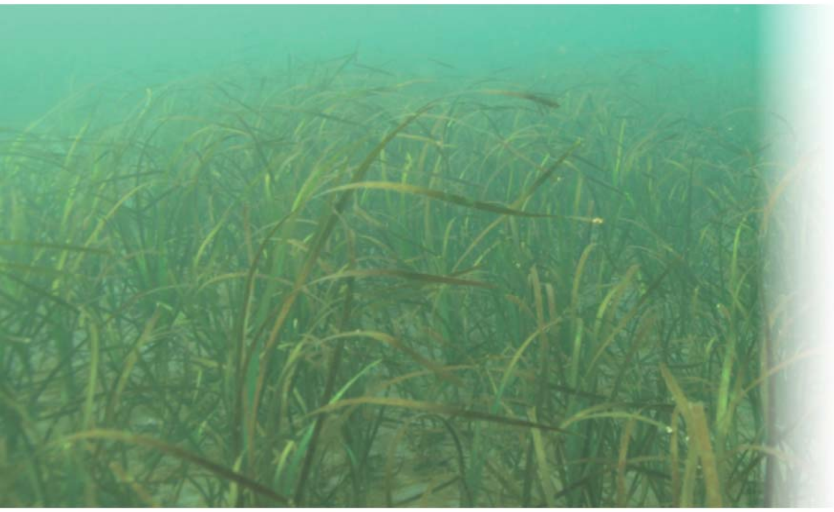

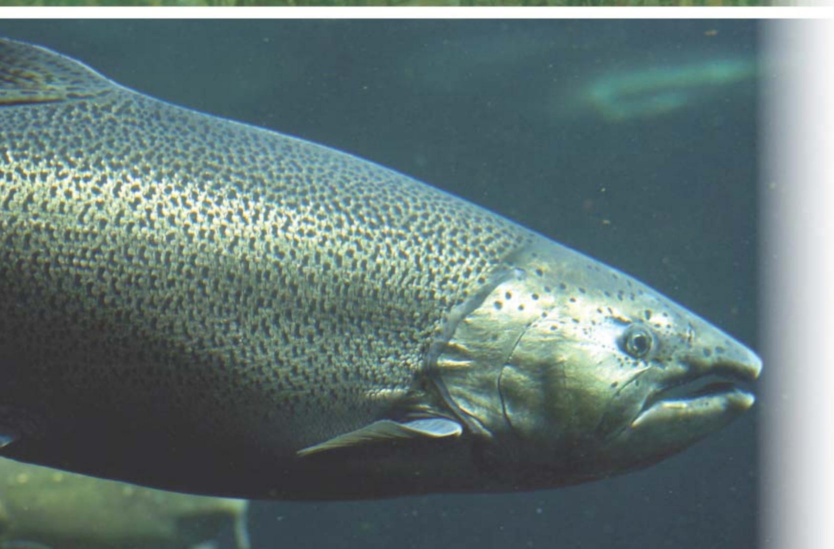

Biological Evaluation Northlake Shipyard Sand Blast Grit Dredging – Interim Action Seattle, Washington

Prepared for
Washington State Department of Ecology

May 23, 2012
17800-26

HARTCROWSER

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Prepared by
Hart Crowser, Inc.

Jim Starkes
Associate Fisheries Biologist

Jon Houghton, PhD
Senior Principal Fisheries/
Marine Biologist

120 Third Avenue South, Suite 110
Edmonds, Washington 98020-8411
Fax 425.778.9417
Tel 425.775.4682

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NORTHLAKE SHIPYARD SAND BLAST GRIT DREDGING – INTERIM ACTION
SEATTLE, WASHINGTON

1.0 INTRODUCTION

This biological evaluation (BE) has been prepared to aid the Washington State Department of Ecology (Ecology) and other agencies in assessing the potential effects of a proposed interim action (dredge and thin layer placement) within the Lake Washington Ship Canal (LWSC) on fish and wildlife species listed as threatened or endangered under the Endangered Species Act (ESA). Section 7 of the ESA requires that any action by a federal agency is "not likely to jeopardize the continued existence of any [listed] species or result in the destruction or adverse modification of habitat of such species..." Issuance of a Section 10/404 permit for a dredge and thin layer placement project in the LWSC qualifies as such an action. Under ESA Section 7(c), the lead federal agency, in this case the US Army Corps or Engineers (USACE), must prepare a BE or biological assessment (BA) of the potential influence of the action on listed species and their critical habitat. Depending on the conclusion, the USACE may be required to confer formally with NOAA Fisheries or US Fish and Wildlife (USFWS) regarding the project.

Because this work will occur in nearshore areas of the LWSC, the proposed project has the potential to impact 3 species listed as threatened or endangered under the ESA or their critical habitat:

- Puget Sound Chinook salmon (*Oncorhynchus tshawytscha*);
- Coastal-Puget Sound bull trout (*Salvelinus confluentus*); and
- Puget Sound steelhead trout (*O. mykiss*).

The ESA status of each of these species is presented in Table 1.

In addition, the USFWS has provided a list of the federally listed species that occur in King County. Additional animal species on this list include the Canada lynx (*Lynx Canadensis*), gray wolf (*Canis lupus*), grizzly bear (*Ursus arctos horribilis*), marbled murrelet (*Brachyramphus marmoratus*), and northern spotted owl (*Strix occidentalis caurina*; Appendix A). If these species are present in King County, they would inhabit areas along the Cascade foothills and mountains (gray wolf, grizzly bear, and Canada lynx) or large tracts of undisturbed old growth forest (marbled murrelet and northern spotted owl). None of these habitats are present in the urbanized waterfront of the LWSC. The proposed project will have no effect on these species and no further mention of them will be made in this BE.

2.0 PROJECT DESCRIPTION

2.1 Description of Project and Action Areas

The proposed Northlake Shipyard Sand Blast Grit Dredging Interim Action is located on Lake Union, within the LWSC in a portion of Section 19, Township 25N, and Range 4E (Sheet 1). The "action area," where direct or indirect effects of the operation occur, is defined as a 200-meter area around the shipyard to account for the potential effects of turbidity. The "project area" for this site consists of the immediate dredge footprint within the shipyard (Sheet 2).

2.2 Project Description

The Northlake Shipyard operates an active shipyard for the construction and repair of large vessels on the northern portion of Lake Union, just west of Gas Works Park (Sheets 1 and 2). Two dry dock facilities are situated on two overwater structures on the site and can facilitate ships up to 1,900 tons and 300 feet in length. The purpose of the proposed project is to complete an interim remedial action implemented by Ecology to remove sediment that has been impacted with sand blast grit from the shipyard. Sand blast grit contains concentrations of heavy metals that exceed Model Toxics Control Act (MTCA) cleanup levels.

The interim action proposes to dredge sediments approximately 2 feet in depth from the property immediately beneath and adjacent to the two existing overwater dry docks (Sheet 2). A barge-based, mechanical, bucket-style dredge will be used. The overwater dry docks will be detached and moved, as needed, in order to gain complete access to the proposed dredge footprint. Dredged materials will be placed in an adjacent barge for dewatering, after which sediments will be transferred to trucks and shipped off-site to an agency-approved upland disposal facility. Prior to or during dredging, debris will be removed, including two derelict vessels, cables, and other debris within the dredge prism. Debris removal will be completed by either the selected contractor or using the Washington Department of Natural Resources Derelict Vessel Program.

The total dredge volume is estimated at 10,000 cubic yards (cy) over an area of 2.48 acres. Following dredging, a thin layer placement composed of approximately 2,000 cy of clean sand will be placed over the dredged area to a thickness of approximately 6 inches. In the future, this placement may be removed or modified during a comprehensive remedial action associated with Gas Works Park. This remedial action has yet to be scheduled. All dredge and thin layer placement activities associated with the Northlake Shipyard interim action are expected to take a maximum of 6 weeks.

2.3 Impact Avoidance, Minimization Measures, and Conservation Measures

2.3.1 Conservation Measures

Care will be taken in all work to prevent dredged sediments, other debris, oils, and grease from entering the water. Potential adverse effects of this project on listed salmonids will be avoided or minimized through the adherence of agency-approved work windows when few juvenile salmonids are present in the action area (October 1 to April 15). Derelict debris, including two existing vessels will also be removed, improving the nearshore corridor for juvenile salmonids.

