Habitat Mitigation Plan
for
Construction of a Wheelchair Access Ramp at the
Drano Lake Public Fishing Area

Little White Salmon National Fish Hatchery, Cook, Washington

Background

This report identifies the mitigation effort required following the construction of an American With Disabilities Act (ADA) compliant wheelchair access ramp to the public fishing area located on Drano Lake commonly known as "Social Security Beach". Located on property owned by the U.S. Fish & Wildlife Service (USFWS) at the Little White Salmon National Fish Hatchery (NFH), this public fishing area provides one of the few bank fishing areas located upstream of Bonneville Dam. The proposed project involves minor excavation, the placement of fill, and existing trail obliteration to allow the construction of a concrete ramp that can accommodate a wheelchair bound person and provide access to the public fishing area per ADA standards.

While the project does not include removal of existing vegetation or trees, riparian area mitigation is required given the project location within the designated Special Management Area of the Columbia River Gorge National Scenic Area. As a result, this plan will identify mitigation to minimize the riparian area impacts of the proposed project. In addition, the plan will identify the standard USFWS operating procedures for sediment and erosion control.

The purpose and need for this project is consistent with requirements of the ADA. Specifically, we have an obligation to provide access, including recreation access, on Service owned lands. This is also consistent with Service policy. On June 21, 2010, Dan Ashe, the Acting Deputy Director of the Service signed a memo to the Service Directorate reaffirming the commitment of the Service to ensuring its programs, facilities, and activities are accessible to all individuals, including persons with disabilities. Providing a person with disabilities access to the Drano Lake fishing area not only provides a great recreation opportunity, it is the right thing to do.

Proposed Project

The Little White Salmon NFH is located in south-central Washington on the Little White Salmon River approximately one mile upstream from the Columbia River. The Little White Salmon River joins the Columbia River at river mile 162. Drano Lake, a natural impoundment at the mouth of the river, is a popular sport and tribal fishing area. The entire western shoreline of Drano Lake is owned by the U.S. Fish & Wildlife Service. Located within the Columbia River Gorge National Scenic Area, this area is one of few areas in the Columbia River Gorge that offers bank fishing opportunities.

The proposed project includes the design and construction services for the fabrication and installation of an accessible ramp and fishing area landing to provide access to Drano Lake. Construction work will occur at the Drano Lake public fishing area commonly known as "Social Security Beach". This area consists of a level bankside area approximately 150 feet long and 50 feet in width. Substrate is largely

fractured (pit run) basalt, the result of fill placed following the construction of Bonneville Dam and inundation of river bank areas by the Bonneville Pool. Elevation from the parking area to the bankside fishing area drops approximately 12-feet vertically. The area can be accessed by a vehicle using an existing gravel drive barricaded by a cable gate. Proposed work includes:

1. Construct an ADA accessible colored concrete ramp for use by persons in wheelchairs, using a walker, or those who have limited disabilities from the existing asphalt hatchery entrance road along the western shoreline of Drano Lake to the existing public fishing area more commonly known as "Social Security Beach".
2. The ramp will measure approximately four feet in width. Total length of the ramp will be approximately 250 feet.
3. Switchbacks or long lazy winding curves will be used to accommodate the vertical drop in elevation consistent with requirements of the ADA compatible design.
4. The ramp will terminate at the water's edge with a sidewalk level pad and curb stop (concrete or natural material as specified in the design) to prevent a wheelchair from entering the water.
5. Rip rap of naturally occurring material will be used protect the new ramp from unusual high water events.
6. All work will occur above the normal high water mark unless the Bonneville Pool elevation is lowered to allow in-water (below the normal high water mark) work that is consistent with existing environmental regulations (U.S. Army Corps of Engineers, NOAA-Fisheries ESA consultation, and WDFW Hydraulic Permit Approval).

<u>Mitigation Plan Goal</u>

The goal of the Mitigation Plan (Plan) is to minimize the riparian area impacts of the project within the designated Special Management Area of the Columbia River Gorge National Scenic Area. The Plan will also identify sediment and erosion control measures to be employed during construction to prevent soil runoff discharges into the Little White Salmon River.

<u>Mitigation Methods</u>

Mitigation methods for the proposed project include obliteration of existing trails and spurs; employing sediment and erosion control measures; post project planting with native vegetation; and invasive species control. Refer to Figure 1 for the Drano Lake mitigation site plan.

Obliteration of Existing Trails and Spurs

The obliteration of old roadways and trails shall consist of rough grading when needed, ripping or scarifying, cross ditching, and opening drainages. The work shall not commence until after the designated sections are no longer needed to serve traffic.

- ROUGH GRADING
  Rough grading shall consist of filling the existing ditch (if applicable) and rough out sloping of the roadway or trail. The old road shoulder shall be roughly broken down to present a more natural appearance.

