

FINAL ENVIRONMENTAL ASSESSMENT
for
BEACH RE-NOURISHMENT
at
LINCOLN PARK, SEATTLE, WASHINGTON

October 2, 2002



**US Army Corps
of Engineers** ®
Seattle District

Lincoln Park Beach Re-Nourishment

Seattle, King County, Washington

Final Environmental Assessment

October 2, 2002

Responsible Agency: The responsible agency for this project is the Seattle District, U.S. Army Corps of Engineers (Corps).

Abstract: This environmental assessment evaluates the potential impacts of the proposed placement of 1,750 cubic yards (cy) of select gravel and sand substrate onto 0.75 of an acre of Puget Sound beach, including upper intertidal areas, at southern Lincoln Park in Seattle, Washington. The work would occur in the fall of 2002.

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ACRONYM INDEX

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|--------|--|
| BE: | Biological Evaluation |
| CFR: | Code of Federal Regulations |
| DPS: | distinct population segment |
| EFH: | Essential Fish Habitat |
| ESA: | Endangered Species Act |
| ESU: | evolutionarily significant unit |
| FWCA: | Fish and Wildlife Coordination Act |
| MLLW: | mean lower low water |
| NEPA: | National Environmental Policy Act |
| NMFS: | National Marine Fisheries Service |
| USC: | United States Code |
| USFWS: | United States Fish and Wildlife Service |

1. INTRODUCTION

The United States (U.S.) Army Corps of Engineers (Corps) proposes place 1,750 cubic yards (cy) of select gravel and sand substrate onto 0.75 of an acre of Puget Sound beach, including upper intertidal areas, at southern Lincoln Park in Seattle, Washington. The work would occur in the fall of 2002. In accordance with the National Environmental Policy Act (NEPA), this document examines the potential impacts of the proposed beach re-nourishment.

2. BACKGROUND

2.1. Project Location

Lincoln Park is located in King County, Washington, within the City of Seattle. The 130-acre park is operated by the Seattle Department of Parks and Recreation and bordered by the East Passage of Puget Sound on the west and by Fauntleroy Way on the east.

2.2. Project History

In the 1930's, the Works Progress Administration constructed a cobblestone and concrete seawall along the Lincoln Park shoreline. In subsequent years, erosion and scour lowered the beach profile along the southwestern beach and damaged the seawall (Figure 1). In the early 1980's, the beach had almost completely eroded down to a hardpan layer of clay, and portions of the seawall had collapsed. Complete loss of the seawall would have likely led to loss of important infrastructure, including a 30-inch diameter sewer force main, and a variety of park amenities behind the seawall. As a long-term solution to address the shoreline erosion, the Corps and the City of Seattle (the City) initiated the Lincoln Park Beach Re-Nourishment Project.



Figure 1. Lincoln Park seawall and steps in 1975 prior to the first beach nourishment project.

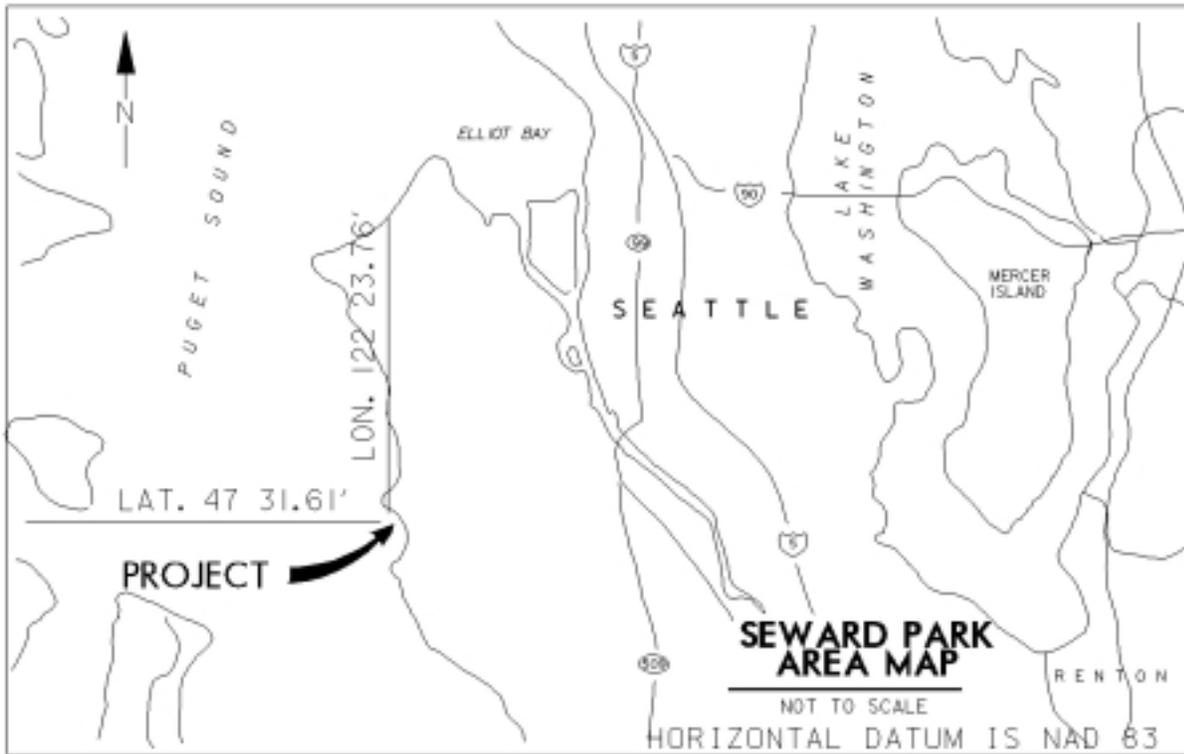


Figure 2. Location and Vicinity Map

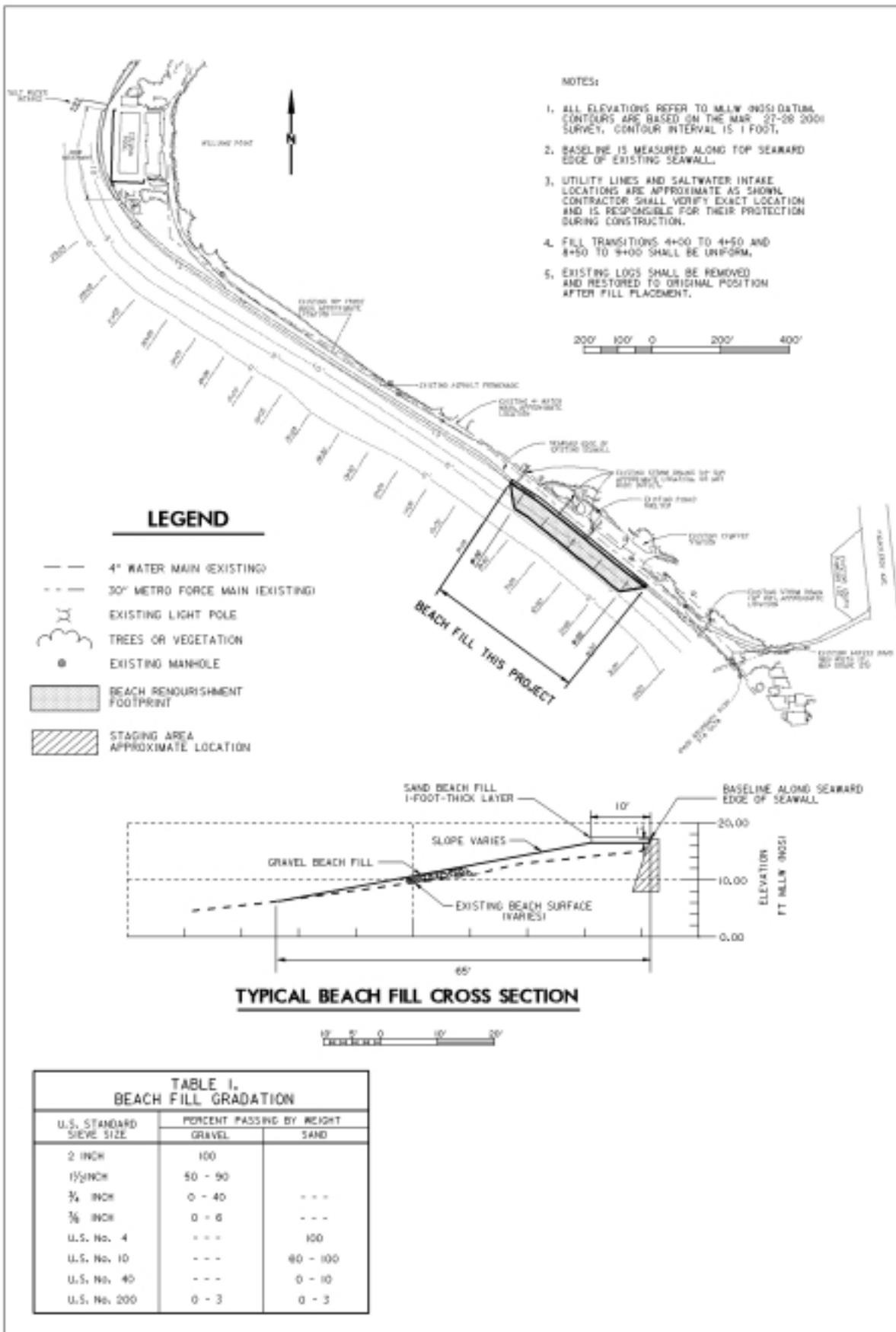


Figure 3. Plan and Section Views

The first phase of the project was constructed in 1988, with placement of a 5-foot-thick layer of armor rock placed upon a 2-foot-thick quarry spall filter blanket along 250 feet of beach at Williams Point; and beach nourishment consisting of 18,000 cy of sand and gravel along 2,300 feet of beach south of the point and 1,000 cy along the 250 feet of rock revetment. The substrate placement created a gravel beach along the Lincoln Park shoreline where erosion had previously scoured all substrate down to a hard clay layer at the toe of the seawall.