2.3.2 Best Management Practices

Best management practices (BMP) will be employed to reduce the potential for construction-related impacts on listed species and their habitats. The following construction-related BMPs will be incorporated into the design of interim action:

- Dewatering of dredge spoils on the construction barge:
  - The bucket will be paused for several seconds at the water surface during retrieval to release excess water from within the bucket.
  - Construction barge shall be equipped with scuppers and sideboards to prevent bypass of return water or dredge material into the water. Scuppers shall be covered with filter fabric or similar material to filter and retain sediment while allowing water to drain. Overtopping of sideboards will not be allowed.
- Minimize the dispersion of resuspended sediments during dredging, including:
  - No multiple bites to achieve a full bucket. Bucket descent will be limited to the designated depth of digging penetration.
  - “Sweeping” the bottom to smooth contours will not be allowed.

  - Limit sloughing of material from adjacent undredged areas into the active dredging area by limiting the depth of each pass.

  - No temporary stockpiling of material in the water. Stockpiling of material on the bottom will not be allowed (each time the bucket is closed it will be brought to the surface).

  - Silt curtains will be used during dredging activities.

- BMPs to prevent water quality exceedances include:
  - Silt curtains will be used during dredging activities.

  - A water quality monitoring program will be initiated to ensure that turbidity levels in the water (as an indicator of suspended sediment load) do not exceed 50 nephelometric turbidity units (NTU) beyond a 300-foot mixing zone during dredging activities.

  - If debris or spill material accidently enters the waterway, immediate actions will be taken to remove the material. All debris or spill material will be properly disposed of at an approved off-site facility.

2.4 Project Schedule

It is anticipated that proposed dredge and thin layer placement will take place between October 1, 2012, and April 15, 2013, within the agency approved work window.

3.0 SPECIES INFORMATION

3.1 Species Information

This BE addresses Chinook salmon, steelhead trout, and bull trout, all of which have been listed as threatened under ESA. This section provides environmental baseline information, including biological data on salmonids, and information regarding the presence of all species in the vicinity of the action area.

3.1.1 Chinook Salmon

Like all Pacific salmon, Chinook salmon reproduce in fresh water, but most of their growth occurs in marine waters. Chinook salmon prefer to spawn and rear in the mainstem of rivers and larger streams (Williams et al. 1975, Healey 1991).

Wild Chinook in the Lake Washington basin emerge from redds in January, February, and March, and have two rearing strategies: (1) rear in stream habitats until May and then emigrate into lake habitat during May and June as pre-smolts, or (2) emigrate shortly after emergence and rear in lake habitats as fry for 3 to 5 months. In May through July, naturally and hatchery-produced Chinook juveniles are located throughout Lake Washington and outmigrate to the marine environment through the LWSC (Celedonia et al. 2008). Once in the Ship Canal, acoustic tagging studies indicate that juvenile Chinook travel relatively quickly out of the canal and into marine waters (Celedonia et al. 2011).

Stream escapement data for each Chinook salmon stock in the Lake Washington Basin are summarized in Table 2. According to the Washington Department of Fish and Wildlife (WDFW) Salmon and Steelhead Stock Inventory (SASSI), Lake Washington basin Chinook salmon are composed of three separate stocks—North Lake Washington tributaries, Issaquah Creek, and Cedar River. All are summer/fall varieties with spawning periods between early September and early November; passage through the LWSC would occur from as early as late-July through early November. Most of the north Lake Washington tributaries are small, with most spawning taking place in North Creek, Swamp Creek, Little Bear Creek, Thornton Creek, Cottage Lake Creek and the Sammamish River. Run sizes are usually between 200 and 500 fish and the stock status is considered healthy, though declining runs have been observed since 2000. Issaquah Creek has the largest run, averaging over 2,300 fish, but this is a non-native stock believed to be entirely the result of hatchery production from the Issaquah Hatchery. Historically, the watershed probably did not have a sustainable population of Chinook salmon. The Cedar River Chinook salmon run is considered depressed due to a long-term decline in escapements. Run size has declined since the 1980s (SSHIAP 2012).

3.1.2 Steelhead Trout

Steelhead is the name commonly applied to the anadromous form of rainbow trout. The species exhibits perhaps the most complex suite of life-history traits of any of the Pacific salmon. Steelhead can be anadromous or freshwater residents, and in some circumstances yield offspring of the opposite life-history form. The anadromous form can spend up to seven years in fresh water prior to smoltification, although two years is most common, and then spend up to four years in salt water prior to first spawning. Unlike the Pacific salmon species, steelhead are iteroparous (individuals can spawn more than once).

The winter-run stock of steelhead is found in the Lake Washington basin, an ocean maturing fish that spawns between early-March and mid-June; passage through the LWSC would occur between January and early-June. Lake

Washington steelhead spawn throughout the basin including the Sammamish River and its tributaries, Issaquah Creek, Coal Creek, May Creek, the lower Cedar River, and several smaller lake tributaries. The stock status of Lake Washington steelhead is critical due to chronically low escapements and a short-term severe decline from 2000 to 2008. Annual run sizes during this period were below 50 fish (Salmonscape GIS database; Table 2).

Wild juveniles typically spend two full years in fresh water before outmigrating during the spring. Because of the larger size at outmigration, steelhead do not typically spend a large amount of time in the nearshore, rather they tend to quickly outmigrate to open water (Hartt and Dell 1986).

3.1.3 Bull Trout

Bull trout spawn in the fall in upper watershed tributaries containing clean gravel and cobble substrate and gentle slopes, with cold surface waters of 8° Celsius (C) or lower. The species requires long incubation periods (4 to 5 months) compared with other salmon and trout. Fry hatch in late winter or early spring and remain in the gravel for up to 3 weeks before emerging. Bull trout typically adopt one of four major residency strategies: (1) residents, which remain high in the watershed of their emergence, (2) fluvial, which migrate downstream and reside in mainstem river habitats, (3) adfluvial, which migrate and reside in large lake systems within the watershed, and (4) anadromous, which annually outmigrate to marine waters. Reproducing stocks of bull trout in the Lake Washington basin are adfluvial; however they only occur in the upper Cedar River basin in Chester Morse Lake. These fish are glacial relicts living above Cedar Falls, which is located a short distance below Chester Morse Lake, and is a complete barrier to anadromous and fluvial fish. Bull trout have not been confirmed in the lower Cedar River, Lake Washington, Lake Sammamish, or their tributaries. Water temperatures in the lower Cedar River and Issaquah Creek are probably too high to support bull trout spawning populations of bull trout (Salmonscape GIS database). Bull trout use in the action area, if it occurs, would be from anadromous stocks from other basins in Puget Sound. The marine resident period of anadromous bull trout generally occurs from mid-March through September.

3.2 Inventories and Surveys

3.2.1 Chinook Salmon

Several studies have been conducted investigating the migratory patterns, timing, and habitat uses of juvenile Chinook salmon in the Lake Washington basin (Celedonia et al. 2008; Celedonia et al. 2011; DeVries et al., 2005, 2007;

Tabor et al. 2006; Sergeant and Beauchamp 2006). Most outmigrating Chinook leave Lake Washington for the Ship Canal in May and most have outmigrated out of the basin into marine waters by late-July. While in Lake Washington Tabor et al. (2006) and Sergeant and Beauchamp (2006) found that juvenile salmon are shore oriented in shallow water, generally avoiding overwater structures. In the Ship Canal, Celedonia et al. (2008, 2011) found that juvenile Chinook are more offshore oriented, but often attracted to the outer edges of overwater and in-water structures. This was particularly prevalent within south Lake Union. The authors surmised that the extensive shoreline development within the Ship Canal may obscure the natural tendencies of the fish or fish may be avoiding predators that are attracted to the structures. Acoustic tagging studies found that very little of the shoreline orientation found in Lake Washington for these fish was observed in the Ship Canal (Celedonia et al. 2008, 2011). This is consistent with snorkel surveys conducted in Lake Union (Hart Crowser 2010a) which found very little shoreline use by juvenile salmonids in areas of dense overwater structures (floating home communities) as well as areas relatively free of structures (Gas Works Park).

Acoustic tagging studies conducted from 2004 to 2008 indicate that juvenile Chinook travel quickly once in the canal, though relative residence times within Lake Union were generally lengthy. Up to 41 percent of tagged fish stayed in Lake Union over 8 days and up to two weeks, by far the longest holding times of anywhere in the LWSC (Celedonia et al. 2008, 2011).

