Environmental Resources Section

Public Notice

Alaska District
U.S. Army Corps of Engineers

Date: 28 March 2017 Identification No. ER-17-02
Please refer to the identification number when replying.

Environmental Assessment and Finding of No Significant Impact
Operation and Maintenance Activities
Thomas Basin Small Boat Harbor
Ketchikan, Alaska

The U.S. Army Corps of Engineers (Corps) will conduct maintenance dredging at the Thomas Basin small boat harbor in Ketchikan, Alaska. Approximately 5,100 cubic yards of sediment and debris will be removed from the harbor. Levels of chemical contamination and organic debris in the material to be dredged make the material unsuitable for in-water disposal or use as fill without extensive further testing, and no upland disposal site is available locally. Therefore, the dredged material will be shipped by barge for disposal at a landfill outside of Alaska certified for contaminated media.

Information on the proposed action and anticipated environmental effects are discussed in the attached environmental assessment (EA) and unsigned Finding of No Significant Impact (FONSI), which are also available for public review and comment at the following Corps' website: http://www.poa.usace.army.mil. Click on the "Reports and Studies" button and look under "Documents Available for Review, Operations and Maintenance." The comment period will close 15 days from the date of this notice. All comments received on or before this date will become part of the official record. The FONSI will be signed upon review of comments received and resolution of significant concerns.

Please send electronic comments on EA/FONSI to Christober.B.Floyd@usace.army.mil and written comments to the following address:

U.S. Army Corps of Engineers, Alaska District
ATTN: CEPOA-PM-C-ER (Floyd)
P.O. Box 6898
Joint Base Elmendorf-Richardson, Alaska 99506-0898

No public meeting is scheduled for this action. If you believe a meeting should be held, please send a written request to the above address during the 15-day review period explaining why you believe a meeting is necessary.

Notice is also hereby given that the Corps will be applying for State Water Quality certification from the Alaska Department of Environmental Conservation (ADEC). ADEC may certify there is a reasonable assurance this proposed action and any discharge that might result will comply with the Clean Water Act, Alaska Water Quality Standards, and other applicable State laws.

ADEC's certification may authorize a mixing zone and/or a short-term variance under 18 AAC 70. ADEC may also deny or waive certification.

Any person desiring to comment on this proposed action with respect to water quality certification may submit written comments to ADEC at the address below within 30 days from the date on this public notice.

Alaska Department of Environmental Conservation
WQM/401 Certification
555 Cordova Street
Anchorage, AK 99501-2617
Telephone: (907) 269-7564
FAX (907) 269-7508

Please contact Mr. Chris Floyd of the Environmental Resources Section via his email address at: Christopher.B.Floyd@usace.army.mil, phone (907-753-2700) or write to him at the Corps' address if you would like additional information concerning the proposed project.

Michael Noah
Chief, Environmental Resources Section

US Army Corps of Engineers
Alaska District

Environmental Assessment and Finding of No Significant Impact

Maintenance Dredging
Thomas Basin Harbor
Ketchikan, Alaska

March 2017

FINDING OF NO SIGNIFICANT IMPACT

Maintenance Dredging
Thomas Basin Harbor
Ketchikan, Alaska

The U.S. Army Corps of Engineers (Corps) will conduct maintenance dredging at the Thomas Basin small boat harbor in Ketchikan, Alaska. Approximately 5,100 cubic yards of sediment and debris will be removed from the harbor. Levels of chemical contamination and organic debris in the material to be dredged make the material unsuitable for in-water disposal or use as fill without extensive further testing, and no upland disposal site is available locally. Therefore, the dredged material will be shipped by barge for disposal at a landfill outside of Alaska certified for contaminated media.

This Federal action complies with the National Historic Preservation Act, the Endangered Species Act, the Clean Water Act, the Magnuson-Stevens Fishery Conservation and Management Act, and the National Environmental Policy Act. The completed environmental assessment supports the conclusion that the action does not constitute a major Federal action significantly affecting the quality of the human and natural environment. An environmental impact statement (EIS) is therefore not necessary for this maintenance dredging project.