The authorizing document for original construction programmed periodic beach nourishment for project year 5 (the fifth year following project construction), or as necessary, and approximately every 5 years thereafter, with major rehabilitation of the revetment at project year 25 of the 50-year project life. The initial construction was designed to re-create a beach at the site and with the realization that periodic substrate re-nourishment would be needed. The first re-nourishment event occurred in October-November of 1994 and consisted of placement of 3,321 cy of coarse beach fill (gravel larger than $\frac{3}{8}$ -inch diameter) and 1,923 cy of fine beach fill (pit run sand and gravel) placed along the seaward side of the existing seawall for a distance of 1,800 feet north from the southern park boundary.

2.3. Project Authority

The proposed project is authorized under Section 103 of the Rivers and Harbors Act of 1962, as amended, and the Seattle 123 Bond Issue of 1984. The authority includes maintenance of the Lincoln Park shoreline through periodic beach re-nourishment, subject to local sponsor cost sharing, and periodic rock revetment rehabilitation by the local sponsor.



Figure 4. Lincoln Park beach in southern part of project area, November, 2001. Compare the elevation of the beach on the steps to the 1975 conditions shown in Figure 1.

2.4. Need and Purpose

Periodic beach re-nourishment is necessary to maintain the shoreline processes re-established by the initial beach nourishment and to prevent the storm damage and loss of public property at Lincoln Park that would result from scour and erosion. The proposed project would replace substrate lost since the last re-nourishment event in 1994, thereby protecting public property from damage and loss. While the beach profile maintains the top elevation just below the top of the seawall (Figure 4), the width of the top bench of the beach in the project area is 5 to 8 feet narrower than adjacent sections, indicating ongoing erosion and the need for additional material to perpetuate natural beach-forming processes.

3. DESCRIPTION OF PROPOSED PROJECT

The proposed project consists of placing approximately 250 cy of fine beach fill and 1500 cy of coarse beach fill material along 500 feet of the Lincoln Park shoreline. The substrate would be placed on the beach between 400 and 900 feet from the park's southern boundary (see Figures 1 and 2). Coarse material would be placed waterward of the break in beach slope and finer material placed on the level bench at the upper part of the beach just seaward of the seawall. Material placement would require a barge with conveyor off-loading capability, a small hydraulic excavator to remove and replace drift logs, and a small bulldozer to grade the new substrate. A barge would deliver all equipment and materials to the work area and construction activity would be confined to the approximate 65- by 500-foot project footprint (32,500 square feet or 0.75 acre). By restricting site access and the size of the work area, disruptions to aquatic biota would be minimal. Construction is anticipated for October 2002, to coincide with daytime high tides and lower park use. Once started, construction is expected to take about 1 week. See Appendix A for photographs of the 1994 construction. Due to the smaller size of the proposed project, the barge and conveyer would likely be smaller than that used in 1994 but the techniques used would be similar.

3.1. Conservation Measures

Several measures would be employed during construction to minimize adverse project effects on the environment:

- All work would be completed between August 16 and October 31. The work window avoids sensitive migration periods for salmonids, the bald eagle nesting period, and the bald eagle wintering period (the actual construction would take about 1 week and is planned to occur during early October).
- No part of any beached barge may rest on the bottom below an elevation of -2 feet (mean lower low water or MLLW).
- Transportation of material between the barge off-loading site and the beach must be carried out within a clearly marked 50-foot-wide access zone. The access zone shall remain unchanged throughout construction.
- All beach fill material shall be graded in the dry during periods of low tide.
- Earth-moving equipment shall remain seaward of the existing seawall and landward of the toe of the beach fill at all times.

- Washing of material from barges or placement of fill by hydraulic means is prohibited.
- All beach logs moved during construction shall be immediately replaced after placement of the beach substrate.
- Work would occur during daylight hours only.

4. OTHER ALTERNATIVES CONSIDERED

4.1. No Action

Under the “No Action Alternative,” no additional substrate would be placed at Lincoln Park. Erosion of the southwest beach would continue and the beach conditions, over time, would begin to resemble the pre-nourishment shoreline in the mid-1980’s. The seawall and the infrastructure it protects would be increasingly vulnerable to damage from discrete storm events as well as long-term beach erosion. The beach would gradually become steeper and the area and value of intertidal habitat would be reduced as a result. Sub-tidal habitat would increase complementarily to the loss of intertidal area. The “No Action Alternative” would not meet the need and purpose of the project.

4.2. Substrate Placement on 1000 Linear Feet of Beach

Preliminary survey of the site in early 2001 indicated that about 2250 cy of material had eroded from the southwest beach since the 1994 construction. The preliminary plans called for placement of approximately 2000 cy of additional beach substrate along the southern 1000 feet of the southwest beach between Stations 2+00 and 12+00. Subsequent investigations revealed that the existing beach profile adequately protects the seawall except along 500 feet of beach between Stations 4+00 and 9+00 (the proposed project). Placement of 2,000 cy of material would cause more temporary construction impacts in the nearshore environment and exceeds the scope necessary to meet the project’s need and purpose. Accordingly, this alternative will not be considered further.

4.3. Placement of Sandy Material On 500 Lineal Feet of Beach

The substrate placed on the beach could consist of finer, sandier particles instead of the proposed gravel. The resulting sandy beach may provide short-term recreational benefits. However, the prevailing wave and current energy along the southwest beach would soon mobilize the sandy material, resulting in rapid erosion and the return of the beach to pre-project conditions. Placement of sandy material would meet the need and purpose of the project, but would entail future re-nourishment events every one or two years, and the associated impacts from the more frequent construction. Also, larger storms may erode large amounts of sand in a short period of time, necessitating emergency actions to protect the seawall and infrastructure. Such emergency actions may occur at inopportune times of year from the standpoints of environment or recreation, and may not allow careful planning to avoid impacts to important resources. Accordingly, this alternative will not be considered further.

5. EXISTING CONDITIONS

5.1. Physical Characteristics

Lincoln Park is a heavily wooded and intensely landscaped park consisting of three distinct geographic areas: flat uplands, steep bluffs, and gently sloping beaches (see cover photograph). Park facilities include playfields, jogging and interpretive footpaths, picnic shelters, parking lots, restrooms, an outdoor 50-meter saltwater swimming pool (Colman Pool), and an easily accessible saltwater beach. Williams Point, extending into East Passage about midway between the north and south park boundaries, represents the most prominent point of land between Alki Point (about 3 miles to the north) and Brace Point (about $\frac{3}{4}$ mile to the south).

The 5,350 foot long shoreline of the park can be divided into three separate areas: a 2,700-foot-long northwest beach, the 250-foot-long beach at Williams Point, and a 2,300-foot-long southwest beach. A concrete and cobblestone seawall is located generally landward of the high tide line and extends the entire length of the Lincoln Park shoreline. A narrow strip of beach vegetation extends waterward of the seawall. In most areas of the beach, the vegetation strip is more than 10 feet wide (Figure 5). In the project area, the strip of beach vegetation is less than about 5 feet wide or entirely absent (Figure 6). Landward of the seawall, a paved asphalt pedestrian promenade/service road extends northward from the south park boundary along the shoreline. The paved promenade/service road provides access to public restrooms, picnic shelters, and associated utility lines. Shoreline access to the northwest beach north of Colman pool is possible by a footpath that originates near Colman pool.

A revetment on the highest part of the Williams Point beach protects Colman Pool. The southwest beach is primarily gravel, the substrate that was placed during previous nourishment events, with a small shelf between the steeper gravel beach and the seawall with a sand surface, driftwood, and sparse vegetation (such as beach grass, *Ammophila* sp.; Scot's broom, *Cytisus scoparius*; and blackberry, *Rubus discolor*). The northwest beach has a coarse sand surface and extends up to the edge of the seawall with very little driftwood accumulation or vegetation.

5.2. Water Quality

Water quality in East Passage is generally good, particularly considering the urban nature of the Seattle shoreline. Elevated levels of fecal coliform have been documented, primarily in months with high rainfall, at the King County water quality sampling station at Lincoln Park (King County DNR, 2002). Fecal coliform levels in nearby Fauntleroy Cove commonly exceed state water quality standards for Class AA waters. Potential nearby sources of water quality degradation include urban runoff, several outfalls discharging to Fauntleroy Cove, and turbidity generated by ferry operations occurring about $\frac{1}{4}$ -mile from the southern park boundary.



Figure 5. Strip of beach vegetation north of the project area (June, 2001).



Figure 6. Strip of beach vegetation within project area (June, 2001).

5.3. Natural Resources

5.3.1. Eelgrass

Eelgrass (*Zostera marina*) beds are present just offshore and north of the project area and in shallow waters all along the Puget Sound shoreline of Seattle. The eelgrass distribution along the southwestern shoreline is highly irregular with some large, dense patches and other areas of sparse colonization. Some of the existing eelgrass results from transplant efforts done in 1993.

A survey of the intertidal zone was completed in spring of 2002 during a low tide of -2 feet (mean lower low water or MLLW). Four patches of eelgrass located at elevations at or below MLLW were observed within 300 feet of the southern park boundary. The largest eelgrass patch encompassed about 3 square feet. The eelgrass patches occur within a mosaic of dense algal growth. A cursory survey of the beach did not reveal any eelgrass within the limits of the proposed project (between 400 and 900 feet from the southern park boundary).

5.3.2. Macroalgae

A sparse bed of bull kelp (*Nereocystis luetkana*) lies offshore of the southwest beach at Lincoln Park. A large kelp bed occurs north of Point Williams. While the density of the bull kelp in this area has decreased precipitously since the mid-1980's, the distribution of the kelp does not appear to have substantially changed over the same time frame (Antrim and Thom, 1995). In 1996, *Laminaria* kelp was observed in many places where bull kelp was observed in previous years (EPA, 1996).

In the intertidal zone in the vicinity of the project area, a variety of algal species occur. In the upper intertidal zone (above +6 feet, MLLW), the gravel beach is mostly bare of algae. At lower elevations, the substrate changes to cobble. *Ulva* and *Enteromorpha* dominate the zone between about +6 and -2 feet (MLLW). Between +2 and -2 feet (MLLW) and lower, a mix of *Laminaria*, *Iridea*, *Fucus*, and *Sargassum muticum* almost completely covers the substrate.