3.2.2 Steelhead Trout

No studies have been identified documenting the migration, residence time, or behavior of juvenile steelhead trout in the Lake Washington Ship Canal. Wild juveniles typically spend two full years in freshwater before outmigrating during the spring. Hence, smolts outmigrate at a much larger size than other salmonids and do not rear extensively in nearshore shallow water habitats (Hartt and Dell 1986). Moore et al. (2010) found that juveniles spend from several hours to one day rearing in natal estuaries of Hood Canal before moving offshore.

3.2.3 Bull Trout

As reported, reproducing bull trout stocks in the basin are confined to the upper Cedar River watershed above a natural barrier. Bull trout (or Dolly Varden char) in the lower Cedar River, Lake Washington, Lake Sammamish or their tributaries have been rare. The Washington State Salmonid Stock Inventory for bull trout/Dolly Varden Char (SSHIAP 2012) reported one char in Lake Washington in 1981, but none in Lake Sammamish. Two char were reported holding below a culvert in the headwaters of Issaquah Creek in 1993. It is possible that these three fish were anadromous and strayed into the basin via the Ballard Locks and were not part of local spawning populations. Bull trout have been observed in the adjacent marine areas of Shilshole Bay as well as the Ballard Locks in 2000 and 2001 feeding on juvenile salmonids and forage fish (USFWS 2007).

3.3 Critical Habitat

3.3.1 Chinook Salmon

On September 2, 2005, NOAA Fisheries released the final rule designating critical habitat for Puget Sound Chinook salmon and other populations of federally protected salmon species in Washington, Oregon, and Idaho. All marine, estuarine, and river reaches accessible to Puget Sound Chinook salmon are designated as critical habitat, save for a number of watersheds, military lands, and tribal lands that were for excluded. Areas of the Lake Washington Ship Canal lie within the designated critical habitat for Puget Sound Chinook salmon.

The project and action areas lie within critical habitat of the Lake Washington subbasin (Federal Register Vol. 70, No. 170, pp. 52630–52858). These areas provide rearing, feeding and migration habitat for Chinook and other salmonids. As a result of these biological functions, these areas are considered to be Primary Constituent Elements (PCEs) essential to the conservation of the species. NOAA Fisheries identified six PCEs for Chinook salmon; those present within the project and action areas are:

- Freshwater rearing sites with: (i) water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; (ii) Water quality and forage supporting juvenile development; and (iii) natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.

- Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

3.3.2 Bull Trout

On October 18, 2010, the USFWS released the final revised rule designating critical habitat for coastal Puget Sound bull trout. This area has been designated as critical habitat Unit 2 – Puget Sound, Sub Unit, Lake Washington (Federal

Register Vol. 75, No. 9). The LWSC lies within the designated critical habitat for bull trout.

USFWS identified nine PCEs that are considered to be essential for the conservation of bull trout (Federal Register Vol. 75, No. 200). Those that are relevant to the project and action areas are as follows:

- Springs, seeps, groundwater sources, and subsurface water connectivity to contribute to water quality and quantity and provide thermal refugia.

- Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.

- An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

- Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks, and unembedded substrates to provide a variety of depths, gradients, velocities, and structure.

- Water temperatures ranging from 2 to 15° C with thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life history and stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.

- Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

3.4 Existing Environmental Conditions in the Project Area

This section presents a summary of existing environmental conditions within the project and action areas and within the LWSC.

3.4.1 Hydromodifications

The Lake Union action area is located within the LWSC, a 13.8-km-long artificial waterway that allows navigation between Lake Washington and Puget Sound.

The LWSC consists of five sections from east to west: the Montlake Cut, Portage Bay, Lake Union, the Fremont Cut, and Salmon Bay. The Ballard Locks are at the downstream (west) end of the LWSC. The Fremont and Montlake cuts are narrow channels with steep banks. Salmon Bay, Portage Bay, and Lake Union are larger embayments that are highly developed with numerous marinas, commercial shipyards, house boat communities, and dry docks. The shoreline is heavily armored with concrete or wooden bulkheads or riprap (Celedonia et al. 2008). The project area shoreline is composed entirely of a vertical bulkhead.

Beginning in 1912, drainage patterns of the Cedar River and Lake Washington were extensively altered. Historically, Lake Washington and its tributaries were part of the Duwamish River watershed, and the Cedar River did not flow into Lake Washington but rather flowed into the Black River and eventually into Puget Sound via the Duwamish. One of the most significant changes made in 1912 was diversion of the Cedar River into Lake Washington, and construction and rerouting of the lake outlet through the LWSC. The Ballard Locks control water levels in Lake Washington. During winter, water levels are kept low, but starting in February levels are gradually raised approximately 2 feet by June 1 (Celedonia et al. 2008).

Historically, before the Ballard Locks or LWSC were constructed, Salmon Bay was a tidally influenced inlet of Shilshole Bay. After the locks and ship canal were constructed the area was converted from an estuary to a freshwater/ pseudo estuarine environment connecting Salmon Bay to Lake Washington. Operation of the locks allows saltwater to intrude into the ship canal during the summer when seasonal freshwater flow decreases and boat use of the locks increases. This intrusion creates a seasonally fluctuating saltwater layer in Salmon Bay, the Fremont Cut and Lake Union. This system is dramatically different from the typical saltwater/freshwater interface observed in most estuarine systems of the Pacific Northwest because there is no natural tidal mixing of these layers within the Ship Canal (USFWS 2007).

3.4.2 Water and Sediment Quality

Historically, water and sediment quality in the LWSC has been degraded from a variety of point and non-point sources of pollutants, with one of the largest being municipal sewage. Efforts in the 1960s and 1970s led to the expansion of wastewater treatment efforts and the elimination of discharges of untreated effluent into the basin. At present, untreated discharges only occasionally enter the basin during periods of high precipitation via combined sewer overflows (GLWTC 2001).

Evidence of industrial discharges can be found in the sediments where persistent chemicals such as polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyl (PCBs), and heavy metals have been observed (USFWS 2007). Lake Union is on the Washington Department of Ecology's 303 (d) list of impaired waterbodies for aldrin, fecal coliform, and lead (USFWS 2007).

The highly modified ship canal and lack of natural shade has influenced summer surface water temperatures. Thermal stratification has resulted in surface temperatures regularly exceeding 20° C for extended periods during the summer, while the average temperature in Puget Sound below the locks is 11 to 14° C during this period. Because of the minimal mixing of freshwater and saltwater through the locks, the large temperature gradient is maintained. Stratification, high organic levels in sediment, and locally dense colonies of macroalgae have caused occasional periods of low dissolved oxygen within the LWSC, particularly in the bottom water layers during the summer (GLWTC 2001).

3.4.3 Habitat and Biota

Information and data on benthic, epibenthic, and zooplankton resources in the LWSC have not been identified and are likely an abridged community from that found in Lake Washington. Chironomids (midge larvae) likely predominate within the organically enriched, fine grained sediments within the canal and are known freshwater prey for juvenile salmonids in the basin. Cladocerans (e.g., *Daphnia* spp.) which predominate in the Lake Washington water column are also likely in the canal; these pelagic zooplankteras forms a vital prey group for juveniles in the lake (GLWTC 2001).

Millions of juvenile salmon smolts leave the locks during the summer, providing potential prey resources for the anadromous variety of bull trout that may be present below the locks in Shilshole Bay or for those that may climb into the LWSC. It is unlikely that the reproducing adfluvial populations within the upper Cedar River basin would be present within Salmon Bay or the LWSC, but anadromous bull trout from other Puget Sound drainages may take advantage of feeding opportunities.

3.4.3.1 Vegetation

In the 1970s, the invasive Eurasian water-milfoil was introduced into Lake Washington and has since spread throughout the basin. Millfoil has caused localized water quality problems when it grows in dense colonies and/or when it forms dense floating mats that contain other plant material. Within the colonies, dissolved oxygen (DO) concentrations can be reduced to levels that are stressful to salmonids. Moderate densities of milfoil have been observed throughout much of the project area shoreline and are probably present in any areas shallow enough to allow sufficient light penetration for the species to photosynthesize.

Very little riparian vegetation is present along the shores of the LWSC as a result of dense urban development. The entire shoreline of the project area is unvegetated.

4.0 EFFECTS OF THE ACTION

4.1 Effects Analysis

The effects of proposed dredge and cap activities on ESA-listed species and their habitats are described in this section. The discussion describes how activities associated with the interim action at the Northlake Shipyard will contribute to improvement, maintaining, or degradation of habitats used by listed species. Potential disturbances caused by project activities are presented in Table 5, along with measurable indicators of habitat health.