_____ _____

Michael S. Brooks Date
Colonel, U.S. Army
Commanding

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1.0 Purpose and Need for the Proposed Action

1.1. Introduction

The Alaska District U.S. Army Corps of Engineers (Corps) prepared this environmental assessment (EA) to describe proposed maintenance dredging at the Thomas Basin Harbor at Ketchikan, Alaska, the disposal of the dredged material in a landfill, and to discuss potential environmental effects of these activities. Thomas Basin Harbor was built in 1933, making use of a cove where Ketchikan Creek discharges into Tongass Narrows, a strait between Revillagigedo and Gravina Islands (figure 1). A 940-foot-long stone breakwater partially encloses an 11.35-acre basin to form the small boat harbor (figure 2; USACE 2014).

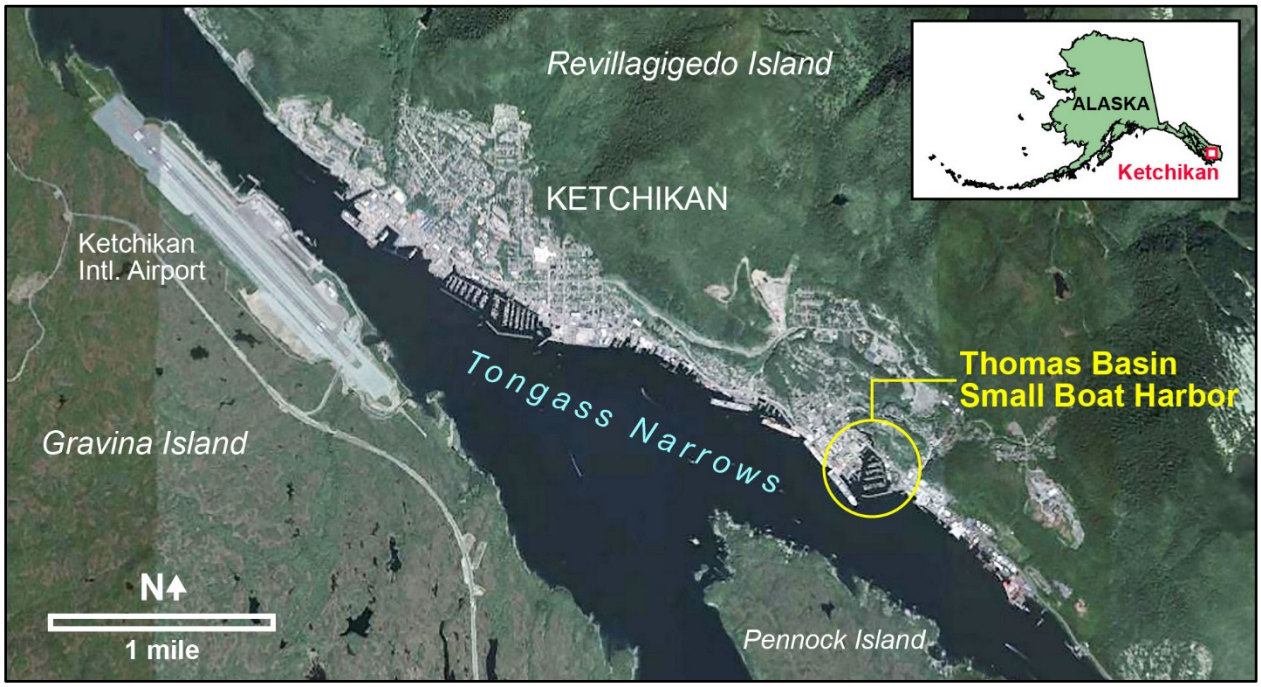

Figure 1. Location and vicinity of Thomas Basin harbor.

1.2 Project Authority

The Rivers and Harbors Act, 3 July 1930 (House Doc. 113, 70th Congress, 1st Session) as adopted, provides for construction of a stone breakwater with concrete cap, 940 feet in length, to protect the harbor in the vicinity of Ketchikan Creek, and dredging the protected area (11.35 acres) to a depth of 10 feet below mean lower low water (MLLW; figure 2).