5.3.3. Fish

Cutthroat trout (*Oncorhynchus clarki clarki*) and chinook (*O. tshawytscha*), chum (*O. keta*), coho (*O. kisutch*), and pink salmon (*O. gorbuscha*) feed and rear in nearshore areas in the vicinity of the project area. Juvenile salmonids feed on epibenthic invertebrates in the intertidal zone. Adult salmonids migrate along the shoreline during the late summer to early winter months. Fauntleroy Creek, about ¼ mile south of the southern park boundary, supports a run of coho salmon that was re-introduced in 1991 as part of the Salmon in the Classroom program (Fauntleroy Watershed Council, 2002). In recent years, between 125 to 170 adult coho have returned to Fauntleroy Creek (Fauntleroy Watershed Council, 2002).

In addition to salmonids, marine fish such as a variety of surfperch (Embiotocidae), flatfish (Pleuronectiformes), gunnel (Pholididae), prickleback (Stichaeidae), and rockfish (*Sebastes* sp.) species occur along Puget Sound shorelines. Common species that likely utilize the Lincoln Park nearshore habitat include striped perch (*Embiotoca lateralis*), surf smelt (*Hypomesus pretiosus*), staghorn sculpin (*Leptocottus armatus*), English sole (*Parophrys vetulus*), copper rockfish (*Sebastes caurinus*), and cabezon (*Scorpaenichthys marmoratus*). The intertidal and

shallow subtidal zones provide feeding and rearing habitat for young marine fish and offer feeding and spawning habitat for mature adult fish. As with salmonids, the benthic invertebrate resources in nearshore areas provide abundant prey for marine fish.

5.3.4. Birds

Shallow nearshore waters and intertidal sediments in the project area produce fish, vegetation, and invertebrate forage for a variety of waterfowl, gulls, shorebirds, and other marine birds. Bird species known to occur offshore of Lincoln Park include black brant (*Branta bernicla nigricans*), common goldeneye (*Bucephala clangula*), harlequin duck (*Histrionicus histrionicus*), white-winged scoter (*Melanitta fusca*), marbled murrelet (*Brachyramphus marmoratus*), and rhinoceros auklet (*Cerorhinca monocerata*). With the exception of black brant (which prefer eelgrass and algae), these birds feed primarily on crustaceans, mollusks, and small fish.

Birds that frequent the Seattle portion of the Puget Sound shoreline must adapt to a moderately high level of disturbance. In the vicinity of the project site, the disturbance level is moderate and ranges from pedestrians (some with dogs) to regular ferry dockings at the nearby ferry terminal (with berthings approximately every 30 minutes between 5:30 a.m. and 11:25 p.m.).

5.3.5. Shellfish

The Lincoln Park intertidal area provides habitat for a variety of mollusks including butter clams (*Saxidomus gigantea*), littleneck clams (*Protothaca staminea*), macoma clams (*Macoma* spp.), and common cockle (*Clinocardium nuttalli*); and crabs including Dungeness crabs (*Cancer magister*) and red rock crab (*Cancer productus*). The Washington State Department of Health advises against shellfish harvest on any beach on the eastern shore of Puget Sound between Everett and Tacoma. Shellfish harvest on the Williams Point beaches is closed due to unsafe shellfish conditions.

5.3.6. Sensitive, Threatened and Endangered Species.

In accordance with Section 7(a)(2) of the Endangered Species Act (ESA) of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed and proposed threatened or endangered species. Several species protected under the Act are potentially found in Puget Sound in the Seattle area (Table 1). Information on the life histories and occurrence of these species in the project area can be found in the Biological Evaluation (BE) prepared for the proposed project. This document is available online at <<http://www.nws.usace.army.mil/ers/envirdocs.html>> and is briefly summarized in section 6.3.5.

5.4. Native American and Cultural Resources Sites

No archaeological, historical, or cultural resource sites occur in the project area. The project would occur entirely on top of substrate that was placed during the two previous beach nourishment events that have occurred since 1988.

Table 1. ESA Protected Species Potentially Occurring in the Project Vicinity

| Species | Listing Status | Critical Habitat |
|--|----------------|------------------|
| Bald Eagle <i>Haliaeetus leucocephalus</i> | Threatened | — |
| Marbled Murrelet <i>Brachyramphus marmoratus</i> | Threatened | Designated |
| Coastal/Puget Sound Bull Trout <i>Salvelinus confluentus</i> | Threatened | — |
| Puget Sound Chinook Salmon <i>Oncorhynchus tshawytscha</i> | Threatened | — |
| Steller Sea Lion <i>Eumetopias jubatus</i> | Threatened | Designated |
| Humpback Whale <i>Megaptera novaeangliae</i> | Endangered | — |
| Leatherback Sea Turtle <i>Dermochelys coriacea</i> | Endangered | Designated |
| Puget Sound/Strait of Georgia Coho Salmon <i>Oncorhynchus kisutch</i> | Candidate | — |

5.5. Land Use

Park visitors intensively utilize the project area for a variety of recreational activities (see Paragraph 5.6). Surrounding land uses are primarily residential, with the exception of the Fauntleroy ferry terminal for the Washington State Department of Transportation Ferry System located about 1/4 mile south of the southern park boundary.

5.6. Recreation

In the vicinity of the project area, Lincoln Park amenities include picnic shelters, Colman Pool, the pedestrian walkway/promenade, restrooms, and trails leading up the bluff that overlooks Puget Sound. Heaviest use occurs from late spring to fall, but small numbers of people use the park even during the winter. Colman Pool is open during the summer only.

6. EFFECTS OF THE PROPOSED ACTION

6.1. Monitoring

Monitoring of vegetation, algae, and epibenthic abundance and distribution has occurred in relation to the 1988 and 1994 beach construction events at Lincoln Park (Antrim, 1994a; Antrim, 1994b; Antrim and Thom. 1995; Antrim, *et al.*, 1993; EPA, 1996; Hiss *et al.*, 1988; Pentec, 1993). The discussion of the effects of the proposed project relies heavily on the monitoring of the earlier construction, realizing that the proposed construction is much smaller in scope and duration than either of the two previous construction events. No specific monitoring is planned following the proposed 2002 construction. However, ongoing monitoring of fish use in nearshore areas includes sampling in close proximity to Lincoln Park and will provide information that will be useful in evaluating potential future nourishment activities.

6.2. Physical Characteristics

The rate of beach erosion appears to be slowing as the beach evolves toward a geomorphological equilibrium since the initial beach nourishment. The volume and extent of the proposed substrate placement (1,750 cy over 500 linear feet of beach) is substantially less than that placed in 1994 (5,244 cy over 1,800 linear feet of beach). The beach appears to be relatively stable and the beach slope is consistent with that which might be expected to occur naturally in this area in the absence of nearby shoreline protection. While the pre-project beach profile appears to be essentially the same along the entire southwestern beach, the top of the sloping beach in the proposed re-nourishment area is much closer to the seawall than in other areas. The narrow width of the top beach shelf indicates some beach erosion has occurred in this area. Although the proposed re-nourishment area would restore the beach contours to the 1994 conditions, the project would not substantially change the beach slope or composition of the substrate.

The Fauntleroy Creek channel flows eastward through residential properties just south of the ferry terminal about $\frac{1}{4}$ -mile south of the project. Where the creek exits uplands onto the beach, a berm of sand has accumulated and directed the creek outlet to north under the ferry pier for several hundred feet where the creek turns east to flow into Fauntleroy Cove. The effects of the sand accumulation on the creek are not likely detrimental from a habitat perspective since the northward leg of the creek provides fairly high quality brackish-water habitat for fish. The along-shore drift moving sediment along marine shorelines commonly directs creeks in the direction of the along-shore current for some distance along the upper reaches of the beach before the creek enters salt water. Salmon migrating to and from Fauntleroy Creek are not likely hindered by the current configuration of the creek mouth. But given the visibility of the creek from the ferry terminal and the public access to the beach near the creek mouth, there is potential for harassment of fish, particularly returning adult salmon, by pets and humans in the stretch of creek that has been directed along the upper beach by the sand berm.

The berm at the creek mouth is composed primarily of sand of a size that was not present in large quantities in the substrate placed at Lincoln Park. The berm orientation (pointing north) indicates that a dominant northward-flowing current deposited the berm material. Based on site observations, it appears that most of the berm material likely originated at a landslide further up in the creek watershed or from the Puget Sound shoreline to the south. It is unlikely that the substrate placement at Lincoln Park has or will affect the dynamics of the creek mouth.

6.3. Water Quality

The substrate that would be placed on the beach would be free from any pollutants or contamination. Some increased turbidity would likely occur for one or two high tides following placement, but the effects of the turbidity are expected to be minimal due to their localized and temporary nature. Waves, tides, and currents would likely rapidly disperse any turbidity. During construction, equipment operating on the beach would work in the dry and would be inspected daily for leaks or petroleum contamination prior to commencing work. A spill prevention control and containment plan designed to reduce the impacts from potential spills (fuel, hydraulic fluid, etc) would be in place prior to the start of construction. Accordingly, impacts to water quality parameters are expected to be minimal.

6.4. Natural Resources

6.4.1. Vegetation and Macroalgae

Since the initial beach nourishment in 1988, eelgrass and kelp extent and density have changed in areas offshore of the southwestern beach. The observed changes have likely resulted from changes in energy, substrate, and beach stability that occurred following the initial beach construction (Antrim and Thom, 1995). As the beach has stabilized in the 14 years since the initial construction event, the vegetation and macroalgae communities also appear to have stabilized. The size of eelgrass and bull kelp beds has decreased, while the extent of *Laminaria* kelp has increased substantially. The observed shift in kelp species offshore of the southwestern beach may indicate natural macroalgal succession. While bull kelp is an annual, *Laminaria* is a perennial species that displaces bull kelp if the substrate is stable and grazing is sparse.

The bulk of the proposed fill would occur at the highest parts of the beach with “feathering” of the fill prism down to a toe at +6.0 feet (MLLW). The substrate footprint extends no further waterward than elevation +6.0 feet. Eelgrass beds offshore of the project area lie between MLLW and approximately -3.5 feet (MLLW), with bull kelp growing at bottom elevations between -6.0 and -15 feet (MLLW). No eelgrass or kelp occurs in the project footprint.