Presented below is a discussion of short-term and long-term direct and indirect effects of project activities as well as the net effects of those activities. Net effect is considered to be the overall effect on the species and habitat in the long term. For example, a short-term adverse condition (e.g., loss of benthic infauna during the dredging of contaminated sediments) may be necessary to achieve a long-term improvement in benthic habitat and quality; in such a case, the net effect is positive and would contribute toward improvement in the benthic infauna indicator. Moreover, if short-term adverse conditions occur when few or no listed species are present, and if those conditions are no longer present when listed species return to the area, those conditions do not constitute adverse modification of the indicator of habitat quality.

4.1.1 Construction Disturbances

4.1.1.1 Short-Term Effects

Direct Effects. Noise and construction disturbances from proposed dredging at the Northlake Shipyard are expected to be minor, but may result in the temporary avoidance of the project area by listed salmonids. This will be minimized by implementing all in-water work during agency-approved work windows (October 1 to April 15) when few juvenile salmonids are present in the LWSC. Data show that residence periods for juvenile Chinook salmon within

Lake Union are the longest of any areas within the LWSC, but occur between May and July (Celedonia 2008, 2011; Hart Crowser 2010b), well outside the proposed work period.

Noise generated from dredging operations could also affect the upstream migration of adult salmonids, which may be migrating through the LWSC during the proposed work period, or any juveniles that still may be present in the canal. However, acoustic data show that these operations do not produce the sound profiles that are injurious to fish. Hart Crowser (2010a) conducted acoustic monitoring during periods of maintenance dredging on the lower Snohomish River. This study found sound exposure levels (SELs) between 141 and 147 dB, well below the Interim Criteria thresholds for fish (183 to 187 dB cumulative SEL; FHWG 2008). In fact, similar noise levels were found when repositioning the barge (141 to 142.5 dB SEL) and louder noises were observed at a reference station under the Interstate 5 bridge (152.7 dB SEL).

The selection of inwater work periods when few juvenile salmonids are outmigrating and the lack of injurious underwater sound profiles for mechanical dredging indicate that these project actions are likely to cause minimal effects to ESA-listed salmonids.

Indirect Effects. No short-term indirect effects will result from noise and disturbances generated by maintenance dredging within the project and action areas.

4.1.1.2 Long-Term Effects

No long-term direct or indirect effects will result from noise and disturbances generated by in-water construction activities within the project and action areas.

4.1.1.3 Net Effects

Dredging will result in minor and temporary increases in noise, possibly causing salmonids to avoid the project area for the duration of activities. However, all in-water work will be conducted during approved work windows and previous acoustic monitoring studies show little evidence of injury to juvenile or adult salmonids. The net effect will be to maintain (neither improve nor degrade) the present condition of this indicator (Table 3).

4.1.2 Water Quality

4.1.2.1 Short-Term Effects

Direct Effects. Dredging and capping may result in temporary and localized increases in turbidity that may result in avoidance of the immediate area by juvenile and adult salmonids. All work will be conducted during agency-approved work windows when few juvenile salmonids are present in Lake Union or the LWSC.

Juvenile salmon have been shown to avoid areas of unacceptably high turbidities (Servizi 1988), although they may seek out areas of moderate turbidity (10 to 80 NTU), presumably as cover against predation (Cyrus and Blaber 1987a and 1987b). Feeding efficiency of juveniles is impaired by turbidities in excess of 70 NTU, well below sublethal stress levels (Bisson and Bilby 1982). Reduced preference by adult salmon homing to spawning areas has been demonstrated where turbidities exceed 30 NTU (20 mg/L suspended sediments). However, Chinook salmon exposed to 650 milligrams per liter [mg/L] of suspended volcanic ash were still able to find their natal water (Whitman et al. 1982).

Recent water quality data collected during maintenance dredging of the lower Snohomish River navigation channel found occasional elevated turbidity plumes near the bottom, within 20 meters (66 feet) of the dredge (up to 84 NTU; Hart Crowser 2010b). At 90 meters (300 feet) downstream from the dredge, mean turbidity levels ranged from 2.6 to 11.0 NTU higher than upstream and lateral reference stations. All but one dredging episode was within the Washington Department of Ecology turbidity standards (10 NTU greater than background concentrations at 300 feet downstream of dredge operations). During these dredge operations, dissolved oxygen concentrations ranged from 6.8 to 11.9 mg/L with no apparent differences between near field stations in the vicinity of the dredge and far field station 90 meters away (Hart Crowser 2010b).

Based on these data, it is unlikely that any short-term (measured in minutes) and localized elevated turbidities generated by the operation would directly affect salmonids or other fish species that may be present. Additionally, a water quality monitoring program will be implemented and work will stop if turbidity levels exceed 50 NTU beyond the 300-foot mixing zone.

Indirect Effects. Short-term and localized increases in turbidity may result in avoidance of immediate work areas by salmonids. Should this avoidance occur, it would have only insignificant and unmeasurable effects on salmonids.

4.1.2.2 Long-Term Effects

No adverse long-term direct or indirect effects on water quality would occur as the result of proposed dredge and cap activities. Removing potentially contaminated sediments and capping with clean sand will remove a potential contaminant source from the LWSC and will be positive.

4.1.2.3 Net Effects

Short-term adverse effects resulting from increased turbidity are likely to be minor and temporary, ceasing after maintenance dredge operations are completed. Recent water quality studies conducted in the lower Snohomish River during other maintenance dredging operations show that turbidities drop to near background levels within 100 meters (330 feet) of the dredge (Hart Crowser 2010b). Dredging will also occur during approved work windows when few juvenile salmonids are expected. Therefore, the net effects of the project will be to maintain water quality in the project and action areas over the long term (Table 3).

4.1.3 Sediment Quality

4.1.3.1 Short-Term Effects

As the result of proposed dredging and capping, short-term direct or indirect effects to sediment quality are anticipated to be minimal or positive. Sediment contaminated with sand blast grit will be removed from the project area and disposed of at an approved upland disposal facility.

4.1.3.2 Long-Term Effects

As the result of proposed dredging and capping, long-term direct or indirect effects to sediment quality are anticipated to be minimal or positive. Sediment contaminated with sand blast grit will be removed from the project area and disposed of at an approved upland disposal facility.

4.1.3.3 Net Effects

The net effect of proposed dredging and capping will be to maintain or improve sediment quality in the project and action areas (Table 3).

4.1.4 Habitat and Biota

4.1.4.1 Short-Term Effects

Direct Effects. As noted, inwater work will take place during approved work periods when few juvenile salmonids are expected to be present. Dredging will eliminate non-mobile benthos over approximately 2.48 acres of bottom area in the project area, resulting in a temporary reduction in abundance and diversity. The newly exposed sediments are expected to be quickly recolonized by infauna and epifauna (McCauley et al. 1977, Richardson et al. 1977, Romberg et al. 1995, Wilson and Romberg 1995). Diversity and health of the benthic assemblage recolonizing the dredged areas are expected to quickly recover and be similar or enhanced to those of the community now present. Substantial increases in benthic productivity may occur as the result of removal of contaminated sediments. Areas adjacent to the dredge footprint will provide local larval sources for recolonization. Because of the prolonged period of planktonic larval development (several days to weeks) for most benthic species, it is expected that most larval recruitment will be derived from current transport into the project area from surrounding areas.

Indirect Effects. No short-term indirect effects to habitat and biota will result from maintenance dredging within the project and action areas.

4.1.4.2 Long-Term Effects

Long-term direct and indirect effects are expected to be positive, as benthic recolonization will occur within the clean sediment.

4.1.4.3 Net Effects

Net effects to habitat and biota will be limited to the short-term elimination of benthic and epibiota removed by dredging within the dredge footprint. These effects will be temporary and highly localized; recovery of the sediment dwelling communities will occur quickly. The proposed actions will maintain habitat and biota quality within the project and action areas (Table 3).

4.2 Net Effects of Action

The net effect of the proposed actions in the project and action areas will be to maintain the overall habitat quality for listed species, species of concern relative to current conditions (Table 3).

Maintenance dredging will occur in a limited footprint over a short time frame, after which full recovery is expected. Effects will be limited to short-term avoidance and displacement during operations. Conducting the work during approved work windows will minimize avoidance since very few juvenile salmonids will be present.