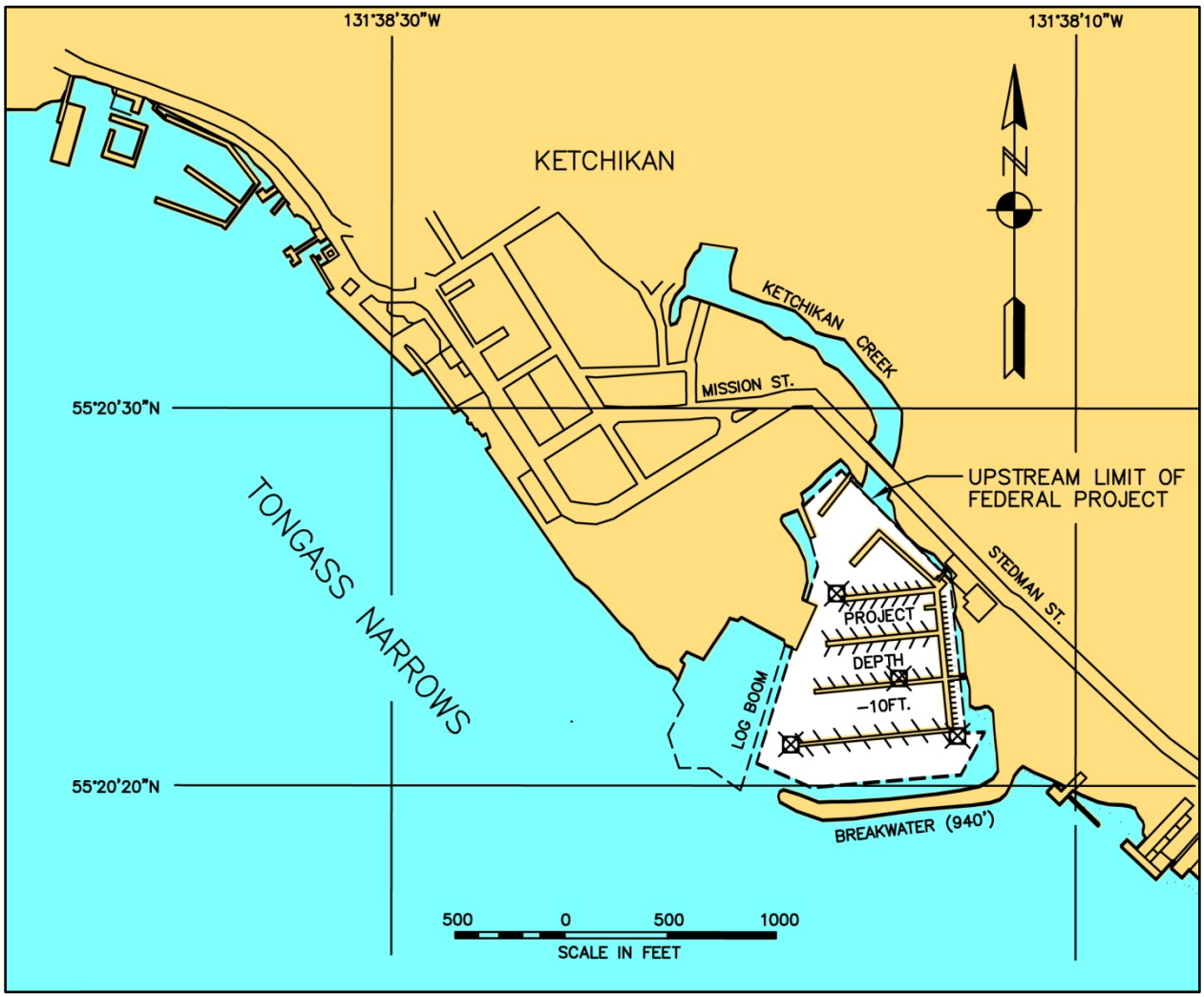

Figure 2. Layout of Thomas Basin Harbor, with the Federal dredging project shown in white (adapted from USACE 2014).