- RIPPING

After the rough grading has been completed, the area of the old roadway or trail shall then be ripped, scarified or plowed to a minimum 6 inch depth at maximum 16 inch intervals and left in a condition suitable for reseeding, or to encourage natural revegetation.

- CROSS DITCHING
  After the rough grading and ripping have been completed, the old roadway or trail shall be cross ditched at approximately 100-foot intervals. These cross ditches shall be sloped with the grade and be cut to a minimum 8 inch depth below the old roadbed, placing the excavated materials on the downhill side. They shall extend from outside the shoulder line continuous into the back slope to form a positive intercepting ditch.

- DRAINAGES
  Live streams and other drainages shall be opened by removing the old structures and grading the approach fills so that they will in no way impair the flow in the channel. Materials with salvage value shall be carefully removed as directed by the Contracting Officer.

Sediment and Erosion Control Methods

The mitigation plan work under this section consists of furnishing all necessary labor, equipment, materials, and performing all operations in connection with construction sediment and control measures. General requirements include:

- Construction activities shall abide by the Best Management Practices (BMPs) as identified in the Stormwater Management Manual for Western Washington, Washington Department of Ecology.
- All erosion and sediment control measures are to be placed prior to any disturbance caused by grading and or excavation and shall conform to the requirements of the appropriate regulatory agency for the State.
- The Contractor shall be solely responsible for ensuring that erosion and sediment control measures are implemented and maintained at the site.
- Soil disturbing activities include but are not limited to: Clearing and grubbing, excavation for utilities and foundations, construction or modification of site drainage, grading, and preparation for final seeding.

- MATERIALS
  Synthetic filter fabric for silt fences shall be a pervious sheet of polypropylene, nylon, or polyethylene fabric conforming to the following physical and hydraulic characteristics:

Physical Properties (Min.)	Requirement	Test Method
Grab Tensile, lbs.	W120/F100	ASTM-D-4632
Grab Elongation, %	15	ASTM-D-4632
Mullen Burst, psi	275	ASTM-D-3786
Puncture, lbs.	65	ASTM-D-4833
Trapezoidal Tear, lbs.	50	ASTM-D-4533
UV Resistance, %	80	ASTM-D-4355
AOS, US Sieve #	30/40	ASTM-D-4751
Permittivity gal/min-sq. ft.	90	ASTM-D-4491

Filter fabric should contain ultraviolet ray inhibitors and stabilizers to provide a minimum of 6 months of expected usable construction life at a temperature range of 0 to 120 F. Support posts will be 4 foot - 2 x 2 wood. Straw bales used for sediment and erosion control will be oat or wheat straw, free from weeds, viable weed seeds, foreign matter detrimental to plant life, and dry. Grass hay bales are not acceptable. In order to prevent deterioration of the bindings, all bales shall be either wire-bound or string-tied so that bindings are oriented around the sides rather than along the tops and bottoms of the bales.

- CONSTRUCTION
  Install straw bales at local drainage ways to prevent silt intrusion upon adjacent drainage courses. Remove straw bales following establishment of vegetation cover and utilize as mulch at swales or on steep slopes. Prior to construction, install silt fence along the downhill construction limits in accordance with the erosion control standard detail to prevent silt intrusion upon adjacent land. Install sediment and erosion control measures on the down slope toe of all top soil stock piles. Maintain and remove all erosion controls as specified.

  Native seeding shall be placed on exposed surfaces that will not be brought to final grading or permanent cover treatment within 30 days of the exposure to reduce erosion and sedimentation by stabilizing exposed soils. Seeded areas shall be checked regularly for bare spots, washouts, and healthy growth to assure that a good stand of grass is being maintained. Reseed areas that fail to establish vegetation cover as soon as such areas are identified.

- DUST CONTROL
  In areas subject to surface and air movement of dust, where on-site or off-site damage is likely to occur, one or more of the following preventive measures shall be taken for dust control; 1) Minimize the period of soil exposure through the use of temporary ground cover and other temporary stabilization practices; and 2) Sprinkle the site with water until surface is wet. Repeat as needed.

- SILT FENCE
  Silt fences are appropriate for the following general locations; 1) Immediately upstream of the point(s) of runoff discharge from a site before flow becomes concentrated; 2) Below disturbed areas where runoff may occur in the form of overland flow; and 3) Along the down slope toe of all top soil stock piles.

  Project work will include the use of standard strength synthetic filter fabric for sediment barriers. The filter fabric shall be purchased in a continuous roll cut to the length of the barrier to avoid the use of joints. When joints are necessary, filter cloth shall be spliced together only at a support post, with a minimum 6 inch overlap, and securely sealed. The standard strength filter fabric shall be stapled or wired to the fence and 6 inches of the fabric shall be extended into the ground. Filter fabric shall not be stapled to existing trees. Support posts shall be spaced at a maximum 6 feet and driven securely into the ground a minimum of 24 inches. The height of a silt fence shall not exceed 36 inches. Higher fences may impound volumes of water sufficient to cause failure of the structure.