4.3 Critical Habitat Analysis

As reported, critical habitat has been designated for the Puget Sound Chinook salmon ESU and coastal Puget Sound bull trout distinct population segments (DPS). Critical habitat has not been designated for steelhead trout in the Puget Sound. The following is a specific analysis of the effects of the proposed project on the critical habitat of Chinook salmon and bull trout.

4.3.1 Chinook Salmon

Two PCEs for the critical habitat of Chinook salmon are relevant to the project and action areas:

- Freshwater rearing sites with: (i) water quantity and floodplain connectivity to form and maintain physical habitat conditions and support juvenile growth and mobility; (ii) water quality and forage supporting juvenile development; and (iii) natural cover such as shade, submerged and overhanging large wood, log jams and beaver dams, aquatic vegetation, large rocks and boulders, side channels, and undercut banks.

- Freshwater migration corridors free of obstruction and excessive predation with water quantity and quality conditions and natural cover such as submerged and overhanging large wood, aquatic vegetation, large rocks and boulders, side channels, and undercut banks supporting juvenile and adult mobility and survival.

Along the Lake Union shore, physical and biological features that contribute to PCE functions for Chinook salmon include:

- Water quantity within the action area and LWSC are sufficient to support a migratory corridor with foraging opportunities.
- Acceptable water quality to support forage for juvenile development.

The project area does not have any significant submerged or overhanging large wood, or side channels. The nearshore of the entire action area is composed of vertical bulkhead and overwater structure, some of which may affect juvenile salmon outmigratory behavior.

4.3.2 Bull Trout

USFWS identified nine PCEs that are considered to be essential for the conservation of bull trout (Federal Register Vol. 70, No. 185, p. 56236). Those relevant to the project and action areas include:

- Springs, seeps, groundwater sources, and subsurface water connectivity to contribute to water quality and quantity and provide thermal refugia.

- Migration habitats with minimal physical, biological, or water quality impediments between spawning, rearing, overwintering, and freshwater and marine foraging habitats, including but not limited to permanent, partial, intermittent, or seasonal barriers.

- An abundant food base, including terrestrial organisms of riparian origin, aquatic macroinvertebrates, and forage fish.

- Complex river, stream, lake, reservoir, and marine shoreline aquatic environments, and processes that establish and maintain these aquatic environments, with features such as large wood, side channels, pools, undercut banks, and unembedded substrates to provide a variety of depths, gradients, velocities, and structure.

- Water temperatures ranging from 2 to 15° C with thermal refugia available for temperatures that exceed the upper end of this range. Specific temperatures within this range will depend on bull trout life-history and stage and form; geography; elevation; diurnal and seasonal variation; shading, such as that provided by riparian habitat; streamflow; and local groundwater influence.

- Sufficient water quality and quantity such that normal reproduction, growth, and survival are not inhibited.

The project and action areas provide several of the PCEs of bull trout critical habitat. Water temperatures in the project area are generally between 2 and 15° C during most months of the year, but exceed this range during the mid-summer months from July through September. The LWSC is generally free of biological or water quality impediments to bull trout outside of temperature limitations during the summer. Bull trout within the marine nearshore have access to areas through and upstream of the locks into the LWSC and project area to potentially feed on outmigrating juvenile salmon. Extensive overwater structures may, however, provide impediments to normal nearshore behavior. No habitat features such as large wood and off-channel habitats are present.

4.3.3 Detailed Analysis

Direct effects on proposed nearshore critical habitats are expected to be temporary and highly localized, limited to the proposed dredge footprint during the 2-week work period, as discussed in Sections 4.1.1 and 4.1.2. Potential impacts can be summarized as follows:

- Temporary avoidance of the Chinook migratory corridor during the period of dredging and capping. These effects will cease once the 6-week dredge and cap operations are completed. Actions will take place during approved work windows outside of the juvenile salmon outmigration period, the most vulnerable life stage to dredging, further minimizing impacts. Thus, maintenance dredging will not degrade the existing migration critical habitat for Chinook salmon or bull trout.

- Highly localized decreases in benthic and epibenthic productivity may temporarily reduce food abundance for juvenile salmon. Recovery of these communities is expected to occur quickly. Substantial areas of unmodified habitats surround the dredge footprint will provide sources of recruitment to recolonize the area. Thus, dredging and capping will not degrade existing forage critical habitat for Chinook salmon, nor will it affect the outmigration of juvenile salmonids which form the prey base critical habitat of anadromous bull trout outside of the locks.

- Project actions will have no affect on water temperatures, water quality or quantity, or complex habitats. Complex natural habitats are not present in the highly developed waterfront of Lake Union. Thus project actions will not degrade any of these PCEs for bull trout.

4.3.4 Summary of Potential Effects on Critical habitat

Based on the analyses provided above and in the BE, it can be seen that the proposed project has the potential to affect only two of the 6 PCEs for Chinook salmon-rearing sites and migration corridors. As many as six of the nine PCEs for bull trout may be affected.

The analyses provided above lead to the conclusion that the proposed project will result in no net degradation of these PCEs, and therefore existing critical habitat for Chinook salmon and bull trout will remain fully functional to serve the conservation needs of the species.

4.4 Interdependent, Interrelated, and Cumulative Effects

Positive cumulative effects in the form of cleaner sediments and benthic habitats are likely to occur as Ecology plans and ultimately implements further sediment remedial activities associated with Gas Works Park, located adjacent to the Northlake Shipyard.

5.0 TAKE ANALYSIS

Section 3 of the ESA defines take as "to harass, harm, pursue, hunt, shoot, wound, trap, capture, collect or attempt to engage in any such conduct." The USFWS further defines "harm" as "significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavior patterns such as breeding, feeding, or sheltering," and "harass" as "actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to breeding, feeding or sheltering."

No measurable or significant effects on listed salmonids are expected; any effects that occur would consist of minor and temporary changes in movement patterns, would be discountable, and would not constitute a significant disruption of normal behavior patterns. Thus, no incidental take is expected to occur. Therefore, project actions will not result in the taking of Chinook salmon, steelhead, or bull trout.

6.0 DETERMINATION OF EFFECT

NOAA Fisheries/USFWS guidelines for the preparation of biological assessments state that a conclusion of "may affect, but is not likely to adversely affect" is the "...appropriate conclusion when the effects on the species or critical habitat are expected to be beneficial, discountable, or insignificant. Beneficial effects have contemporaneous positive effects without any adverse effects...." Insignificant effects, in the NOAA Fisheries/USFWS definition, "...relate to the size of the impacts and should never reach the size where take occurs [One would not expect to]...be able to meaningfully measure, detect, or evaluate insignificant effects." Based on the analyses in this BE, the expected nature and level of the impacts of the proposed project follow.

6.1 Salmonids

Although the conclusion of this BE regarding salmonids is focused on Chinook salmon, it is applicable to steelhead trout and bull trout as well. Because steelhead are less dependent on nearshore habitats before outmigration, this species will be less affected by both the negative and positive aspects of each project component. Bull trout access is likely to occur from anadromous stocks from other watersheds; it is highly unlikely that the adfluvial stocks present within the upper Cedar River watershed will be present within the LWSC. This species will also be less affected by both the negative and positive aspects of each project component. This BE leads to the following conclusions regarding the potential effects of the proposed project on listed salmonids:

Effects from proposed project activities will be minor, temporary, and highly localized to the immediate dredge and cap footprint within north Lake Union. Turbidity will be highly localized and temporary, and noise will be limited to that emanating from a bucket dredge over a 6-week period. Therefore, the proposed interim dredge and cap action **may affect, but is not likely to adversely affect**, Chinook salmon, bull trout, and steelhead trout, or their designated critical habitat.