1.3 Purpose and Need

Thomas Basin Harbor requires maintenance dredging at relatively long (10 to15-year) intervals, receiving little sediment from Ketchikan Creek or Tongass Narrows in a typical year. Since its construction in 1933, the Corps has dredged the Federal area of the harbor only five times: in 1950, 1960, 1964, 1974, and 1996 (USACE 2014). However, high flow periods in Ketchikan Creek caused by unusually heavy precipitation can result in large quantities of riverine sediment

being deposited in the harbor in a short period of time. A routine condition survey of Thomas Basin in 2012 found a lens of new material extending from the creek mouth into the harbor, which raised the harbor bottom above its project depth of -10 feet MLLW in some areas (figure 3). Approximately 5,100 cubic yards of material needs to be dredged from the federally maintained basin to return high-use areas to the Federal project depth, plus an allowed 2-foot "overdredge." Dredging may be deferred in some small areas of the Federal basin that are above design depth, but are typically only used by small watercraft such as skiffs. While the area of the harbor above project design depth is relatively small at this time, if allowed to shoal further, it may become much more difficult and costly to access with dredging equipment in the future.

2.0 Alternatives and Proposed Action

2.1 No-Action Alternative

The no-action alternative would result in no maintenance dredging of Thomas Basin Harbor, and no need to dispose of dredged material. This alternative would avoid the potential environmental impacts and temporary restricted access to the harbor described in later sections. However, it would leave the Corps' obligation to maintain authorized project depths unfulfilled, and lead to diminished usefulness of the harbor.

2.2 Action Alternatives

Any dredging action requires a dredging method, a place to put the dredged material, and the means of transporting the dredged material to the disposal/placement site.

2.2.1 Dredging and Sediment Transport Alternatives.

The basic choices of dredge type are mechanical (e.g., clamshell) versus hydraulic (suction), and transport via a barge or hopper versus a pipeline.

2.2.1.1 Mechanical Dredge. A clamshell dredge deployed by a barge-mounted crane is often used for dredging, especially in areas around harbor floats and other infrastructure where maneuvering space is limited. Where the area to be dredged is in relatively shallow waters, a large, long-armed excavator can also be used. The dredged sediment is typically deposited onto a barge or scow and loses much of its entrained water as it is transferred to or held on the scow. The dredged material is partially dewatered before being placed at the disposal or stockpiling location. In comparison to other dredging methods, mechanical dredging can result in less lofting of sediment into the water column.

2.2.1.2 Hopper Dredge. A hopper dredge operates by use of suction "drag heads" that extend from the hull of the dredge down into the substrate to be dredged. Through suction, materials are brought up into the open hull of the dredge until the hopper is full and the material