  Silt fences and filter barriers shall be inspected immediately after each rainfall and at least daily during prolonged rainfall. Silt fences shall be inspected for depth of sediment, tears, and to see if the fabric is securely attached to the fence posts, and to see that the fence posts are firmly in

the ground. Any deficiencies shall be repaired immediately. Should the fabric on a silt fence of filter barrier decompose or become ineffective prior to the end of the expected usable life and the barrier still be necessary, the fabric shall be replaced promptly.

Sediment deposits should be removed after each storm event and/or when deposits reach approximately 1/3 the height of the barrier or when the sediments limit or prevent the flow of water through the fabric hydraulic. Any sediment deposits remaining in place after the silt fence or filter barrier is no longer required shall be dressed to conform with the existing grade, prepared, and seeded.

- STRAW BALE EROSION CONTROL FENCE
  Straw bale erosion control fences are appropriate for the following general locations; 1) *Sheet flow applications* - Straw bales shall be placed in a single row, lengthwise on the contour with ends of adjacent bales tightly abutting one another; and 2) *Channel flow applications* - Straw bales shall be placed in a single row, lengthwise and oriented perpendicular to the direction of flow with ends of adjacent bales tightly abutting one another.

  The barrier shall be extended to such a length that the bottoms of the end bales are higher in elevation than the top of the lowest middle bale to assure that sediment laden runoff will flow either through or over the barrier but not around it. The barrier shall be entrenched and backfilled. A trench shall be excavated the width of a bale and the length of the proposed barrier to a minimum depth of 4 inches. After the bales are staked and chinked, the excavated soil shall be backfilled against the barrier. Backfill shall conform to the ground level of the downhill side and shall be built up to 4 inches against the uphill side of the barrier.

  Each bale shall be securely anchored by at least 2 stakes or rebar driven through the bale. The first stake in each bale shall be driven toward the previously laid bale to force the bales together. Stakes or rebar shall be driven a minimum of 12 inches into the ground or deep enough into the ground to securely anchor the bales, whichever is greater. The gaps between bales shall be chinked (filled by wedging with straw to prevent water from escaping between the bales). Loose straw scattered over the area immediately uphill from a straw bale barrier tends to increase barrier efficiency.

- MAINTENANCE
  Inspection shall be frequent and repair or replacement shall be made promptly as needed. Straw bale carriers shall be removed when they have served their usefulness, but not before the upslope areas have been permanently stabilized.

Post Project Planting with Native Vegetation

Figure 1 identifies areas for post project planting with native vegetation to enhance riparian habitat of the project area and to control erosion. The poor quality substrate in the area of the Drano Lake public fishing area requires nutritional enhancement to assure plantings are successful. A proven and ready source of natural fertilizer and material exists at the Little White Salmon NFH to help assure planting success. Clarifier sludge, a by-product of fish culture operations, is pumped and stored in a composting pit. Composed of fish fecal material and uneaten feed, this composted material is an excellent high nitrogen fertilizer. Mixed with inert sediment removed from the hatchery grit chamber, this material has been successfully used as a fertilizer for previous lawn and shrub plantings at the hatchery.

Figure 2 identifies the vegetative types for the 432 acres owned by the Service at Little White Salmon NFH (Stringer 2009). Douglas-fir (*Pseudotsuga menziesii)* is a prevalent overstory tree species in most forested vegetation types. Bigleaf maple (*Acer macrophyllum*) is the most commonly occurring hardwood. There are four general forest conditions that characterize most forest at Little White Salmon NFH:

1. Stands where Douglas-fir is the dominant species and bigleaf maple is a minor associate.
2. Stands where Douglas-fir and bigleaf maple co-dominate. In these areas, Douglas-fir and maple are arranged both in discrete groves and mixed.
3. Stands where maple dominates and Douglas-fir is a minor associate.
4. Stands currently dominated by Douglas-fir and maple that have remnant Oregon white oak (*Quercus garryana*) and/or ponderosa pine (*Pinus ponderosa*).

Oregon white oak can be found as a minor associate throughout forest types and is often overtopped or growing in small discrete patches, usually on thinner soils. Western red cedar (*Thuja plicata*) is uncommon and found on moist conifer slopes. Ponderosa pine is rare and widely scattered through forest types and indicative, along with oak, of more open conditions prior to white settlement. Black cottonwood (*Populous trichocarpa*), and red alder (*Alnus rubra*) are concentrated mostly in draws and riparian areas and occasionally on moist north slopes and edges of talus.

