alside	<i>Trifolium hybridum</i> (FACU+)
<input type="checkbox"/> Grass	<i>Elymus</i> spp. (FAC/FACU/FACW)
<input type="checkbox"/> Grass	<i>Eriophorum</i> spp. (OBL)
<input type="checkbox"/> Clover, red	<i>Trifolium pratense</i> (FACU)
<input type="checkbox"/> Grass, barnyard	<i>Echinochloa crusgalli</i> (FACW)
<input type="checkbox"/> Grass, bent	<i>Agrostis tenuis</i> [nl]

Grass, cotton
 Grass, orchard
 Grass, perenial rye/Wild rye/Rye grass
 Grass, Reed canary
 Grass, velvet
 Timothy

Eriophorum chamissonis (OBL)
Dactylis glomerata (FAU)
Elymus hirsutus [nl]
Phalaris arundinacea(FACW)
Holcus lanatus (FAC)
Phleum pratense (FACU)

FERNS/HERBACEOUS (Shrub/Forb Layer)

Fern, bracken
 Fern, deer
 Fern, holly
 Fern, lady
 Fern, maidenhair
 Fern, sword
 Skunk Cabbage
 Triple Sugarscoop

Pteridium aquilinum pubescens (FACU)
Struthiopteris spicant [nl]
Polystichum lonchitis (FACU)
Athyrium felix-femina (FAC)
Adiantum pedatum aleuticum (FAC)
Polystichum munitum [nl]
Lystichum americanum (OBL)
Tiarella trifoliata (FAC)

PERMANENT WATER DEPENDANT (Shrub / Forb Layer)

Bulrush
 Bulrush, river
 Bulrush, soft-stemmed
 Buttercup
 Buttercup, watercrowfoot (yellow)
 Cattail
 Cattail, narrow-leaved
 Cattail, wide-leaved
 Duckweed
 Hemlock, water
 Hemlock, water (white)
 Iris
 Iris, yellow water flag/Fleur de Lis*
 Milfoil*
 Parsnip*
 Parsnip, common*
 Parsnip, water* (white)
 Plantain, water (white)
 Rushes
 Sedge, slough
 Sedges
 Smartweed/Water smartweed/Doorweed
 Smartweed

Scirpus spp. (OBL)
Scirpus fluviatilis (OBL)
Scirpus validus/actus (OBL)
Ranunculus spp. (OBL/all other indicators)
Ranunculus aquatilis (OBL)
Typha spp. (OBL)
Typha angustifolia (OBL)
Typha latifolia (OBL)
Lemna spp. (OBL)
Cicuta bulbifera (OBL)
Cicuta douglasii/occidentalis (OBL)
Iris missouriensis (FACW+)
Iris pseudacorus (OBL)
Myriophyllum spp. (OBL)
Sium suave (OBL)
Pastinaca sativa [nl]
Sium cicutaefolium [nl]
Alisma plantago-aquatica (OBL)
Janicus spp. (OBL/all other indicators)
Carex obnupta (OBL)
Carex spp. (OBL/all other indicators)
Polygonum amphibium (OBL)
Polygonum sp. (OBL/all other indicators)

___ Watercress*
___ Waterlily, yellow pond (yellow)
___ Waterlily
___ Water shield/Water target

Nasturtium officinale (OBL)
Nymphaea polysepala [nl]
Nymphaea spp. (OBL)
Brasenia schreberi (OBL)

WETLANDS ENVIRONMENTAL, INC.

COMPANY PROFILE

Environmental Consultants

WETLAND DELINEATION...SOILS, WILDLIFE, STREAM, FISHERIES AND VEGETATIVE ANALYSIS ...GEOTECHNICAL SERVICES

SOILS

Anthony Jay Bredberg has over 15 years experience in soils and related fields. He is one of the leading wetland delineators in the country, having cooperated with over 1,000 individual surveys and wetland evaluations. He has unique credentials and experience; his consulting activities have taken him throughout the U.S., Latin America and the Caribbean. He is a Certified Professional Soil Scientist, is on the board of directors of the National Society of Consulting Soil Scientists and serves as the Chairman of the committee on hydric soils and is a Registered Professional Soils Scientist (RPSS). He is a botanist and his experience in wetlands is unique in the Northwest. Additionally, he has had direct supervision and contact with the author of the document used by the federal agencies for wetland determination. He is qualified in the areas of soil survey and mapping, sediment and erosion, wetlands biologist/botanist, site evaluation, slope stability, wetlands delineation and waste management. Few individuals are both a botanist and soil scientist. His educational background includes MS degree in Soil and Plant Science from North Carolina State University, a BS in Plant Science and Botany from Western Illinois University and graduate studies in soils science (University of Illinois), forestry (University of New Hampshire) and wetlands (University of Massachusetts). He is a partner in Wetlands Environmental, Inc.

Richard C. Herriman is a retired senior environmental analyst with the Soil Conservation Service and presently holds the same position with a Puget Sound consulting firm. He is an experienced soil scientist/geomorphologist with extensive experience in soils, geomorphic mapping, including GIS, and explanation of soil behavior for all land uses. He specializes in on-site ecosystem evaluation and management, including soil/water concerns for wastes and toxics and landscape stability analysis. He has regional experience throughout the western United States, including Puget Sound. His specific areas of expertise are; soil and geomorphic resource inventories, hazardous waste and toxics evaluation and management, soil and water determinations, plant growth/ecosystems management, soil erosion/degradation assessments, foundation/construction soil material interpretations, real estate consultation and environmental consultants management. He educational experience BS in Soil Science from Oregon State

University and graduate studies in soil and plant science and geomorphology from Oregon State University and Iowa State University. He has been extensively published in technical soil journals.