During construction, a barge would ground on the beach to deliver equipment and material. Construction would be timed during the fall to coincide with relatively calm weather and high daytime tides that would allow the barge to access staging areas in the high intertidal or supratidal zone with no grounding in eelgrass or kelp beds. The barge would deliver gravel directly to the beach with a conveyor belt. The barge would not rest on the bottom below an elevation of -2 feet (MLLW) and would be positioned to avoid grounding on areas with eelgrass.

Construction activities would likely disturb the upper edge of the intertidal zone where *Ulva* and *Enteromorpha* were observed in spring of 2002. Grounding of the barge may indirectly impact the more diverse algae community in the lower intertidal zone. Substantial impacts to eelgrass are not anticipated due to extremely low eelgrass density in the work zone. The impacts to algae would be temporary. Within several months, any disturbed algae are expected to re-grow.

The community dynamics of the algal species in the area may be affected by the proposed project. Since *S. muticum* was noted by algal surveys along the southwest beach in 1994, *S. muticum* abundance in the project vicinity appears to be gradually increasing. The proposed project may speed changes in the algal community by providing an opportunity for additional colonization by *S. muticum*.

The proposed work would cause temporary and minor disturbance to the macroalgae and eelgrass areas in and directly adjacent to the construction area. However, due to the small scope of the proposed re-nourishment and prudent management of the barge, substantial adverse impacts to the existing eelgrass and macroalgal communities are not anticipated.

6.4.2. Fish

During coordination for the earlier construction events, state and Federal agencies expressed concern about potential impacts to juvenile salmonid habitat. The primary ecological functions provided for juvenile salmonids along the shoreline of Lincoln Park are feeding and refuge.

Monitoring of the beach following the initial construction event found that the overall density of important salmonid prey items along the southwestern beach is similar to a control beach (Pentec, 1993). By burying the beach surface, the proposed work would temporarily decrease populations of epibenthic organisms within the project footprint. Potential adverse effects would be minimal because the work would occur in the fall as epibenthic production seasonally decreases, the project footprint represents only a small proportion of the available foraging habitat in the vicinity, and any dip in epibenthic abundance would be short-term.

Peak abundance of juvenile salmonids at the project site occurs in the spring. Salmonids may occur in the vicinity of the project when the work would occur but these fish would likely be larger and not heavily dependent upon the nearshore environment.

The proposed construction would occur just prior to the peak of the migration of adult coho salmon returning to Fauntleroy Creek (Lynch, 2002). Although adult coho may orient along the shoreline during their migration, they are not specifically dependent upon the nearshore during migration. Coho may stage near the creek prior to their terminal migration but the project is likely too far from the creek mouth to be considered an important staging area. In-water disturbance during construction would be minimal and, in any event, much less magnitude than the regular ferry dockings at the terminal directly adjacent to the creek.

Sand lance and surf smelt spawn on beaches bracketing either side of the Fauntleroy ferry terminal. The beaches in these areas have a finer, sand substrate than that along the southwestern beach of Lincoln Park. Typically, sand lance and surf smelt prefer a beach substrate substantially less than 1-inch-diameter; pea gravel or smaller sized substrate is ideal. The beach substrate at Lincoln Park is larger than 1-inch-diameter and unlikely to be utilized by sand lance or surf smelt. Adverse effects to other marine fish are not anticipated since the work would occur at relatively high elevations (higher than +6.0 feet, MLLW), the disturbance would be temporary, and the project area is small.

6.4.3. Birds

The proposed construction would slightly increase activity over ambient levels. Some displacement of birds may occur. Due to the small size of the project, construction disturbance would be limited in size and duration. Birds moving from the vicinity of the project would not be displaced from locally important habitat. The completed project would not change habitat features important to bird life. Overall, adverse impacts to birds are not anticipated as a result of the proposed work.

6.4.4. Shellfish

Monitoring following the 1988 beach nourishment found no effects of the work on shellfish resources at Lincoln Park (Antrim *et al.*, 1993). The proposed work would be much smaller in scope and should not affect shellfish occurring in the vicinity.

6.4.5. Sensitive, Threatened and Endangered Species.

There is an eagle nest approximately ¼-mile north of the project area. Due to the small size of the project, the timing and short duration of construction, and the restorative nature of the project, we have concluded that the project is not likely to adversely affect bald eagles, marbled

murrelets, bull trout, chinook salmon, and Steller sea lions. To avoid adverse effects to these species, construction would occur during the period of August 16 to October 31. Additional conservation measures taken to avoid impacts to salmonids and eagles include management of the construction barge to avoid grounding, allowing work during daylight hours only, and replacement of all beach logs removed during construction. Humpback whale, and leatherback sea turtle would not be affected by the proposed work since they do not utilize the action area for the project. The BE contains more details about the project's potential effects on threatened, endangered, and sensitive species.

6.5. Native American and Cultural Resources Sites

The proposed project would have no effect on Native American and cultural resource sites since no such resources occur in the project area. The work would not adversely affect salmonid populations or impair fishing sites reserved by treaties for Native American use.

6.6. Land Use

During construction, public access to a portion of the Lincoln Park shoreline would be restricted. Construction would take place during the fall when park use is relatively low. After construction, use of land in the vicinity would be unaffected by the new beach substrate. The proposed project would not affect land use in areas adjacent to the project area, including the Fauntleroy ferry terminal or nearby residential properties.

6.7. Recreation

The project would occur during low-use months at Lincoln Park. Also, during the fall, most visitors to Lincoln Park utilize the upland areas, not the shoreline. Given the timing, short duration of construction, and small size of the project, substantial impacts to recreation are not anticipated during the construction period. After construction, recreational use of the park and shoreline would be the same as before construction.

7. CUMULATIVE EFFECTS

The NEPA defines cumulative effects as the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions (40 CFR §1508.7).

Although the southwest beach appears to be getting more stable over time, future re-nourishment would likely be necessary. While the exact re-nourishment schedule is dependent upon weather patterns and the frequency of larger storm events, it is reasonable to expect that additional substrate would next be placed on the beach in 5 to 8 years. The amount of re-nourishment would likely be the same or less than that currently proposed. In the interval between nourishment events, the beach would recover entirely from the minor disturbances that would result from the proposed project. As such, subsequent re-nourishment events would be essentially independent of previous projects and would not result in additive beneficial or detrimental effects on the environment in the project area.

The Fauntleroy ferry terminal is scheduled for a major repair and replacement of piling and decking, with in-water work occurring between mid-September to mid-October, 2002. During

that time, the Fauntleroy ferry terminal would be closed to ferry traffic. The Fauntleroy ferry terminal work has been closely coordinated with interested groups and agencies to avoid and minimize potential impacts to Fauntleroy Creek (which flows under the landward end of the pier). The ferry terminal work will largely occur in offshore areas or above the waterline. Due to the distance between the beach nourishment and ferry terminal projects and the minor nature of the beach nourishment project, the two projects are not expected to result in synergistic adverse effects on Fauntleroy Cove, adjacent areas, or the resources of these areas.

The Washington State Department of Transportation routinely maintains the Fauntleroy ferry terminal. Typical activities include replacement of piling and dolphins. Routine maintenance at the ferry terminal would require environmental evaluation to minimize the potential adverse construction impacts. Additionally, compared to normal operation, routine maintenance activities would not substantially increase the level of activity at the ferry terminal. Routine maintenance work at the ferry terminal is not expected to interact with the proposed beach re-nourishment project.

Between the ferry terminal and the southern boundary of Lincoln Park, the shoreline is lined with residential properties. Currently, the shorelines of these properties are not armored, allowing relatively natural beach profiles to persist throughout Fauntleroy Cove. The prevailing direction of the alongshore current in the project vicinity is from the south. Over time, the nearshore currents and waves are capable of mobilizing large quantities of beach sediment, as evidenced by the complete loss of the Lincoln Park beach prior to the original beach nourishment event. By stabilizing the beach at Lincoln Park, the proposed re-nourishment helps prevent erosion of beaches to the south by the prevailing winds and currents. For that reason, bulkheads and riprap are not needed to protect the residential properties from erosion. Given the documented adverse environmental effects of marine shoreline armoring and that over half of shorelines in central Puget Sound have already been armored or otherwise modified (Berry, 2002), preservation of the natural beach grade at the residential properties south of Lincoln Park represents a potential cumulative benefit of the proposed work.

8. TREATY RIGHTS

In the mid-1850's, the United States entered into treaties with a number of Indian tribes in Washington. These treaties guaranteed the signatory tribes the right to "take fish at usual and accustomed grounds and stations . . . in common with all citizens of the territory" [*U.S. v. Washington*, 384 F.Supp. 312 at 332 (WDWA 1974)]. In *U.S. v. Washington*, 384 F.Supp. 312 at 343 - 344, the court also found that the Treaty tribes had the right to take up to 50 percent of the harvestable anadromous fish runs passing through those grounds, as needed to provide them with a moderate standard of living (Fair Share). Over the years, the courts have held that this right comprehends certain subsidiary rights, such as access to their "usual and accustomed" fishing grounds. More than *de minimis* impacts to access to usual and accustomed fishing area violates this treaty right [*Northwest Sea Farms v. Wynn*, F.Supp. 931 F.Supp. 1515 at 1522 (WDWA 1996)]. In *U.S. v. Washington*, 759 F.2d 1353 (9th Cir 1985) the court indicated that the obligation to prevent degradation of the fish habitat would be determined on a case-by-case basis. The Ninth Circuit has held that this right also encompasses the right to take shellfish [*U.S. v. Washington*, 135 F.3d 618 (9th Cir 1998)].

The proposed project has been analyzed with respect to its effects on the treaty rights described above. We anticipate that:

- (1) The work will not interfere with access to usual and accustomed fishing grounds or with fishing activities or shellfish harvesting;
- (2) The work will not cause the degradation of fish runs and habitat; and
- (3) The work will not impair the tribes' ability to meet moderate living needs.

9. IRRETRIEVABLE AND IRREVERSIBLE COMMITMENTS OF RESOURCES

No federal resources would be irreversibly and irretrievably committed to the proposed action until this Environmental Assessment is finalized and a "Finding of No Significant Impact" has been signed.