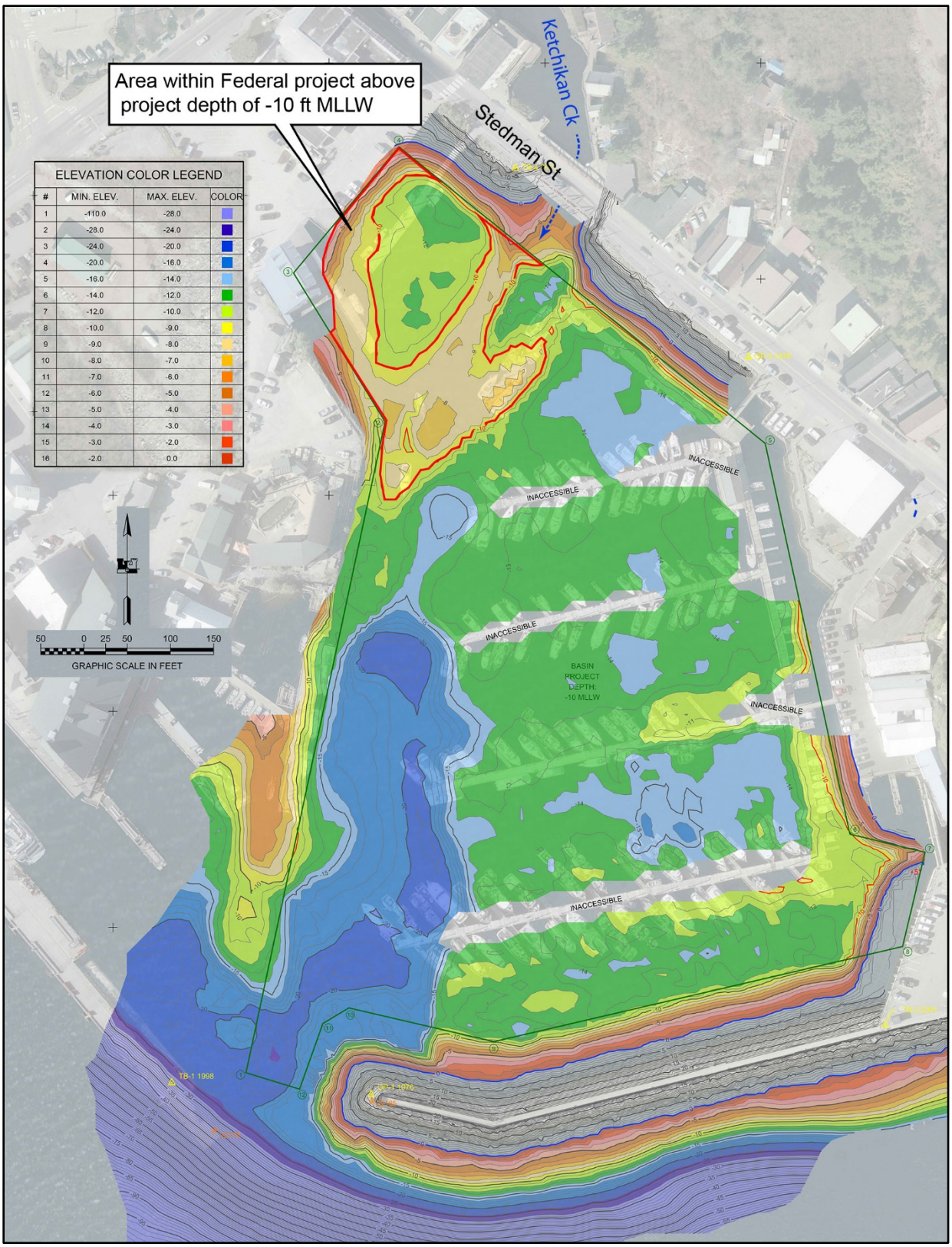

Figure 3. Depth contours (relative to MLLW) generated from a Corps hydrographic survey conducted August 2015. The heavy red line indicates the area of the Federal project above the design depth of -10 feet MLLW.

can then be moved to a dredged material placement site. The suction of material brings in significant volumes of water along with the sediment; the excess water is allowed to overflow the hopper and flow back into the waterbody. The overflow water can increase turbidity and cause water quality issues.

2.2.1.3 Pipeline Dredge. A pipeline dredge, like the hopper dredge, uses suction and a cutter head to bring up sediment from the bottom of the harbor. However, a pipeline dredge does not have a hopper to contain the material. Instead, the material is moved directly to the placement site. As with a hopper dredge, water is removed with the sediment. The excess water helps to keep the sediment "fluid" so that it can be pumped to the dredged material disposal facility. The pipeline dredge must have a placement or dewatering location within pumping range of the dredge.

2.2.2. Dredged Material Placement Alternatives.

The typical alternatives for the placement of dredged material include onshore placement or disposal; off-shore or near-shore placement as fill for construction or environmental-enhancement purposes; and offshore disposal.

2.2.2.1 Onshore Placement or Disposal. The Corps originally thought that the dredged material from Thomas Basin might be placed locally onshore for disposal or beneficial reuse, such as cover at the city landfill or cemetery, but the City of Ketchikan has stated it has neither use nor storage capacity for the material, and other practicable options for upland placement have not materialized. The harbor material contains chemical contaminants at concentrations that exceed State of Alaska soil cleanup levels, and cannot be placed permanently or disposed of on land without special containment provisions and authorizations from the State. The harbor material also contains a significant fraction of plant and other organic debris flushed into the harbor from Ketchikan Creek, which greatly reduces its usefulness for fill or cover purposes. Even if the City of Ketchikan had the capacity to use the dredged material, placement of the material at the Class III Deer Mountain landfill in Ketchikan would likely not be allowed by Alaska Department of Solid Waste policies governing the placement of "polluted soil" at small landfills (Woods 2016).