Additional qualified personnel: Douglas A. Bellingham, Thomas M. Knight, B. LeRoy Davidson

WILDLIFE

Douglas A. Bellingham is the retired Washington State (21 years service) Department of Wildlife Regional Biologist for Region Four (the state's largest wildlife management region), with jurisdiction over Whatcom, Skagit, Snohomish, King, Island, San Juan, Kitsap, Pierce and Thurston counties. In his tenure as Regional Biologist he held state responsibility for reviewing every county and private EIS and SEPA development document as it related to wetland and upland/big game wildlife habitat impact for those counties and prepared the state response. He was frequently called upon as expert witness for state cases regarding environmental damage to wetlands and other critical habitat. Consequently, Mr. Bellingham has eminent knowledge of both procedural and practical environmental requirements for both the state and county levels and has contact with present Department of Wildlife biologists to utilize their expertise, if necessary. His educational background includes a BS Degree in Wildlife Management from Oregon State University (with many related courses in Fisheries Management) and numerous State of Washington environmental and wildlife-related seminars and courses. In addition, he has taught wildlife management courses at the University of Washington School of Forestry. He is a partner in Wetlands Environmental, Inc.

Claramarie Kidd has 12 years experience in technical writing, scientific illustration, computer graphic design, data base management, word processing, statistical analysis (univariate and multivariate techniques, including factor analysis), biological and hydrological monitoring and wildlife management (migratory bird stop-over site management, woodcock management, controlled burns, law enforcement, endangered species protection, watershed conservation, vegetation mapping and experience with Geographical Information Systems (GIS), plus public speaking experience. She holds a MS degree in Environmental Science from the University of Virginia, BS degree (Magna Cum Laude) in Natural Resources from the University of Maryland and an Associates degree (Summa Cum Laude) in Wildlife Biology from Pennsylvania State University. She has received National Science Foundation research funding and scholarship awards from the University of Maryland and Pennsylvania State University.

Additional qualified personnel: Thomas M. Knight, Garry Garrison

FISHERIES

D. Wayne Brunson is the retired statewide senior fisheries pathologist for the Washington State Department of Wildlife with 30 years experience in fisheries pathology (both state and private sectors), aquatic biology, technician and laboratory assistant. He established

treatment and control measures for all 40 WDW hatcheries and rearing ponds for 26 diseases and parasites. In the course of his professional career with WDW he treated annually 15-20 million trout and steelhead for disease, smoltification status, and live fish bioassays; he conducted extensive lake and stream limnological surveys statewide to determine levels of residual chlorinated hydrocarbon pesticides and the effects of these pesticides on aquatic organisms using gas chromatography. In the private sector he established treatment methods to control endemic fish diseases, primarily fungus, in broodstock trout and Atlantic salmon and in incubating eggs. He holds a BS degree in Freshwater Fish Biology from the University of Washington, is certified in pesticide controls and has extensive experience working with hatchery managers, fish culturists, administrators, fisheries biologists, other pathologists and the general public, and been published in scientific fisheries journals.

Additional qualified personnel: Douglas A. Bellingham

TECHNICAL REPORT WRITING AND GRAPHICS

Thomas M. Knight has been an established Northwest professional freelance writer/photographer for 28 years, specializing in the environment and other outdoor-related subjects. He will prepare all documents for both grammatical and procedural accuracy as required by each city, county or state agency. All documents will be computer-generated and in letter quality form. Any photographs required for a document will be provided by him and will be of professional quality; he is skilled in DOS and MacIntosh computer systems. Mr. Knight is a BS graduate of the Boston University School of Communications, a retired Chief Information Officer for the Washington Department of Wildlife, raptor biology expert and is eminently familiar with the environmental complexities of Washington State. He is a partner in Wetlands Environmental, Inc.

Additional qualified personnel: A.J. Bredberg, Richard C. Herriman, Douglas A. Bellingham, Claramarie Kidd, D. Wayne. Brunson

ADDITIONAL STAFF

Garry Garrison is the retired Washington State (18 years service) Department of Wildlife Assistant Game Management Chief at the Olympia Headquarters. His duties included responsibility for overall supervision of wildlife management programs throughout the state. He has expertise in the area of digitally created habitat maps and headed the Wildlife Department's NASA LANDSAT satellite data input to the Pacific Northwest Land Resources Project. Prior to his appointment as statewide Upland Game Bird Supervisor and subsequently Assistant Chief, Mr. Garrison preceded the position of Douglas Bellingham as Regional Biologist for Region Four, with the responsibilities described above. While Regional Biologist he was lead supervisor in delineating and designing critical wildlife corridors along Interstate 90 during its construction. He is a graduate of Washington State University with a BS in Wildlife Management and is a life-long resident of Tacoma and Olympia.

B. LeRoy Davidson is one of the Northwest's most prominent horticultural experts on native plant species, has over 45 years of extensive field research experience and is a founder of the Northwest Rock Garden Society. He has been widely published in many national and international scientific publications, including American Horticulture Society Magazine and Pacific Horticulture, lectures frequently in both the US and in United Kingdom, and is author of the upcoming definitive treatise on the plant genus *Lewisia*. Additionally, Mr. Davidson is in close contact with virtually all the Northwest scientific botanical community and can draw on their expertise if required.