10. ENVIRONMENTAL COMPLIANCE

10.1. National Environmental Policy Act

Section 1500.1(c) and 1508.9(1) of the National Environmental Policy Act of 1969 (as amended) requires federal agencies to "provide sufficient evidence and analysis for determining whether to prepare an environmental impact statement or a finding of no significant impact" on actions authorized, funded, or carried out by the federal government to insure such actions adequately address "environmental consequences, and take actions that protect, restore, and enhance the environment". This assessment evaluates environmental consequences from the proposed placement of substrate along the shoreline of Lincoln Park at Seattle, Washington.

10.2. Endangered Species Act

In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed threatened or endangered species. The potential effects of the project and conservation measures taken to reduce those effects are addressed in more detail in Paragraphs 5.3.6, 6.4.5, and the BE for the project. In a letter dated 16 August 2002, the NMFS concurred with the Corps' determination that the project is not likely to adversely affect Puget Sound chinook salmon and will have no effect on Steller sea lions. In a letter dated 25 September 2002, the USFWS concurred with the Corps' determination that the project is not likely to adversely affect Puget Sound bull trout, bald eagles, and marbled murrelets.

10.3. Clean Water Act Compliance

The proposed work was evaluated pursuant to Section 404(b)(1) of the Clean Water Act in accordance with the guidelines promulgated by the Environmental Protection Agency (40 CFR 230) for evaluation of the discharge of dredged or fill material into waters of the United States. In addition, consideration has been given to the need for the work, and to such water quality standards as are appropriate and applicable by law. The Washington Department of Ecology issued Section 401 Water Quality Certification for the project on 16 September 2002. Alternatives not requiring the discharge of dredged or fill material into water of the U.S. are not available, practicable, or are more damaging to the aquatic ecosystem (see Paragraphs 3 and 4). The proposed discharge represents the least environmentally damaging practicable alternative and would include all appropriate and practicable measures to minimize adverse effects on the

aquatic environment. The work would not result in the unacceptable degradation of the aquatic environment. The proposed action represents the least environmentally damaging, practicable alternative. The discharges and methods specified in the proposed work are in accordance with the Section 404(b)(1) guidelines (see Appendix C).

10.4. Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA, 16 USC 470) requires that wildlife conservation receive equal consideration and be coordinated with other features of water resource development projects. This goal is accomplished through Corps funding of USFWS habitat surveys evaluating the likely impacts of proposed actions, which provide the basis for recommendations for avoiding or minimizing such impacts. Requirements of the FWCA were completed during review of the original plans and specifications in 1986.

10.5. Essential Fish Habitat

In accordance with the Essential Fish Habitat (EFH) requirements of the Magnuson-Stevens Fishery Conservation and Management Act, the Corps has determined that the proposed work would impact approximately 0.75 of an acre of EFH utilized by Pacific salmon, groundfish, and coastal pelagic species. We have determined that the proposed action would not adversely affect EFH for federally managed fisheries in Washington waters. The BE for the project provides supporting documentation for our determination. Since the Corps conservation measures included as part of the project are adequate to avoid, minimize, or otherwise offset adverse impacts to EFH, the NMFS did not provide EFH conservation recommendations for the project.

10.6. National Historic Preservation Act

The National Historic Preservation Act (16 USC 470) requires that the effects of proposed actions on sites, buildings, structures, or objects included or eligible for the National Register of Historic Places must be identified and evaluated. The project area does not include any sites listed or eligible for the National Register of Historic Places.

10.7. Clean Air Act

The proposed project has been analyzed for conformity applicability pursuant to regulations implementing Section 176(c) of the Clean Air Act. The proposed activities would not exceed *de minimis* levels of direct emissions of a criteria pollutant or its precursors and are exempted by 40 CFR Part 93.153. Any later indirect emissions are generally not within the Corps continuing program responsibility and generally cannot be practicably controlled by the Corps. For these reasons, a conformity determination is not required for this project.

10.8. Environmental Justice

Executive Order 12898 directs federal agencies to identify and address disproportionately high and adverse human health or environmental effects of agency programs and activities on minority and low-income populations. No tribal resources would be harmed. No adverse effects to minority or low-income populations would result from the implementation of the proposed project.

11. CONCLUSIONS

Based on the above analysis, this project is not a major Federal action significantly affecting the quality of the human or natural environment, and therefore does not require preparation of an environmental impact statement.

12. REFERENCES

- Antrim, L.D. 1994a. Eelgrass transplant plot monitoring at Lincoln Park beach, Seattle, Washington, April 1994. Final letter report to the Seattle District, U.S. Army Corps of Engineers. Battelle Marine Sciences Laboratory, Sequim, Washington.
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U.S. Army Corps of Engineers. 2001. Programmatic Biological Evaluation for the State of Washington for Salmonid Species Listed or Proposed By the National Marine Fisheries Service and U.S. Fish and Wildlife Service Under the Endangered Species Act. Seattle District, Regulatory Branch, Seattle, Washington.

APPENDIX A

Photographs of 1994 Construction
Equipment & Methods

Loaded Barge Approaching the Lincoln Park Beach in 1994.



Conveyor unloading beach fill onto the upper beach in 1994.



Photo 2

Nov 1994

APPENDIX B

Corps Responses to Public and Agency Comments on the Draft Environmental Assessment Lincoln Park Beach Re-Nourishment Seattle, King County, Washington

The Corps received one comment letter on the draft environmental assessment (EA) for the proposed Lincoln Park beach re-nourishment. Specific comments and questions (*in italics*) are presented below (in alphabetical order), followed by Corps responses.

1. Fauntleroy Watershed Council

Nothing we have learned about this project dispels our concern about when it is done. The presence of coho (and, last year, chum) spawners in Fauntleroy Cove during October is well documented, and we believe the return warrants being cautious about any elective in-water activity then. The fact that Washington State Ferries will be doing major restoration of its facilities in the cove during September and October is, we believe, even more reason to reassess your timing.

The project construction window runs from August 16 to October 31, with construction planned to take place in early October 2002. The construction window is based on prohibiting construction during the sensitive juvenile salmonid and bull trout outmigration, the bald eagle nesting period, and the bald eagle wintering period. The 2 ½-month construction window limits the opportunity to phase different construction projects so that they don't happen concurrently.

It is important to note that the allowable construction period is based on periods where impacts to sensitive environmental resources are avoided or minimized to the maximum extent. Adult salmon are likely present in Fauntleroy Cove throughout the year. Adult salmon staging in marine areas prior to return to spawning streams are not vulnerable to standard marine construction. For example, the standard Washington State (WAC 220-110-271) and Seattle District Regulatory Branch (Corps, 2001) marine work windows do not prohibit construction in marine areas during adult migration periods. For the Lincoln Park project, the vast majority of the work will take place in-the-dry and will have very minor construction impacts to the nearshore, in particular, and Fauntleroy Cove, in general. We do not believe that the proposed project will have adverse impacts on adult coho or chum salmon that may be staging for entry into Fauntleroy Creek.

Your public notice states that "...disruptions to aquatic biota will be minimal," a claim that suggests some degree of monitoring. I recall from our walkaround in May, however, your insistence that prior renourishments hadn't been monitored and that this third one wouldn't be either. Perhaps I have it wrong. I had occasion recently to talk with Hugh Shipman at the Department of Ecology on another matter and he offered that he knows quite a bit about cove geology and the renourishments. If he (or anyone else) has monitoring information in writing, it might clear up the apparent disparity and be useful to us over the long term.

Substantial monitoring has occurred in association with the placement of gravel and sand on the Lincoln Park shoreline in 1988 and 1994. Citations for the monitoring reports are listed in the Reference section. Section 6.1 (Monitoring) has been added to emphasize that monitoring has been done for past projects and that the discussion of effects is based on the results of that monitoring. The monitoring reports are part of the public records for the Lincoln Park project and we will contact the Fauntleroy Watershed Council to make them available for their review and use. Reports can be obtained by contacting Mr. Evan Lewis at the Corps, (206)764-6922.

No specific monitoring is planned following the proposed 2002 construction. However, ongoing monitoring of fish use in nearshore areas includes sampling in close proximity to Lincoln Park and will provide information that will be useful in evaluating potential future nourishment activities.

APPENDIX C

Substantive Compliance for
Section 404 of the Clean Water Act and the
Rivers and Harbors Act

Lincoln Park Beach Re-Nourishment
Seattle, King County, Washington
Substantive Compliance for
Section 404 of the Clean Water Act
and the
Rivers and Harbors Act

- 1. Introduction.** The purpose of this document is to record the Corps' evaluation and findings regarding this project pursuant to Section 404 of the Clean Water Act (CWA) and the Rivers and Harbors Act (RHA).

This document covers the placement of sand and gravel substrate from an upland source on the beach along the southern shoreline of Lincoln Park in the City of Seattle, King County, Washington.

The information contained in this document reflects the findings of the project record. Specific sources of information included the following:

- a. Lincoln Park Final Detailed Project Report and Environmental Assessment, dated 18 September 1986.
- b. Lincoln Park Environmental Assessment Supplement, dated 15 November 1993.
- c. Lincoln Park Biological Evaluation, dated July 2002.
- d. Lincoln Park Beach Re-Nourishment Final Environmental Assessment, dated 2 October 2002.

This document addresses the substantive compliance issues of the Clean Water Act 404(b)(1) Guidelines [40 CFR §230.12(a)] and the Regulatory Programs of the Corps of Engineers [33 CFR §320.4(a)].

- 2. Project Background.** The Lincoln Park Beach Re-Nourishment Project, located in Seattle, Washington, is authorized under Section 103 of the Rivers and Harbors Act of 1962, as amended, and the Seattle 123 Bond Issue of 1984. The authority includes maintenance of the Lincoln Park shoreline through periodic beach re-nourishment, subject to local sponsor cost sharing, and periodic rock revetment rehabilitation by the local sponsor. The authorizing document for original construction programmed periodic beach nourishment for project year 5 (the fifth year following project construction), or as necessary, and approximately every 5 years thereafter, with major rehabilitation of the revetment at project year 25 of the 50-year project life.