Most Alaska landfills serve small, relatively isolated communities, and have a very limited capacity to accept contaminated media or waste from outside their community service areas. Per the State of Alaska solid waste regulations (18 AAC 60), "polluted soil" may be disposed of only in a Class I landfill unless certain requirements are met. Among other restrictions, polluted soil may generally be placed in a Class III landfill only if fuel is the only contaminant, the contaminated soil originates from the cleanup of a single spill within the community served by that landfill, and the volume of soil to be disposed of is less than 500 cubic yards (18 AAC 60.025). The Thomas Basin sediment does not meet any of these criteria. The nearest Class I municipal landfill is at Juneau, about 221 nautical miles to the north. The Juneau Capitol

Disposal Landfill is unlined and could not accept polluted soil without prior approval from the State of Alaska, approval that would be contingent upon further demonstrations and evaluations that the material would not pose a threat to public health or the environment if placed in that landfill (Woods 2016). The Anchorage Regional Landfill is a lined Class I landfill, but does not accept polluted soil from outside its service area (SAS 2008) and is over 800 nautical miles from the project site.

Landfills exist that are designed to manage large volumes of industrial wastes and contaminated media, although none are located in Alaska. The Corps occasionally uses such landfills for disposal of non-hazardous wastes and contaminated soil from its environmental cleanup projects at former military sites in Alaska. An example of such a facility is the Columbia Ridge Landfill in central Oregon. This 700-acre landfill processes 2 million tons of waste from Oregon, Washington, Idaho, and Alaska annually, and has a projected remaining operational life of about 140 years (Waste Management Northwest 2016). This landfill is accessible by rail from the Port of Seattle, which is about 650 nautical miles from Ketchikan.

Another potential upland disposal alternative is the creation of a new industrial monofill to hold the dredged material. Such an industrial landfill would be regulated under 18 AAC 60.485 and would require a liner and leachate collection system (Woods 2016). The Corps would have to obtain land for the monofill and would be responsible for its monitoring and maintenance.

2.2.2.2. Off-Shore or Near-Shore Placement. The Corps and the U.S. Environmental Protection Agency (EPA) have policies encouraging the beneficial use of dredged material for construction of environmental enhancement, and such beneficial placement would potentially allow the Thomas Basin material to be placed within Tongass Narrows relatively near the harbor. The Corps has looked into possible beneficial uses of the dredged material, such as cover for sunken logs and woody debris in timber-rafting areas, but has not identified any potential projects within an economically viable distance from the dredging site.

2.2.2.3 Off-Shore Disposal. Tongass Narrows, immediately outside Thomas Basin, is part of the "territorial sea;" disposal of material below mean low water within the territorial sea is subject to regulation under the Marine Protection, Research, and Sanctuaries Act (MPRSA). Under Section 103 of the MPRSA, the U.S. Army Corps of Engineers has the authority to issue or deny permits for the disposal of dredged material in the territorial sea. While the Corps does not issue itself permits, a Corps action to discharge dredged material into the territorial sea must follow the substantive requirements and criteria of the MPRSA, and is subject to EPA review and concurrence. There are no active MPRSA ocean disposal sites near Ketchikan, and the process to designate and permit one is complex and can take several years. An ocean disposal permit issued under Section 103 is valid for only 3 years, with the possibility of renewal for another 3 years. Thomas Basin requires maintenance dredging at relatively long intervals (12

years on average); the nearby Bar Point harbor has not required maintenance dredging since it was constructed in 1953. The Corps assesses that the time and expense of designating an ocean disposal site under Section 103, for what would be a one-time (given the short term of a Section 103 authorization) disposal of a small quantity of dredged material, would be prohibitive and inappropriate for this relatively small maintenance dredging action.

Disposal of dredged material in "inland waters," bodies of water on the landward side of the territorial sea baseline, is regulated under Section 404 of the Clean Water Act (CWA), rather than the MPRSA. Where the territorial sea baseline is drawn across the mouth of a bay or inlet, that "closing line" defines the boundary between CWA and MPRSA jurisdictions. The enforcement agency for Section 404 is the U.S. Army Corps of Engineers. The Corps does not issue permits to itself, but must meet the substantive requirements of the CWA, which include evaluating the effects of the proposed discharge under Section 404(b)(1) and obtaining a water quality Certificate of Reasonable Assurance from the State of Alaska under Section 401 of the CWA. The Corps must demonstrate under the CWA that the discharge will not have significant adverse effects on the aquatic environment, but the authorization requirements under Section 404 of the CWA are less complex than those of the MPRSA and allow for a shorter project timeline.