In forest types, total understory vegetation cover ranges from 15 % to 96 %, averaging 26% across all types. Shrubs are the most extensive understory cover and range from 20 % to 95 % with an average of 30% across all forest types. The top four dominant shrub cover species in terms of frequency of occurrence include vine maple (*Acer circinatum*), sword fern (*Polystichum munitum*), Western hazel (*Corylus cornuta* var*. Californica*) and ocean spray (*Holodiscus discolor*) each found on over half of the sample plots. On more productive sites, plant cover is dominated by vine maple and sword fern. Moderate productivity sites often contained Western hazel, oceanspray, and dwarf Oregon-grape (*Berberis nervosa*). The lowest productivity sites were dominated by poison oak (*Toxidendron diversiloba*). Pacific dogwood (*Cornus nuttallii*) is common throughout forested types often occupying a mid-canopy position.

Forb cover averaged 3% across all forest types5. Common forbs known to occur in these types include Northern starflower (*Trientalis borealis*), Western trillium (*Trillium ovatum*), and vanilla leaf (*Achlys triphylla*). Grass cover averaged 7%. Native understory grasses include blue wild rye (*Elymus glaucus*), Sitka brome (*Bromus Sitchensis*) and Columbia brome (*Bromus vulgaris*). Non-native grasses were uncommon in dense forest areas. In more open areas including roadsides and edges species such as orchard grass (*Dactylis glomerata*), hedgehog dogtail (*Cynosurus echinatus*), ripgut brome (*bromus rigidus*) and bulbous bluegrass (*Poa bulbosa*) occur.

Riparian vegetation is generally not distinguished in vegetation typing because these zones are very narrow and limited in extent. The main areas of riparian vegetation occur along the Little White Salmon River. However, developments along the river including the Hatchery Road and hatchery facilities have replaced much of the riparian zone, so previous vegetation communities are unknown. Steep rocky terrain, talus, and natural confinement of the river channel limited riparian vegetation in places prior to development of the river. Current vegetation along the river and Drano Lake is generally confined to a narrow strip between the water line and road bank or canyon wall. Composition includes a mix of native sedges, shrubs and trees including willow (*Salix* spp.), elderberry, thinleaf alder (*Alnus incana*), Oregon ash (*Fraxinus latifolia*), and cottonwood.

Plantings will focus on species necessary to enhance riparian habitat and to prevent erosion. Emphasis will be placed on plantings of those species characteristic of the Little White Salmon NFH riparian areas. It is interesting to note that hatchery and Scenic Area staff observed native Oregon ash growing in the vicinity of the Drano Lake public fishing area.

Planting recommendation 1: The riparian species identified above and including willow, elderberry, thinleaf alder, Oregon ash, and cottonwood will be procured at a relatively small size, and possibly bare-rooted, due to their ability to adapt readily to a new site. Use of smaller plants will also allow planting of a larger number in anticipation of some possible post-planting mortality.

Planting recommendation 2: The predominant overstory species identified above that are commonly seen in riparian areas along Drano Lake including douglas fir, bigleaf maple, red alder, and ponderosa pine will be procured at a relatively small size, and possibly bare-rooted, due to their ability to adapt readily to a new site. Use of smaller plants will also allow planting of a larger number in anticipation of some possible post-planting mortality.

The attached planting plan and plant list will guide the revegetation of project area.

Excavated areas will be fertilized as described above prior to plantings. Hatchery staff will use the hatchery 400-gallon distribution tank that is currently modified to accept a fire hose to water new plantings as frequently as necessary to maintain an optimum growth environment.

Invasive Species Control

Invasive shrubs and forbs are common in the project area and include Scot's broom, Armenian blackberry, and many weedy forbs. Noxious weed problems are concentrated mainly along roadsides and Drano Lake. Twelve state-listed noxious weeds were identified. Most of these species are associated with disturbed areas with partial to full sunlight. Most noxious weed populations on the hatchery property are comprised of small and scattered populations (typically less than 10 plants), mostly along roadsides. They do not pose a particularly high risk in dense forests. Nevertheless, control should be a high priority to eliminate competition with post project plantings. Giant hogweed (*Heracleum mantegazzianum*), yellow iris (*Iris pseudacorus*) and Eurasian watermilfoil *(Myriophyllum spicatum)* pose a major threat to riparian/aquatic habitats if left uncontrolled.