The initial construction was designed to re-create a beach at the site and with the realization that periodic substrate re-nourishment would be needed. The first phase of the project was constructed in 1988, with placement of a 5-foot-thick layer of armor rock placed upon a 2-

foot-thick quarry spall filter blanket along 250 feet of beach at Williams Point; and beach nourishment consisting of 18,000 cy of sand and gravel along 2,300 feet of beach south of the point and 1,000 cy along the 250 feet of rock revetment. The substrate placement created a gravel beach along the Lincoln Park shoreline where erosion had previously scoured all substrate down to a hard clay layer at the toe of the seawall. The first re-nourishment event occurred in October-November of 1994 and consisted of placement of 3,321 cy of coarse beach fill (gravel larger than $\frac{3}{8}$ -inch diameter) and 1,923 cy of fine beach fill (pit run sand and gravel) placed along the seaward side of the existing seawall for a distance of 1,800 feet north from the southern park boundary.

3. Project Purpose and Need. Periodic beach re-nourishment is necessary to maintain the shoreline processes re-established by the initial beach nourishment and to prevent the storm damage and loss of public property at Lincoln Park that would result from scour and erosion. The proposed project would replace substrate lost since the last re-nourishment event in 1994, thereby protecting public property from damage and loss. While the beach profile maintains the top elevation just below the top of the seawall (Figure 4), the width of the top bench of the beach in the project area is 5 to 8 feet narrower than adjacent sections, indicating ongoing erosion and the need for additional material to perpetuate natural beach-forming processes.

4. Availability Of Less Environmentally Damaging Practicable Alternatives to Meet the Project Purpose. The alternatives evaluated for this project were as follows:

a. Alternative 1 (No Action). Under the “No Action Alternative,” no additional substrate would be placed at Lincoln Park. Erosion of the southwest beach would continue and the beach conditions, over time, would begin to resemble the pre-nourishment shoreline in the mid-1980’s. The seawall and the infrastructure it protects would be increasingly vulnerable to damage from discrete storm events as well as long-term beach erosion. The beach would gradually become steeper and the area and value of intertidal habitat would be reduced as a result. Sub-tidal habitat would increase complementarily to the loss of intertidal area. The “No Action Alternative” would not meet the need and purpose of the project. Therefore, the no action alternative is not considered to be a less practicable alternative.

a.b.

Alternative 2 (Proposed Action). The proposed project consists of placing approximately 250 cy of fine beach fill and 1500 cy of coarse beach fill material along 500 feet of the Lincoln Park shoreline. The substrate would be placed on the beach between 400 and 900 feet from the park’s southern boundary (see Figures 1 and 2). Coarse material would be placed waterward of the break in beach slope and finer material placed on the level bench at the upper part of the beach just seaward of the seawall. Material placement would require a barge with conveyor off-loading capability, a small hydraulic excavator to remove and replace drift logs, and a small bulldozer to grade the new substrate. A barge would deliver all equipment and materials to the work area and construction activity would be confined to the approximate 65- by 500-foot project footprint (32,500 square feet or 0.75 acre). By restricting site access and the size of the work area, disruptions to aquatic biota would be minimal. Construction is anticipated for October

A

2002, to coincide with daytime high tides and lower park use. Once started, construction is expected to take about 1 week.

- c. Alternative 3 (Substrate Placement on 1000 Linear Feet of Beach).** Preliminary survey of the site in early 2001 indicated that about 2250 cy of material had eroded from the southwest beach since the 1994 construction. The preliminary plans called for placement of approximately 2000 cy of additional beach substrate along the southern 1000 feet of the southwest beach between Stations 2+00 and 12+00. Subsequent investigations revealed that the existing beach profile adequately protects the seawall except along 500 feet of beach between Stations 4+00 and 9+00 (the proposed project). Placement of 2,000 cy of material would cause more temporary construction impacts in the nearshore environment and exceeds the scope necessary to meet the project's need and purpose. Accordingly, Alternative 3 is more environmentally damaging compared to the proposed action.
- d. Alternative 4 (Placement of Sandy Material On 500 Lineal Feet of Beach).** The substrate placed on the beach could consist of finer, sandier particles instead of the proposed gravel. The resulting sandy beach may provide short-term recreational benefits. However, the prevailing wave and current energy along the southwest beach would soon mobilize the sandy material, resulting in rapid erosion and the return of the beach to pre-project conditions. Placement of sandy material would meet the need and purpose of the project, but would entail future re-nourishment events every one or two years, and the associated impacts from the more frequent construction. Also, larger storms may erode large amounts of sand in a short period of time, necessitating emergency actions to protect the seawall and infrastructure. Such emergency actions may occur at inopportune times of year from the standpoints of environment or recreation, and may not allow careful planning to avoid impacts to important resources. Accordingly, this alternative is not practicable and likely would be more environmentally damaging than the proposed alternative.

Findings. The Corps rejected Alternatives 1, 3 and 4 because they would either not meet the authorized project objectives, or they were not considered to be a less environmentally damaging alternative when compared to the proposed action.

5. Significant Degradation, Either Individually or Cumulatively, To the Aquatic Environment

- a. Impacts on Ecosystem Function.** Intertidal habitats on and adjacent to the project area at Lincoln Park will be disturbed by the re-nourishment construction. The Corps has assessed potential impacts from the construction and determined that they will generally be highly localized in nature, short in duration, and minor in scope (see the Lincoln Park Beach Re-Nourishment Biological Evaluation, July 2002). Impacts of the work on salmonids, other fish, and intertidal communities will be reduced and/or avoided through implementation of timing restrictions. Due to these measures, impacts to these important resources should not be significant either individually or cumulatively.

- b. Impacts on Recreational, Aesthetic and Economic Values.** Construction vehicles may temporarily disrupt recreational use in Lincoln Park in the vicinity of the project area. However, no significant adverse effects on recreation, aesthetics, or the economy are anticipated (see the Lincoln Park Beach Re-Nourishment Environmental Assessment, dated September 2002). The placement of nourishment materials onto the beach will delay the conversion of the current high intertidal beach to a subtidal beach, thereby allowing for continued use of the shore for recreational purposes.

Findings. The Corps has determined that there would be no significant adverse impacts to aquatic ecosystem functions and values or recreational, aesthetic, and economic values.

6. Appropriate and Practicable Measures To Minimize Potential Harm to the Aquatic Ecosystem

- a. Impact Avoidance Measures.** Potential impacts of the proposed work on salmonids will be avoided through the implementation of timing restrictions. For the protection of bull trout and outmigrating juvenile salmonids, work will not occur during the juvenile outmigration period or the bull trout work closure period, 15 February through 15 July. To avoid impacts to water quality, all beach fill material shall be graded in the dry during periods of low tide and earth-moving equipment shall remain seaward of the existing seawall and landward of the toe of the beach fill at all times. To further avoid potential impacts, washing of material from barges or placement of fill by hydraulic means is prohibited and no part of any beached barge may rest on the bottom below an elevation of -2 feet (mean lower low water or MLLW).
- b. Impact Minimization Measures.** Transportation of material between the barge off-loading site and the beach must be carried out within a clearly marked 50-foot-wide access zone. The access zone shall remain unchanged throughout construction. Beach nourishment material will be placed in the intertidal zone, thereby mimicking natural sediment erosion and transport processes to the maximum extent practicable.
- c. Compensatory Mitigation Measures.** The beach nourishment program is considered to be self-mitigating.

Findings. The Corps has determined that all appropriate and practicable measures have been taken to minimize potential harm.

7. Other Factors In the Public Interest.

- a. Fish and Wildlife.** The Corps has coordinated with State and Federal agencies to assure careful consideration of fish and wildlife resources. The Corps has obtained an advisory Hydraulic Project Approval from the Washington Department of Fish and Wildlife, and has prepared a Biological Evaluation in accordance with the Endangered Species Act. The Corps will assure full compliance with the Endangered Species Act prior to project implementation.
- b. Water Quality.** Public Notice CENWS-OD-TS-NS-16 (February 1, 2002) served as an application for a Section 401 Water Quality Certification from the Washington

Department of Ecology (Ecology). Ecology issued a Water Quality Certification for the work on 16 September 2002. The Corps will abide by the conditions of the State-issued Water Quality Certification to ensure compliance with State water quality standards.

- b.c. Historic and Cultural Resources.** No archaeological, historical, or cultural resource sites occur in the project area. The project would occur entirely on top of substrate that was placed during the two previous beach nourishment events that have occurred since 1988. The proposed project would have no effect on Native American and cultural resource sites since no such resources occur in the project area. The work would not adversely affect salmonid populations or impair fishing sites reserved by treaties for Native American use.
- d. Activities Effecting Coastal Zones.** The proposed action will simply restore the Federal erosion control project to a state comparable to its original condition. Work will remain well within the footprint of the original project, and will not cause substantial adverse effects to shore resources or the environment. Pursuant to Section 173-27-040(b) of the Washington Administrative Code, which has been adopted in Section 15.08.030 of the City of Port Angeles Municipal Code, the Corps determined that this proposal is consistent to the maximum extent practicable with the State of Washington Shoreline Management Program.
- e. Environmental Benefits.** The proposed nourishment project would delay the conversion of the southern beach along Lincoln Park from a gravel intertidal beach to a subtidal clay bench (similar to that which existed prior to the original construction in 1988). The maintenance of a higher, more gently graded beach profile would maintain the range of intertidal elevations necessary to support the epibenthic invertebrates which serve as prey for a wide variety of birds and marine fishes.
- f. Navigation.** No adverse effects to navigation will occur as a result of the proposed maintenance work.

Findings. The Corps has determined that this project is within the public interest.

- 8. Conclusions.** Based on the analyses presented in project NEPA documents, as well as the following 404(b)(1) Evaluation and General Policies for the Evaluation of Permit Applications analysis, the Corps finds that this project complies with the substantive elements of Section 404 of the Clean Water Act and the Rivers and Harbors Act.