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TABLES

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Table 1 – ESA-Listed Species Documented or Potentially Present in the Lake Washington Ship Canal

Species	Listing Status	ESA Agency	Date of Listing	Critical Habitat in the LWSC
Puget Sound Chinook (*Oncorhynchus tshawytscha*)	Threatened	NOAA	March 24, 1999	Yes, designated September 2, 2005
Coastal-Puget Sound Bull trout (*Salvelinus confluentus*)	Threatened	USFWS	December 1, 1999	Yes, revised designated October 18, 2010
Puget Sound Steelhead Trout (*O. mykiss*)	Threatened	NOAA	Many 11, 2007	No

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Table 2 – Annual Lake Washington Basin ESA-Listed Salmonid Esca

Year	North Lake Washington Tributary Chinook	Issaquah Creek Chinook	Cedar River Chinook	Lake Washington Winter steelhead
1976	303		416	
1977			675	
1978			890	
1979	46		1,243	
1980			1,360	
1981	97		624	1,668
1982	122		763	
1983	544		788	2,575
1984	354		898	1,250
1985	183		766	474
1986	528	3,396	942	1,816
1987	498	2,716	1,540	1,172
1988	233	1,567	559	858
1989	453	3,585	558	686
1990	318	5,098	469	714
1991	153	1,684	508	621
1992	265	1,254	525	599
1993	89	3,475	156	184
1994	436	3,923	452	70
1995	249	2,582	681	126
1996	33	2,146	303	234
1997	67	5,265	227	620
1998	265	7,314	432	584
1999	537	3,507	241	220
2000	227	1,668	120	48
2001	459	311	810	42
2002	268	1,118	369	38
2003	212	391	562	20
2004	143	823	587	44
2005	215	547	525	22
2006	129	1,895	1,090	32
2007	161	1,024	1,729	8
2008	183	1,858	788	4
2009	80	827	474	
2010	74	1,657	496	

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Source: Salmonscape GIS Database. Washington Department of Fish and Wildlife
http://fortress.wa.gov/dfw/gispublic/apps/salmonscape/default.htm

Table 3 - Effects of Project Activities on Habitats used by ESA-Listed Species in the Project and Action Areas

		Effects of Action		
Project Activities	**Habitat Indicator**	**Improve[1]**	**Maintain[2]**	**Degrade[3]**
Construction Disturbances	Noise		X	
	Entrainment		X	
	Stranding		X	
Water Quality Disturbance	Turbidity		X	
	Chemical contamination/nutrients		X	
	Temperature		X	
	Dissolved oxygen		X	
Sediment Disturbance	Sedimentation sources/rates		X	
	Sediment quality	X	X	
Habitat Disturbance	Fish access/refugia		X	
	Depth			
	Substrate		X	
	Slope		X	
	Shoreline		X	
	Riparian conditions		X	
	Flow and hydrology/current patterns/ saltwater–freshwater mixing patterns		X	
	Overwater structures		X	
	Disturbance		X	
Biota Disturbance	Prey—epibenthic and pelagic zooplankton		X	
	Infauna		X	
	Prey—forage fish		X	
	Aquatic/wetland vegetation		X	
	Nonindigenous species		X	
	Ecological diversity		X	

Notes:

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1 Action will contribute to long-term improvement, over existing conditions, of the habitat indicator.

2 Action will maintain existing conditions.

3 Action will contribute to long-term degradation, over existing conditions, of the habitat indication.

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FIGURES

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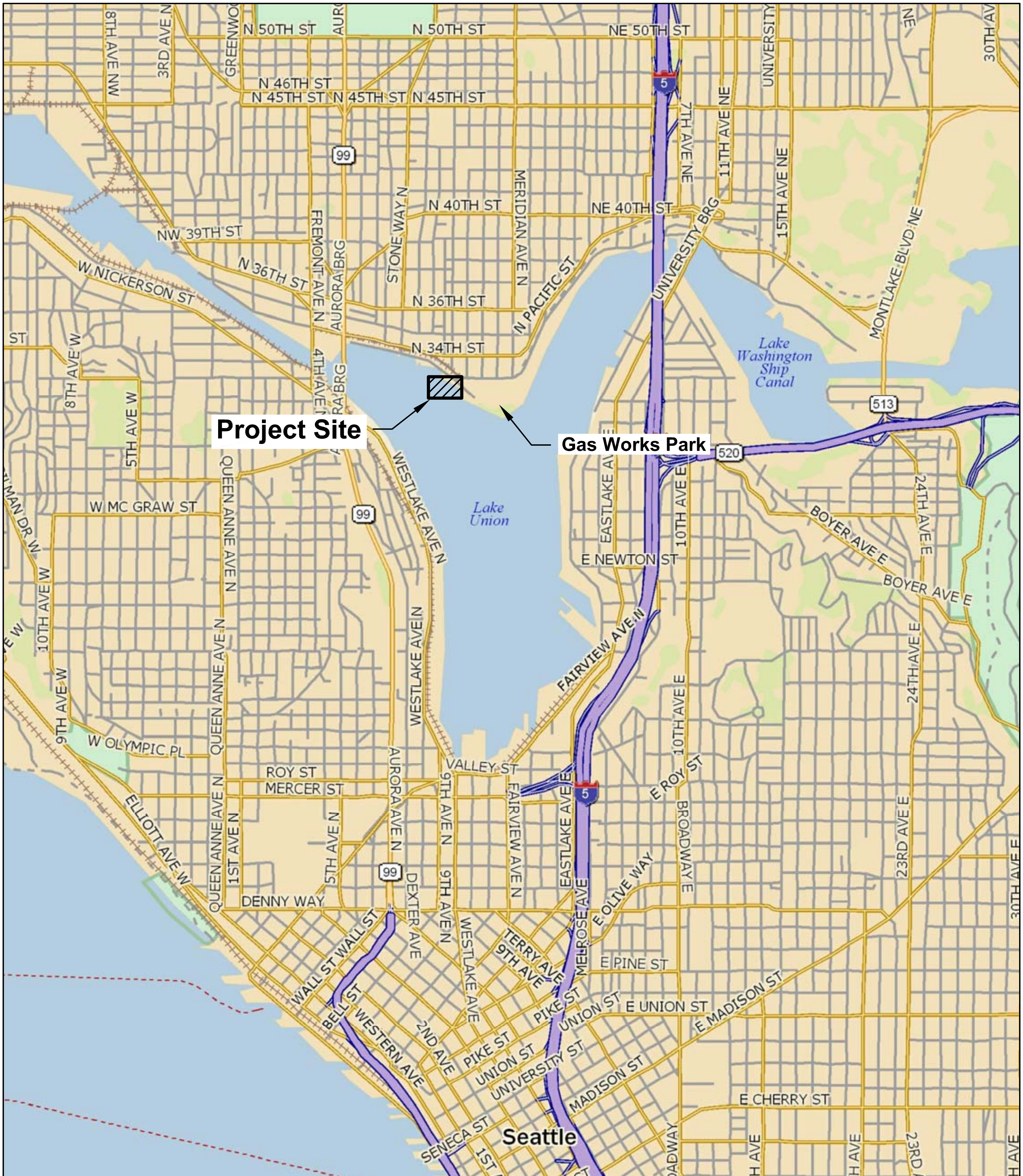

Source: Base map prepared from DeLorme Topo 7.0, 2007.