Table 1. State Listed Noxious Weeds and Locations (refer to Figure 1 for Stand Number References)

Common Name:	**Scientific Name:**	**Weed Class:**	**Location:**
Scot's broom	*Cytisus scoparius*	State-B	Stand 2019, Roadside Cook-Underwood (2059)
Knapweed	*Centaurea Spp.*	State-B	Roadside Cook-Underwood (2059)
Oxeye daisy	*Leucanthemum vulgare*	State-B	Roadside Cook-Underwood (2059), 2045, 2052
Bull thistle	*Cirsium vulgare*	State-C	Roadside Cook-

			Underwood
Canada thistle	*Cirsium arvense*	State-C	Roadside Cook-Underwood
Herb Robert	*Geranium robertianum*	State-C	Roadside Cook-Underwood
Common St. Johnswort	*Hypericum perforatum*	State-C	Along Hatchery Road, 2052
Sulfur cinquefoil	*Potentilla recta*	State-B	Along Hatchery Road, 2052
Evergreen/Armenian blackberry	*Rubus laciniatus /armeniacus*	State-C	Drano Lakeside
Eurasian watermilfoil	*Myriophyllum spicatum*	State-B	Drano Lake
Yellow Iris	*Iris pseudacorus*	State-C	Drano Lake
Giant Hogweed	Heracleum mantegazzianum	State-A	Drano Lake

Though not state-listed, there are several other identified invasive plant species on the hatchery property worth noting because they are likely to increase with tree thinning. Control of these species may be necessary to achieve restoration objectives. Hedgehog dogtail (*Cynosurus echinatus*) and ripgut brome (*Bromos rigidus*) are annual invasive grasses that are found in open habitats and woodland edges. Dogtail is the most prevalent invasive grass on the hatchery property and often dominates vegetation cover in open oak habitats. Ripgut brome is more common in open areas with deeper soils and roadsides. Wild oats (*Avena fatua*) is another invasive annual grass scattered throughout the hatchery property, mostly in the fields along Cook-Underwood Road. The other somewhat common invasive grass in oak and open habitats is bulbous bluegrass (*Poa bulbosa*), a perennial found in slightly better soils than sites dominated by dogtail. Spreading hedgeparsely (*Torilis arvensis*) is commonly found in disturbed woodlands. Wall lettuce (*Lactuca muralis*) is infrequently found in disturbed forest types but has potential to be quite invasive after thinning. Wild carrot (*Daucus carota*) is found in open grassy areas throughout the hatchery property.

Though not currently found on the hatchery property, the following species are described because they are extremely invasive and represent future threats to plant community diversity. Garlic mustard (*Alliaria petiolata*), shining geranium (*Geranium lucidum*), false brome (*Brachypodium sylvaticum*) and knotweed (*Polygonum* spp.) are increasingly found in woodland understories and riparian areas. Their invasion in relatively undisturbed and shady forest understories distinguishes them from many other weeds. Common hound's-tongue *Cynoglossum officinale,* a state B-listed species, is found in open to partially shaded habitats. Several of the above species including garlic mustard, false brome, knotweed, and common hound's-tongue have been found in the Columbia Gorge.

Areas dominated by invasive annual grasses will be treated primarily with repeat herbicide application followed by native grass seeding. Broadcast burning, though a desirable treatment will not occur on most of these sites due to steeps slopes and lack of access for control. These highly degraded prairies will require the greatest effort and expense to restore. Some of these annual grass dominated sites on excessively steep slopes may not be treated because of excessive cost and concern for erosion during vegetation control phase. Various combinations of such treatments are highly recommended to test different methods on the range of sites, while limiting potential unintended consequences over large

project areas. At least three consecutive herbicide applications will be required before seeding to exhaust the weed seed bank. Failure to complete weed control treatments is a major cause of many failed prairie projects. Following the above treatments, broadcast seeding of a mix of native mostly perennial grasses will occur. Some native forbs can be seeded with grasses, particularly those slow to establish such as arrowleaf balsamroot, lomatium and buckwheat. In areas where forb weeds are likely to need additional control with herbicides after seeding, grasses should be established first to allow use of broad leaf specific herbicide.

Areas still containing strong native bunchgrass and forb cover will not need herbicide treatments. Stewardship in these areas may include tree density reduction and periodic burning (5-20 years) if possible. In many areas, remnant native bunchgrass and forbs are interspersed with invasive grasses. These are difficult sites to fully restore because natives reduce herbicide options. Various methods can be employed based on specific conditions. Burning can be used if timed correctly, to reduce annual grasses around established bunchgrasses, or a very low rate of glyphosate may be applied in the spring to target young germinants. Certain grass specific herbicides can be applied over established bunchgrasses to control invasive annual grass. In most cases, weeds will persist along with natives even under optimal restoration conditions and treatments. Native bunchgrass communities, under most circumstances, are effective at maintaining dominance once well established. The goal of treatments is not to eliminate invasive grasses, but to re-establish native plant community dominance.

Given the relatively small size of the project area, it is expected that invasive species control can be accomplished by manual/mechanical methods relying on herbicides only if large infestations occur.