Potential Impacts on Physical and Chemical Characteristics (Subpart C)

1. **Substrate [230.20].** The existing intertidal beach substrate consists of small gravel with patches of cobble and coarse sand. On average, the nourishment material grain size gradation for the intertidal beach will be slightly smaller than that of the existing material, but well within the grain-size gradation of the existing material. The supratidal substrate consists of fine sand and will remain fine sand. The size of the new material will closely mimic that which is already present.
2. **Suspended Particulate/Turbidity [230.21].** Any increases in turbidity resulting from the proposed action would be minor considering the large grain size of the nourishment material. The nourishment materials will be washed at the quarry so that the percentage of fines will be quite low (less than 3% by weight). Any sediment plumes attributable to the project would be temporary, localized, and equivalent to those created by natural sediment transport processes.
3. **Water Quality [230.22].** No significant water quality effects are anticipated (see number 2. above).
4. **Current Patterns and Water Circulation [230.23].** The discharge of nourishment materials will not obstruct flow, change the direction or velocity of water flow/circulation, or otherwise change the dimensions of the receiving water body. The material to be placed on the intertidal beach is large enough to remain fairly immobile and will not likely enter the alongshore drift system in large quantities. In the vicinity of the project, the net alongshore drift appears to be toward the north.
5. **Normal Water Fluctuations [230.24].** The discharge of nourishment materials will not impede normal tidal fluctuations. Beach nourishment material will be placed high in the intertidal zone, thereby mimicking natural sediment erosion and transport processes to the maximum extent practicable. The proposed nourishment project would delay the conversion of the beach fronting the revetment from a high intertidal beach to a subtidal bench. Surveys since the initial beach construction in 1988 indicate that the beach profile is becoming more stable over time. Loss of material to alongshore drift and wave action is expected to occur to some extent but is not expected to cause rapid degradation of the Lincoln Park beach.
6. **Salinity Gradients [230.25].** The discharge of nourishment materials will not divert or restrict tidal flows or affect salinity gradients (see number 5. above).

Potential Impacts on Biological Characteristics of the Aquatic Ecosystem (Subpart D)

1. **Threatened and Endangered Species [230.30].** Pursuant with Section 7 of the Endangered Species Act, the Corps prepared a Biological Evaluation (BE) to assess potential impacts of the proposed work on species protected under the Act. This document concluded that the proposed maintenance work was not likely to adversely affect the bald eagle (*Haliaeetus leucocephalus*), marbled murrelet (*Brachyramphus marmoratus*), bull trout (*Salvelinus confluentus*), chinook salmon (*Oncorhynchus tshawytscha*); and Steller sea lion (*Eumetopias jubatus*). The BE concluded that the project would have no effect on the humpback whale (*Megaptera novaeangliae*) or leatherback sea turtle (*Dermochelys coriacea*). In a letter dated

16 August 2002, the National Marine Fisheries Service (NMFS) concurred with the determination for chinook salmon and changed the determination for Steller sea lions to “no effect.” In a letter dated 25 September 2002, the U.S. Fish and Wildlife Service (USFWS) concurred with the effect determinations for bald eagle, marbled murrelet, and bull trout.

- 2. Aquatic Food Web [230.31].** The proposed action is not expected to have a significant affect on the eelgrass and algae in the vicinity of project area. Construction activities would likely disturb the upper edge of the intertidal zone where *Ulva* and *Enteromorpha* were observed in spring of 2002. Grounding of the barge may indirectly impact the more diverse algae community in the lower intertidal zone. Substantial impacts to eelgrass are not anticipated due to extremely low eelgrass density in the work zone. The impacts to algae would be temporary. Within several months, any disturbed algae are expected to re-grow.

Monitoring of the beach following the 1988 construction event found that the overall density of important salmonid prey items along the southwestern beach is similar to a control beach. By burying the beach surface, the proposed work would temporarily decrease populations of epibenthic organisms within the project footprint. Potential adverse effects would be minimal because the work would occur in the fall as epibenthic production seasonally decreases, the project footprint represents only a small proportion of the available foraging habitat in the vicinity, and any dip in epibenthic abundance would be short-term.

Forage fish, such as herring, surf smelt, and sand lance, will not be directly impacted by the proposed action. Typically, sand lance and surf smelt prefer a beach substrate substantially less than 1-inch-diameter; pea gravel or smaller sized substrate is ideal. The beach substrate at Lincoln Park is larger than 1-inch-diameter and unlikely to be utilized by sand lance or surf smelt. Adverse effects to other marine fish are not anticipated since the work would occur at relatively high elevations (higher than +6.0 feet, MLLW), the disturbance would be temporary, and the project area is small.

- 3. Wildlife [230.32].** Noise associated with disposal operations may have an effect on bird and marine mammals in the project vicinity. The impacts of any sound disturbance would likely result in displacement of animals rather than injury. Disposal operations are not expected to result in a long-term reduction in the abundance and distribution of any prey items. No breeding or nesting areas will be directly impacted. The work window avoids sensitive nesting and wintering periods for bald eagles.

Potential Impacts to Special Aquatic Sites (Subpart E)

- 1. Sanctuaries and Refuges [230.40].** The proposed project will not impact any designated sanctuary or refuge area.
- 2. Wetlands [230.41].** Nourishment material will not be discharged in wetland areas. The project will not alter the inundation patterns of wetlands.
- 3. Mudflats [230.42].** Nourishment material will not be discharged in or near mudflat areas. The project will not alter the inundation patterns of mudflats.
- 4. Vegetated Shallows [230.43].** In the intertidal zone in the vicinity of the project area, a variety of algal species occur. In the upper intertidal zone (above +6 feet, MLLW), the gravel beach is mostly bare of algae. At lower elevations, the substrate changes to cobble.

Ulva and *Enteromorpha* dominate the zone between about +6 and –2 feet (MLLW). Between +2 and –2 feet (MLLW) and lower, a mix of *Laminaria*, *Iridea*, *Fucus*, and *Sargassum muticum* almost completely covers the substrate. Construction activities would likely disturb the upper edge of the intertidal zone where *Ulva* and *Enteromorpha* were observed in spring of 2002. Grounding of the barge may indirectly impact the more diverse algae community in the lower intertidal zone. Substantial impacts to eelgrass are not anticipated due to extremely low eelgrass density in the work zone. The impacts to algae would be temporary. Within several months, any disturbed algae are expected to re-grow. The community dynamics of the algal species in the area may be affected by the proposed project. Since *S. muticum* was noted by algal surveys along the southwest beach in 1994, *S. muticum* abundance in the project vicinity appears to be gradually increasing. The proposed project may speed changes in the algal community by providing an opportunity for additional colonization by *S. muticum*.

The project will not change circulation patterns, increase nutrients, or result in any chemical contamination. As described in the Aquatic Food Web section, the placement of nourishment materials is not expected to reduce the value of the area as nesting, spawning, nursery, cover, or forage habitat. The proposed work would cause temporary and minor disturbance to the macroalgae and eelgrass areas in and directly adjacent to the construction area. However, due to the small scope of the proposed re-nourishment and prudent management of the barge, substantial adverse impacts to the existing eelgrass and macroalgal communities are not anticipated.

5. **Coral Reefs [230.44].** Not applicable.
6. **Riffle and Pool Complexes [230.45].** Not applicable.

Potential Effects on Human Use Characteristics (Subpart F)

1. **Municipal and Private Water Supplies [230.50].** Not applicable.
2. **Recreational and Commercial Fisheries [230.51].** The project is not expected to affect recreational or commercial fisheries.
3. **Water-Related Recreation [230.52].** Construction vehicles will likely disrupt recreational use of the Lincoln Park beach in the project area. The project would occur during low-use months at Lincoln Park. Also, during the fall, most visitors to Lincoln Park utilize the upland areas, not the shoreline. Given the timing, short duration of construction (about 1 week), and small size of the project, substantial impacts to recreation are not anticipated during the construction period. After construction, recreational use of the park and shoreline would be the same as before construction.
4. **Aesthetics [230.53].** Localized, temporary increases in noise and turbidity will occur while construction equipment is operating. Prior to final grading, small stockpiles of gravel will be present on the upper beach. These stockpiles will not block views of the East Passage of Puget Sound, nor mar the view of the Seattle shoreline from points west. After project completion, the project area will rapidly become indistinguishable from adjacent, undisturbed beach areas.

- 5. Parks, National and Historic Monuments, National Seashores, Wilderness Areas, Research Sites, and Similar Preserves [230.54].** The project is located within a Seattle park. Lincoln Park offers picnic areas, water access, swimming (in the nearby Coleman Pool and from the beach), and hiking and bicycle trails. To minimize disruption to park use, construction vehicles may access the beach from barges only and will be restricted to beach areas with the project footprint. Given the timing, short duration of construction, and small size of the project, substantial impacts to recreation are not anticipated during the construction period. After construction, recreational use of the park and shoreline would be the same as before construction.

Evaluation and Testing (Subpart G)

- 1. General Evaluation of Dredged or Fill Material [230.60].** The fill material will be composed of washed sand, gravel, and other naturally occurring inert material obtained from upland borrow sources for which all state and local permits have been obtained.
- 2. Chemical, Biological, and Physical Evaluation and Testing [230.61].** The extraction site is sufficiently removed from sources of pollution to provide reasonable assurance that the proposed discharge material is not a carrier of contaminants. Therefore, the required determinations pertaining to the presence and effects of contaminants can be made without testing.

Action to Minimize Adverse Effects (Subpart H)

- 1. Actions Concerning the Location of the Discharge [230.70].** The effects of the discharge will be minimized by minimizing the extent of the discharge to the maximum practicable extent. The discharge will not disrupt tidal flows, nor create standing bodies of water. The substrate of the project area is similar to that being discharged. The location and timing of the proposed discharge has been planned to minimize impacts to marine organisms.
- 2. Actions Concerning the Material to be Discharged [230.71].** No treatment substances nor chemical flocculates will be added to the nourishment materials before disposal. The material will be washed at the borrow site to reduce the concentration of fines.
- 3. Actions Controlling the Material after Discharge [230.72].** Methods for reducing the potential for erosion, slumping, or leaching will not be employed, since the discharge material is intended to create a stable beach with very limited need for short-term maintenance. Final grading of the discharged material will occur in the dry during low tides to avoid direct fishery and water quality impacts. Discharge will not occur during periods of high wind and wave action.
- 4. Actions Affecting the Method of Dispersion [230.73].** Beach nourishment material will be placed high in the intertidal zone, thereby mimicking natural sediment erosion and transport processes to the maximum extent practicable. The material will be washed at the borrow site to minimize the release of suspended particulates.
- 5. Actions Related to Technology [270.74].** Appropriate machinery and methods of transport of the material for discharge will be employed. To minimize disturbance of areas outside of the project footprint, the new substrate will be delivered to the project site via barge and

discharged onto the upper beach with a conveyor. All machinery will be properly maintained and operated.