0 0.5 1.0

Scale in Miles

N

Northlake Shipyard Sand Blast Grit Dredge Project
Seattle, Washington

Vicinity Map

17800-26 5/12

HARTCROWSER

Figure

1

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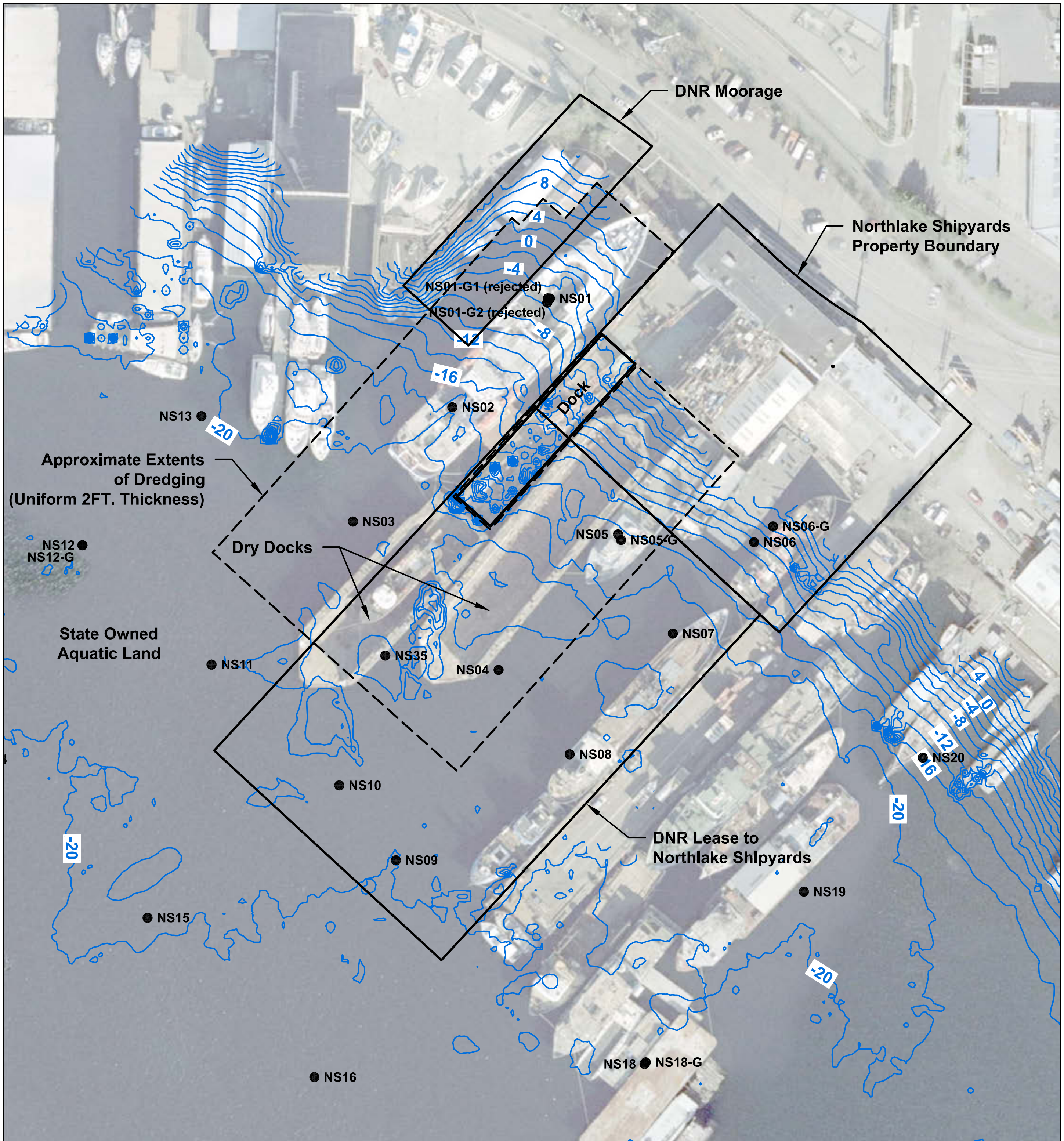


LEGEND

NS01 ● Core Sample Location and Number

Notes:
1. Core sampling by others as part of sand blast grit study, Ecology and Environment, 2009.
2. Bathymetry from 2008 Tetra Tech Report.

0 120 240
Scale in Feet

N

Northlake Shipyard Sand Blast Grit Dredge Project
Seattle, Washington

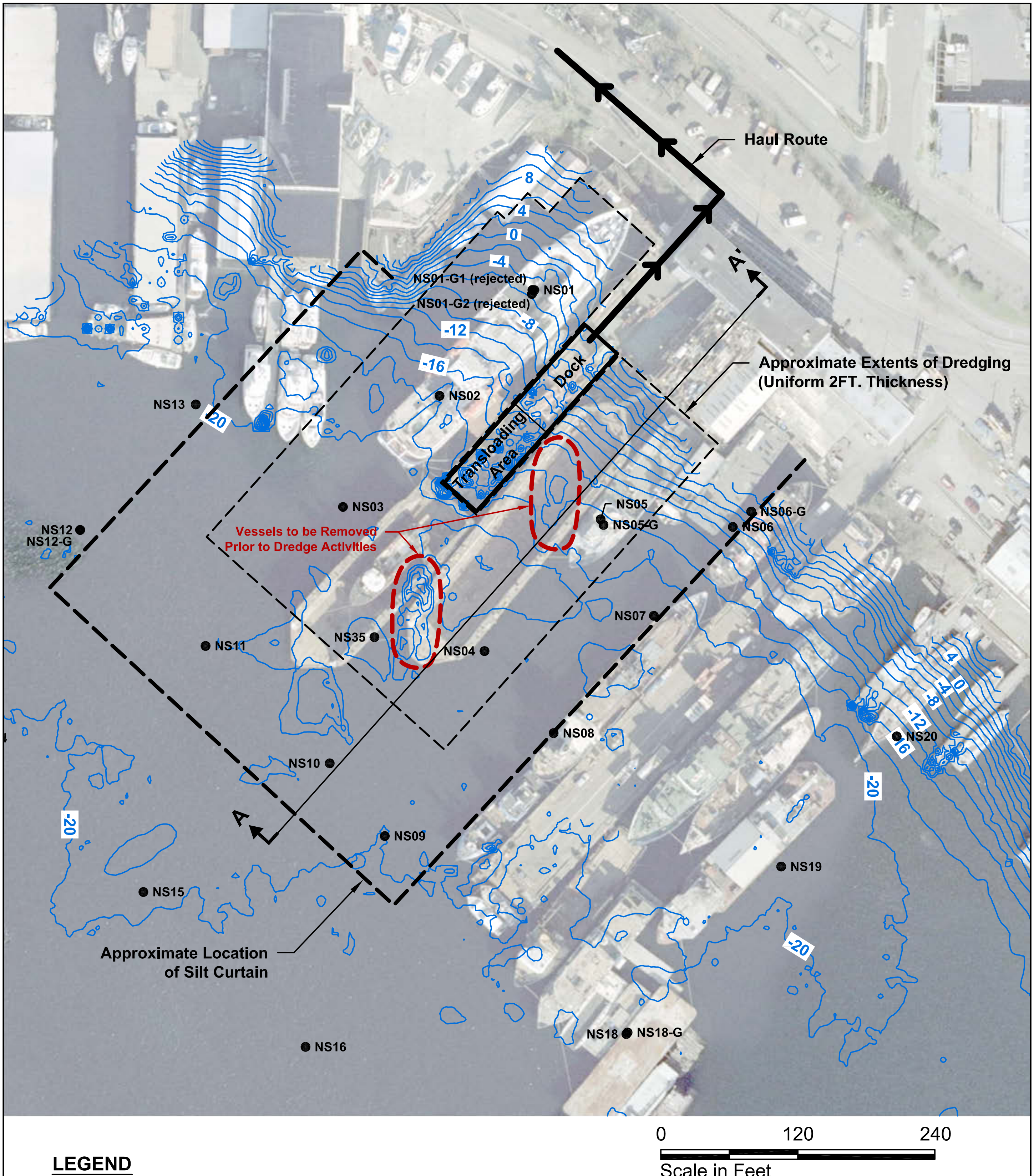
Project Area and Adjacent Ownership

17800-26 5/12

HARTCROWSER

Figure
2

EAL 05/9/12 1780026-013.dwg



LEGEND

NS01 ● Core Sample Location and Number

Notes:

1. Core sampling by others as part of sand blast grit study, Ecology and Environment, 2009.
2. Bathymetry from 2008 Tetra Tech report.
3. Transload will occur while barge is located next to doc onto trucks that are backed up onto the dock.
4. Dredging will not occur under dock, however, effort may be made to remove sediment from under dock.

N

Northlake Shipyard Sand Blast Grit Dredge Project
Seattle, Washington

Dredge and BMP Plan

17800-26 5/12

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Figure

3

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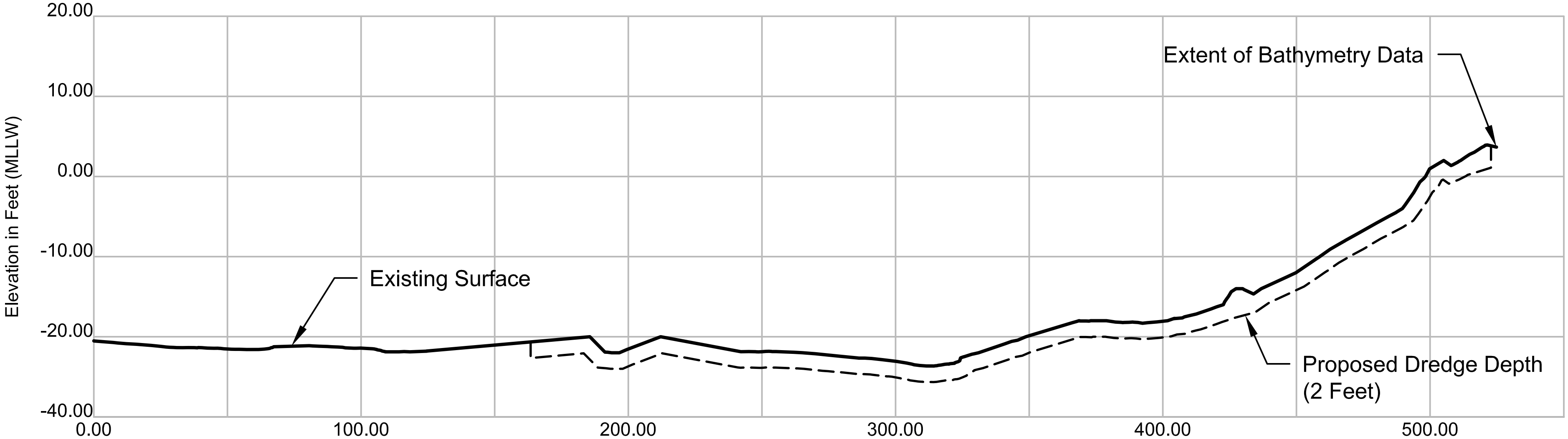