Several inland waters are present within or just beyond Tongass Narrows (Table 1 and Figure 4):

Table 1. Inland waters near Thomas Basin

Bay	Approx. Distance by Boat from Thomas Basin (Statute Miles)
Annette Bay	5.4
Black Sand Cove	5.5
Ward Cove	6.5
Carroll Inlet	7.8
Blank Inlet	8.0
Vallenar Bay	14.8

Annette Bay is within the Annette Island Reserve of the Metlakatla Indian Community and was not considered a candidate for a disposal site. Black Sand Cove is very small (roughly 10 acres) and shallow (30 feet deep or less). Carroll Inlet and Blank Inlet are potentially large and deep enough to consider for disposal sites, but are also relatively pristine waters about which little environmental information is available. Vallenar Bay is a greater distance from Thomas Basin than would be ideal for the project.

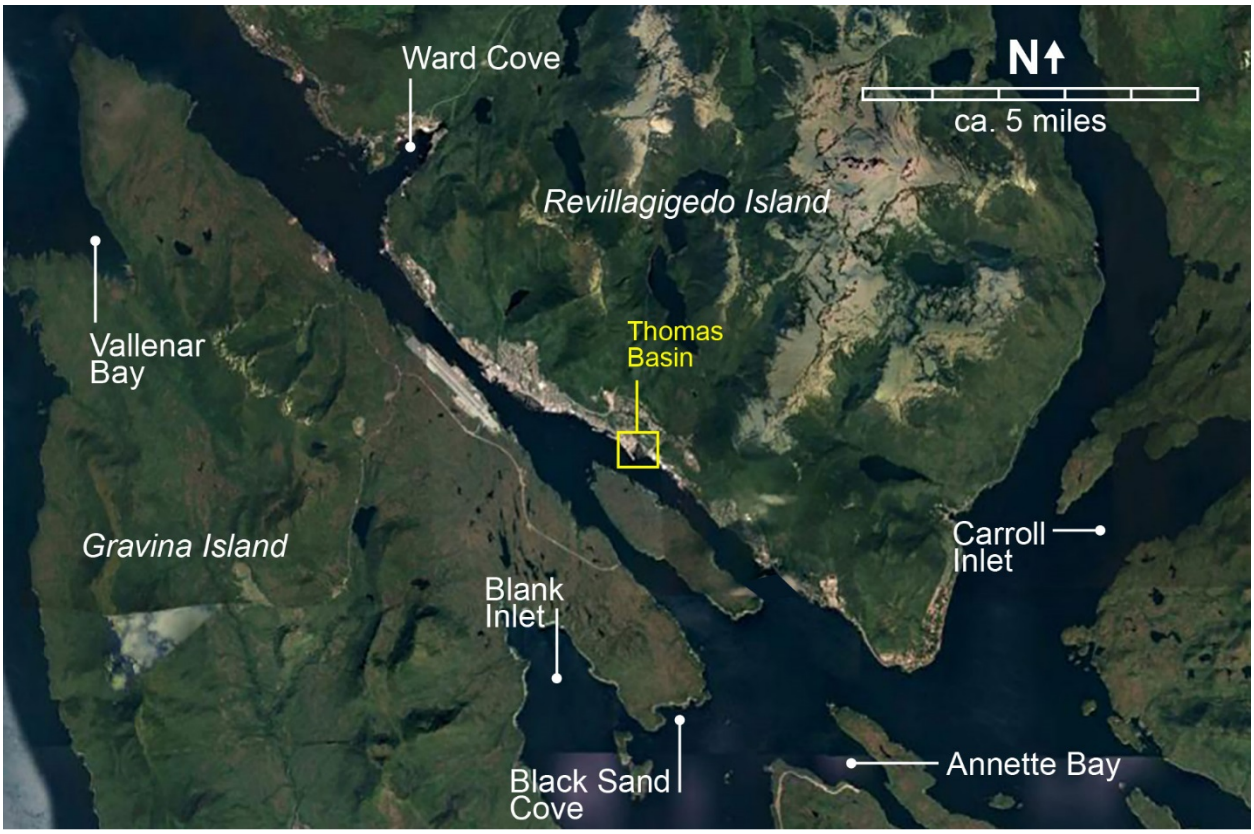

Figure 4. Locations of inland water bodies in the vicinity of Thomas Basin.