Project Area – Mitigation Plan Maintenance

Hatchery staff will regularly water new plantings and control invasive species. Regular inspections of new plantings will be conducted to identify plant mortality. Replanting will occur as necessary. Public outreach is an essential component of a successful mitigation effort. Boaters have historically used the Drano Lake riparian area vegetation for boat mooring. Signs will be posted and hatchery staff will provide information to fishermen and boaters to seek their assistance in assuring that the actions contained in this mitigation plan are successful.

Survivability Standards

The USFWS is responsible for maintaining the restoration area. Maintenance will continue for five years with 75% survivability. A progress report will be written and submitted to the Forest Service after 3 years.

<u>Literature Cited</u>

Stringer, D. 2009. Little White Salmon Fish Hatchery Habitat Stewardship Plan. Report to the U.S. Fish and Wildlife Service. 132 pp.

Figure 1. Mitigation Site Plan

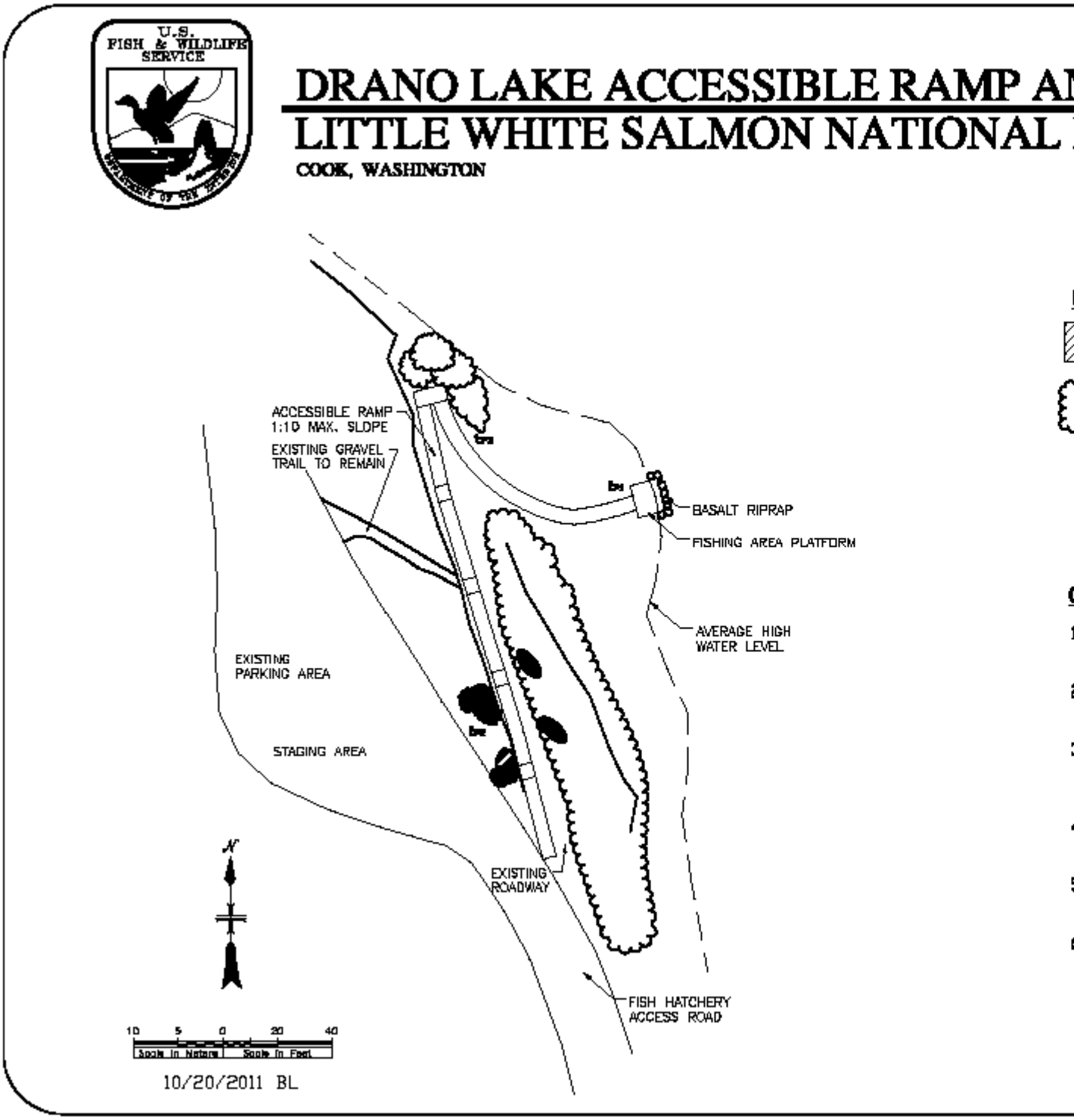


Figure 2. Vegetative Types at Little White Salmon NFH

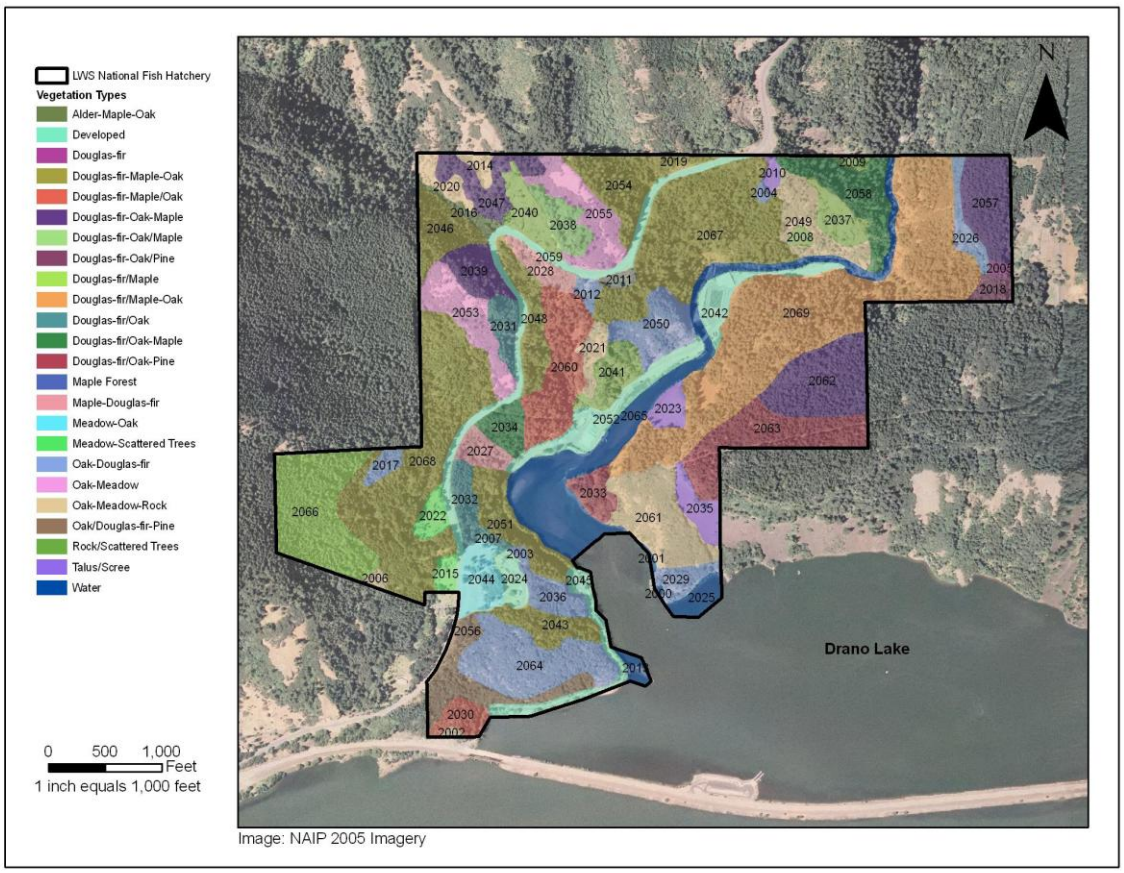


Image: NAIP 2005 Imagery

9/8/2011

DRANO LAKE
ACCESSIBLE RAMP
AND FISHING AREA

Q. garryana

P. ponderosa

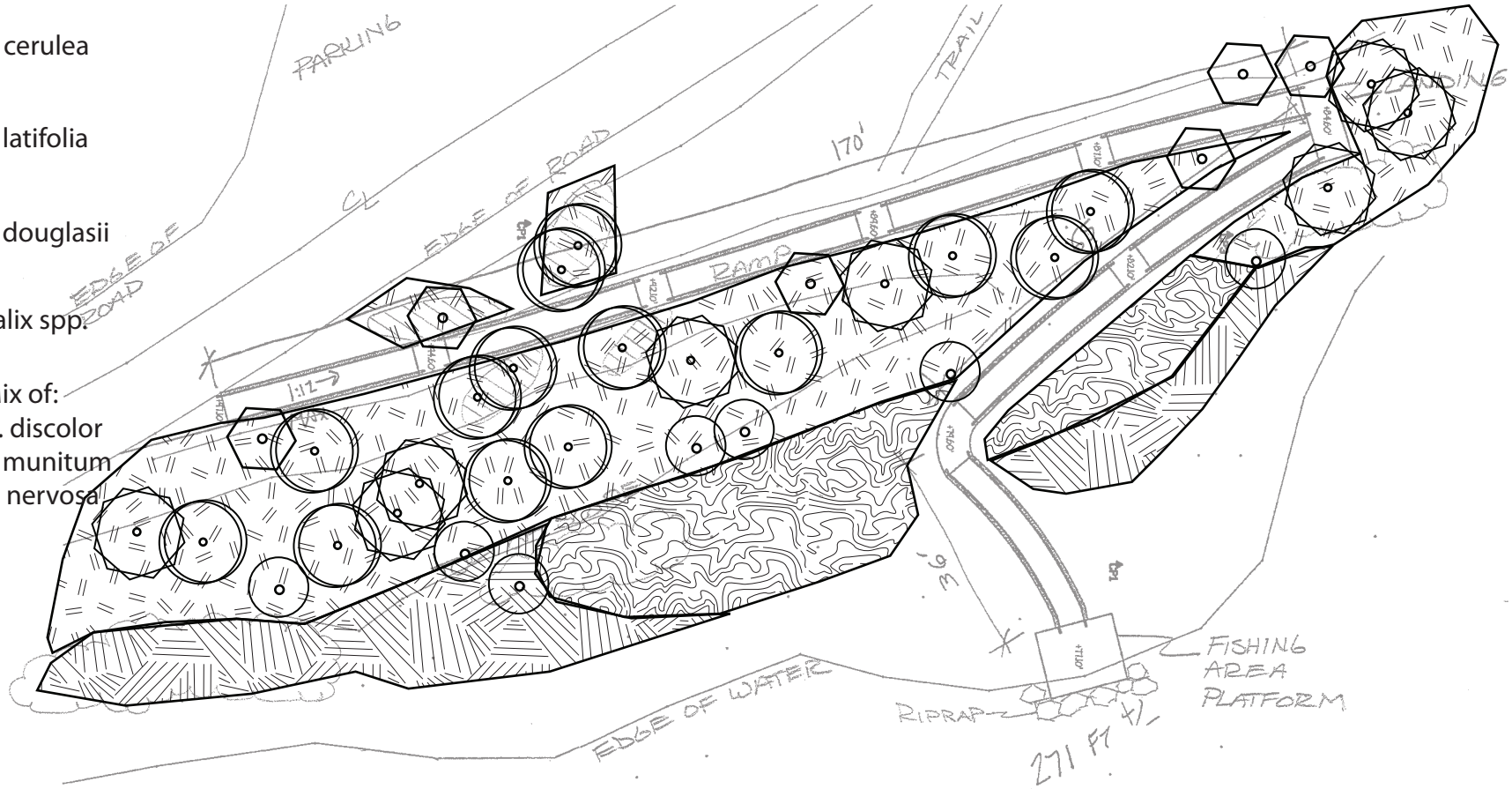
S. cerulea

F. latifolia

S. douglasii

Salix spp.

Mix of:
H. discolor
P. munitum
B. nervosa



Notes:
Mix of H. discolor, P. munitum and B. nervosa to be planted in groups of 3 to 9 of same species spaced irregularily 5' to 20' apart.

AREAS FOR TRAIL OBLITERATION

REMOVAL OF INVASIVE PLANTS AND REPLANTING WITH NATIVE PLANTS.

Plant List

<u>Planting Area 1:</u> Upper Slope Area, Low Probability of Inundation
Oregon White Oak (*Quercus garryana)*
Ponderosa Pine (*Pinus ponderosa)*
Blue Elderberry (*Sambucus cerulea)*
Oceanspray (*Holodiscus discolor)*
Western Swordfern *(Polystichum munitum)*
Oregon grape *(Berberis nervosa)*

<u>Planting Area 2:</u> Area of Potential Inundation
Oregon Ash (Fraxinus latifolia)
Douglas Spirea (*Spirea douglasii*)
One or more of the following willow species:
- Narrowleaf willow *(Salix exigua)*- preferred recommendation
- Hookers willow *(Salix hookeriana)*
- Columbia River willow (*Salix fluviatilis*)

<u>Seed Mix (20 lbs/ acre):</u> To be applied to whole planting area
Idaho fescue (*Festuca idahoensis*) 30%
Bromus vulgaris and/ or B. carinatus 30%
Blue wild rye (*Elymus glaucus*) 30%
Sandberg's bluegrass (*Poa sandbergii* or *P. secunda*) 5%

Add some herbaceous seed 5%:
- Arrowleaf balsamroot (Balsamhorriza)
- Buckwheat spp. (*Eriogonum compositum)*
- Desert Parsley spp. (*Lomatium columbianum* & *L. grayi*)
- Yarrow (*Achillea millefolium*)
- Sneezeweed (*Helenium autumnale*)