6. **Actions Affecting Plant and Animal Populations [270.75].** The timing of the proposed discharge operations will minimize the potential for adverse effects to animal populations, particularly juvenile salmonids and bald eagles. The placement of the substrate will provide intertidal beach habitat for salmonids, other marine fish, and their prey resources.
7. **Actions Affecting Human Use [230.76].** The discharge will not result in damage to aesthetically pleasing features of the aquatic landscape. The discharge will not increase incompatible human activity in remote fish and wildlife areas.
8. **Other Actions [230.77].** Not applicable.

General Policies for the Evaluation of Permit Applications [33 CFR §320.4]

1. **Public Interest Review [320.4(a)].** The Corps finds these actions to be in compliance with the 404(b)(1) guidelines and not contrary to the public interest.
2. **Effects on Wetlands [320.4(b)].** No wetlands will be altered by the proposed project.
3. **Fish and Wildlife [320.4(c)].** U.S. Fish and Wildlife Service and the National Marine Fisheries Service were consulted to ensure that direct and indirect loss and damage to fish and wildlife resources attributable to the proposed maintenance work will be minimized.
4. **Water Quality [320.4(d)].** The Corps will abide by the conditions of the Section 401 Water Quality Certification (issued by the Washington Department of Ecology on 16 September 2002) to ensure compliance with Washington water quality standards.
5. **Historic, Cultural, Scenic, and Recreational Values [320.4(e)].** No wild and scenic rivers, historic properties, National Landmarks, National Rivers, National Wilderness Areas, National Seashores, National Recreation Areas, National Lakeshores, National Parks, National Monuments, estuarine and marine sanctuaries, or archeological resources will be adversely impacted by the proposed maintenance work. The maintenance of a gently graded beach profile would maintain recreation values.
6. **Effects on Limits of the Territorial Sea [320.4(f)].** The proposed maintenance work will not alter the coastline nor baseline from which the territorial sea is measured for the purposes of the Submerged Lands Act and international law.
7. **Consideration of Property Ownership [320.4(g)].** Not applicable.
8. **Activities Affecting Coastal Zones [320.4(h)].** The proposed work complies with the policies, general conditions, and general activities specified in the City of Seattle Shoreline Management Master Plan and Washington Administrative Code.
9. **Activities in Marine Sanctuaries [320.4(i)].** Not applicable.
10. **Other Federal, State, or Local Requirements [320.4(j)]**
 - a. **National Environmental Policy Act.** An Environmental Assessment (EA), tiered from a past Environmental Assessment, has been prepared to satisfy the documentation requirements of NEPA.

b. Endangered Species Act. In accordance with Section 7(a)(2) of the Endangered Species Act of 1973, as amended, federally funded, constructed, permitted, or licensed projects must take into consideration impacts to federally listed or proposed threatened or endangered species. A Biological Evaluation (BE) was submitted to USFWS and NMFS on 12 August 2002. In letters dated 16 August 2002 and 25 September 2002, respectively, the NMFS and USFWS concurred with the determinations made in the BE for effects to threatened and endangered species.

c. Clean Water Act. The Corps must demonstrate compliance with the substantive requirements of the Clean Water Act. This document records the Corps' evaluation and findings regarding this project pursuant to Section 404 of the Act. Public Notice CENWS-PL-02-05 (July 30, 2002) served as an application for a Section 401 Water Quality Certification from the Washington Department of Ecology. Ecology issued a Water Quality Certification for the project on 16 September 2002. The Corps will abide by the conditions of the State-issued Water Quality Certification to ensure compliance with State water quality standards.

d. Coastal Zone Management Act. The Coastal Zone Management Act of 1972, as amended, requires Federal agencies to carry out their activities in a manner which is consistent to the maximum extent practicable with the enforceable policies of the approved Washington Coastal Zone Management Program. The proposed action will simply restore the Federal erosion control project to a state comparable to its original condition. Work will remain well within the footprint of the original project, and will not cause substantial adverse effects to shore resources or the environment. Pursuant to Section 173-27-040(2)(b) of the Washington Administrative Code, which has been adopted in Section 23.60.020 of the City of Seattle Municipal Code, the Corps determined that this proposal is consistent to the maximum extent practicable with the State of Washington Shoreline Management Program.

e. Rivers and Harbors Act. This document records the Corps' evaluation and findings regarding this project pursuant to the Rivers and Harbors Act.

f. National Historic Preservation Act. The National Historic Preservation Act (16 USC 470) requires that the effects of proposed actions on sites, buildings, structures, or objects included or eligible for the National Register of Historic Places must be identified and evaluated. The project will have no effect on historic or cultural resources.

g. Fish and Wildlife Coordination Act. The Fish and Wildlife Coordination Act (16 USC 470) requires that wildlife conservation receive equal consideration and be coordinated with other features of water resource development projects. This goal is accomplished through Corps funding of U.S. Fish and Wildlife Service habitat surveys evaluating the likely impacts of proposed actions, which provide the basis for recommendations for avoiding or minimizing such impacts. A Fish and Wildlife Coordination Act Report was prepared for the original erosion control project. A report is not required for maintenance work.

11. Safety of Impoundment Structures [320.4(k)]. Not applicable.

12. Floodplain Management [320.4(l)]. The proposed maintenance work will not alter any floodplain areas.

13. Water Supply and Conservation [320.4(m)]. Not applicable.

14. Energy Conservation and Development [320.4(n)]. Not applicable.

- 15. Navigation [320.4(o)].** No adverse effects to navigation will occur as a result of the proposed maintenance work.
- 16. Environmental Benefits [320.4(p)].** The proposed nourishment project would delay the conversion of the southern Lincoln Park beach from an intertidal gravel beach to a subtidal clay bench. The maintenance of a higher, more gently graded beach profile would maintain the range of intertidal elevations necessary to support the epibenthic invertebrates which serve as prey for a wide variety of marine fishes.
- 17. Economics [320.4(q)].** During the feasibility study for original construction of the erosion control project, it was determined that the beach nourishment program was economically justified.
- 18. Mitigation [320.49(r)].** Potential impacts of the maintenance work on salmonids and bald eagles will be avoided through implementation of timing restrictions. For the protection of these species, work will occur between August 15 and October 31. The use of rounded gravels of similar size to the substrate presently on the beach will minimize habitat impacts of the proposed action.

APPENDIX D – Preparers and Contributors

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APPENDIX E

Required State and Federal Agency Responses

1. Washington State Department of Ecology: Water Quality Certification/Coastal Zone Consistency Determination, dated 16 Sept. 2002.
2. National Marine Fisheries Service: Endangered Species Act Section 7 Informal Consultation and Magnuson-Stevens Fishery Conservation and Management Act Essential Fish Habitat Consultation, dated 16 August 2002.
3. U.S. Fish and Wildlife Service: Endangered Species Act Section 7 Informal Consultation (USFWS Reference 1-3-02-I-2123), dated 25 September 2002.

APPENDIX F

Finding of No Significant Impact



REPLY TO
ATTENTION OF

DEPARTMENT OF THE ARMY
SEATTLE DISTRICT, CORPS OF ENGINEERS
P.O. BOX 3755
SEATTLE, WASHINGTON 98124-3755

CENWS-PM-PL-ER

2 October 2002

**Lincoln Park Beach Re-Nourishment
Seattle, King County, Washington**

FINDING OF NO SIGNIFICANT IMPACT

Proposed Action. The proposed project consists of placing approximately 250 cy of fine beach fill and 1500 cy of coarse beach fill material along 500 feet of the Lincoln Park shoreline. The substrate would be placed on the beach between 400 and 900 feet from the park's southern boundary. Coarse material would be placed waterward of the break in beach slope and finer material placed on the level bench at the upper part of the beach just seaward of the seawall. Material placement would require a barge with conveyor off-loading capability, a small hydraulic excavator to remove and replace drift logs, and a small bulldozer to grade the new substrate. A barge would deliver all equipment and materials to the work area and construction activity would be confined to the approximate 65- by 500-foot project footprint (32,500 square feet or 0.75 acre). By restricting site access and the size of the work area, disruptions to aquatic biota would be minimal. Construction is anticipated for October 2002, to coincide with daytime high tides and lower park use. Once started, construction is expected to take about 1 week.

Alternatives to the proposed action were rejected for reasons described in the environmental documentation accompanying this Finding of No Significant Impact. Alternatives included:

- No Action
- Substrate Placement on 1000 Linear Feet of Beach
- Placement of Sandy Material on 500 Lineal Feet of Beach

The EA and FONSI are available online at: http://www.nws.usace.army.mil/ers/doc_table.cfm

1. Summary of Impacts. An environmental assessment (EA) has been prepared pursuant to the National Environmental Policy Act (NEPA) for the proposed action. The EA describes the environmental consequences of the beach re-nourishment, which are briefly summarized below.

Some increased turbidity would likely occur for one or two high tides following placement, but the effects are expected to be minimal due to their localized and temporary nature. There may be some temporary and minor disturbance to the macroalgae and eelgrass areas in and directly



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adjacent to the construction area. However, due to the small scope of the proposed re-nourishment and prudent management of the barge, substantial adverse impacts to the existing eelgrass and macroalgal communities are not anticipated. Some displacement of birds may occur temporarily during the period of construction. Salmonids may occur in the vicinity of the project when the work would occur but these fish would likely be larger and not heavily dependent upon the nearshore environment.

Impacts to the human environment would be insignificant. There will be no effect on Native American and cultural resource sites since no such resources occur in the project area. After construction, use of land in the vicinity would be unaffected by the new beach substrate which will mirror that substrate already present. Land use in areas adjacent to the project area, including the Fauntleroy ferry terminal or nearby residential properties will be unaffected due to the localized construction impacts. Recreational use of the shoreline and park would be the same as before construction; no additional use restrictions will be made.

Conservation measures to limit the extent, timing, and duration of the proposed project have been incorporated to avoid and minimize the environmental impacts of the work. Impacts to physical characteristics of the beach, water quality, fish, wildlife, eelgrass, macroalgae, and recreation are expected to be minimal and very short duration.

2. Finding. Based on the analysis detailed in the EA and summarized above, this project is not a major Federal action significantly affecting the quality of the human environment and, therefore, does not require preparation of an environmental impact statement.

11 Oct 2002

Date

/S/

RALPH H. GRAVES
Colonel, Corps of Engineers
District Engineer