Cross Section A-A'

Horizontal Scale in Feet

0 60 120

0 20 40

Vertical Scale in Feet

Vertical Exaggeration x 3

Notes:

1. Water elevation in Lake Union maintained by USACE between +20 feet and +22 feet MLLW.
2. No side slopes due to shallow uniform designed dredge depth. Minor sloughing of adjacent cleaner material is expected.

HARTCROWSER

17800-26 5/12

Typical Dredge Cross Section

Northlake Shipyard Sand Blast Grit Dredge Project
Seattle, Washington

Figure **4**

APPENDIX A
AGENCY CORRESPONDENCE

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Endangered Species Act Status of West Coast Salmon & Steelhead

(Updated Aug. 11, 2011)

Species[1]			Current Endangered Species Act Listing Status[2]	ESA Listing Actions Under Review
Sockeye Salmon (*Oncorhynchus nerka*)	1	Snake River	*Endangered*	
	2	Ozette Lake	*Threatened*	
	3	Baker River	*Not Warranted*	
	4	Okanogan River	*Not Warranted*	
	5	Lake Wenatchee	*Not Warranted*	
	6	Quinalt Lake	*Not Warranted*	
	7	Lake Pleasant	*Not Warranted*	
Chinook Salmon (*O. tshawytscha*)	8	Sacramento River Winter-run	*Endangered*	
	9	Upper Columbia River Spring-run	*Endangered*	
	10	Snake River Spring/Summer-run	*Threatened*	
	11	Snake River Fall-run	*Threatened*	
	12	Puget Sound	*Threatened*	
	13	Lower Columbia River	*Threatened*	
	14	Upper Willamette River	*Threatened*	
	15	Central Valley Spring-run	*Threatened*	
	16	California Coastal	*Threatened*	
	17	Central Valley Fall and Late Fall-run	*Species of Concern*	
	18	Upper Klamath-Trinity Rivers	*Not Warranted*	
	19	Oregon Coast	*Not Warranted*	
	20	Washington Coast	*Not Warranted*	
	21	Middle Columbia River spring-run	*Not Warranted*	
	22	Upper Columbia River summer/fall-run	*Not Warranted*	
	23	Southern Oregon and Northern California Coast	*Not Warranted*	
	24	Deschutes River summer/fall-run	*Not Warranted*	
Coho Salmon (*O. kisutch*)	25	Central California Coast	*Endangered*	
	26	Southern Oregon/Northern California	*Threatened*	
	27	Lower Columbia River	*Threatened*	• Critical habitat
	28	Oregon Coast	*Threatened*	
	29	Southwest Washington	*Undetermined*	
	30	Puget Sound/Strait of Georgia	*Species of Concern*	
	31	Olympic Peninsula	*Not Warranted*	
Chum Salmon (*O. keta*)	32	Hood Canal Summer-run	*Threatened*	
	33	Columbia River	*Threatened*	
	34	Puget Sound/Strait of Georgia	*Not Warranted*	
	35	Pacific Coast	*Not Warranted*	
Steelhead (*O. mykiss*)	36	Southern California	*Endangered*	
	37	Upper Columbia River	*Threatened*	
	38	Central California Coast	*Threatened*	
	39	South Central California Coast	*Threatened*	
	40	Snake River Basin	*Threatened*	
	41	Lower Columbia River	*Threatened*	
	42	California Central Valley	*Threatened*	
	43	Upper Willamette River	*Threatened*	
	44	Middle Columbia River	*Threatened*	
	45	Northern California	*Threatened*	
	46	Oregon Coast	*Species of Concern*	
	47	Southwest Washington	*Not Warranted*	
	48	Olympic Peninsula	*Not Warranted*	
	49	Puget Sound	*Threatened*	• Critical habitat
	50	Klamath Mountains Province	*Not Warranted*	
Pink Salmon (*O. gorbuscha*)	51	Even-year	*Not Warranted*	
	52	Odd-year	*Not Warranted*	

1 The ESA defines a "species" to include any distinct population segment of any species of vertebrate fish or wildlife. For Pacific salmon, NOAA Fisheries Service considers an evolutionarily significant unit, or "ESU," a "species" under the ESA. For Pacific steelhead, NOAA Fisheries Service has delineated distinct population segments (DPSs) for consideration as "species" under the ESA.

LISTED AND PROPOSED ENDANGERED AND THREATENED SPECIES AND CRITICAL HABITAT; CANDIDATE SPECIES; AND SPECIES OF CONCERN IN KING COUNTY AS PREPARED BY THE U.S. FISH AND WILDLIFE SERVICE WASHINGTON FISH AND WILDLIFE OFFICE

(Revised March 15, 2012)

LISTED

Bull trout *(Salvelinus confluentus)*
Canada lynx *(Lynx canadensis)*
Gray wolf *(Canis lupus)*
Grizzly bear *(Ursus arctos = U. a. horribilis)*
Marbled murrelet *(Brachyramphus marmoratus)*
Northern spotted owl *(Strix occidentalis caurina)*

Major concerns that should be addressed in your Biological Assessment of project impacts to listed animal species include:

1. Level of use of the project area by listed species.

2. Effect of the project on listed species' primary food stocks, prey species, and foraging areas in all areas influenced by the project.

3. Impacts from project activities and implementation (e.g., increased noise levels, increased human activity and/or access, loss or degradation of habitat) that may result in disturbance to listed species and/or their avoidance of the project area.

Castilleja levisecta (golden paintbrush) [historic]

Major concerns that should be addressed in your Biological Assessment of project impacts to listed plant species include:

1. Distribution of taxon in project vicinity.

2. Disturbance (trampling, uprooting, collecting, etc.) of individual plants and loss of habitat.

1. Changes in hydrology where taxon is found.

DESIGNATED

Critical habitat for bull trout
Critical habitat for the marbled murrelet
Critical habitat for the northern spotted owl

PROPOSED

None

CANDIDATE

Fisher *(Martes pennanti)* – West Coast DPS
North American wolverine *(Gulo gulo luteus)* – contiguous U.S. DPS
Oregon spotted frog *(Rana pretiosa)* [historic]
Yellow-billed cuckoo *(Coccyzus americanus)*
Whitebark pine *(Pinus albicaulis*)

SPECIES OF CONCERN

Bald eagle *(Haliaeetus leucocephalus)*
Beller's ground beetle *(Agonum belleri)*
Cascades frog *(Rana cascadae)*
Hatch's click beetle *(Eanus hatchi)*
Larch Mountain salamander *(Plethodon larselli)*
Long-eared myotis *(Myotis evotis)*
Long-legged myotis *(Myotis volans)*
Northern goshawk *(Accipiter gentilis)*
Northern sea otter *(Enhydra lutris kenyoni)*
Northwestern pond turtle *(Emys (= Clemmys) marmorata marmorata)*
Olive-sided flycatcher *(Contopus cooperi)*
Pacific lamprey *(Lampetra tridentata)*
Pacific Townsend's big-eared bat *(Corynorhinus townsendii townsendii)*
Peregrine falcon *(Falco peregrinus)*
River lamprey *(Lampetra ayresi)*
Tailed frog *(Ascaphus truei)*
Valley silverspot *(Speyeria zerene bremeri)*
Western toad *(Bufo boreas)*
Aster curtus (white-top aster)
Botrychium pedunculosum (stalked moonwort)
Cimicifuga elata (tall bugbane)