Ward Cove was the potential in-water disposal site looked at most closely by the Corps. Its advantages are:

- It is relatively close to Thomas Basin;
- It is an area previously impacted by human activities and is surrounded by development;
- A large amount of information is available about environmental and physical conditions there, due to EPA studies and remedial actions at the former Ketchikan Pulp Company site;
- Barges traveling from Thomas Basin to Ward Cove would remain within the sheltered waters of Tongass Narrows.

However, as discussed in more detail in section 2.4, the material to be dredged contains chemical contaminants at concentrations that exceed Corps sediment quality screening levels (DMMP 2016), and could not be discharged at an open-water disposal site without further evaluation. The next step in evaluating the dredged material would be to conduct "Tier 3" biological toxicity analyses, including bioassays and bioaccumulation tests. This tier of analysis would require the collection of additional sediment samples, the identification of appropriate test species, control, and reference sites, and other tasks that would necessarily delay maintenance dredging. The Corps project team also recognized that even if the Thomas Basin sediment passed the basic *ex situ* biological tests, still more analysis might be needed to evaluate the ecological impact of

discharging contaminated sediment within the already-impacted Ward Cove environment. The U.S. Environmental Protection Agency (EPA) conducted remedial actions and monitoring at Ward Cove from 2000 to 2007 under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) to address contamination generated by the Ketchikan Pulp Company. The Marine Operable Unit of the EPA project encompasses all of Ward Cove, while remedial efforts focused on an 80-acre area of concern, where 27 acres were capped with a layer of sand. The chemicals of concern identified by the EPA were ammonia, sulfide, and 4-methylphenol. The EPA determined in 2009 that its remedial actions at Ward Cove had been achieved (Integral Consulting, Inc. 2009).

Another source of uncertainty for in-water disposal is the large proportion of organic debris in the material to be dredged. The Corps project team planned to model the proposed sediment discharge plume using STFATE in order to predict how the discharge plume would behave within Ward Cove and maximize the accuracy of the material's placement within the disposal area. However, the STFATE model was created to predict the behavior of typical silt, sand, and gravel particles, and not irregularly sized and shaped organic debris. The Corps project team had low confidence that the behavior of the organic material within the dredged material discharge could be defensibly modeled. Since the Corps project team believes that the chemical contamination detected is largely entrained in the organic fraction of the harbor sediment, being able to model its distribution after discharge with reasonable confidence was an important consideration.

2.3 Preferred Alternatives

To a large extent the means of dredging will be selected and proposed by the contractor. However, because of the close confines of the small harbor, and the lack of a nearby ocean disposal site or space for an upland dewatering site into which hydraulically dredged sediment could be discharged, the Corps expects mechanical dredging with a barge-mounted excavator or clamshell dredge to be the only practicable dredging method.

In the absence of an identifiable onshore placement or in-water beneficial use option, and because of the delays and uncertainties inherent in the additional evaluations required to pursue in-water disposal, the preferred alternative for disposing of the contaminated sediment and debris is disposal at a landfill facility, presumably outside Alaska, that can safely and easily accommodate the material.

2.4 Sediment Quality Considerations

The most recent and most comprehensive sampling and analysis of sediments in Thomas Basin was performed in 2016, in support of the off-shore disposal alternative then being evaluated. On 27-28 September 2016, a Corps sampling team collected harbor sediment samples from three locations within the harbor (figure 5). The sediment samples were collected using a hydraulically

activated vibratory coring device with a 10-foot barrel, which allowed collection of core samples spanning the proposed dredge prism depth, plus the "Z-layer" underlying the dredge prism (a Z-layer sample was not collected at the TB-3 sampling locations). Following the dredged material management guidance (DMMO 2016) currently used by Alaska District, the depth intervals from the two core samples representing the main body of dredged material (TB-1 and TB-2) were composited into a single sample for chemical analysis; the Z-layer intervals from the TB-1 and TB-2 core samples were likewise composited into a single sample. The TB-3 core sample was analyzed as an independent sample. The sampling team also collected surface sediment samples from three sampling points at Ward Cove within the proposed disposal area, and composited those into a single sample and field duplicate.

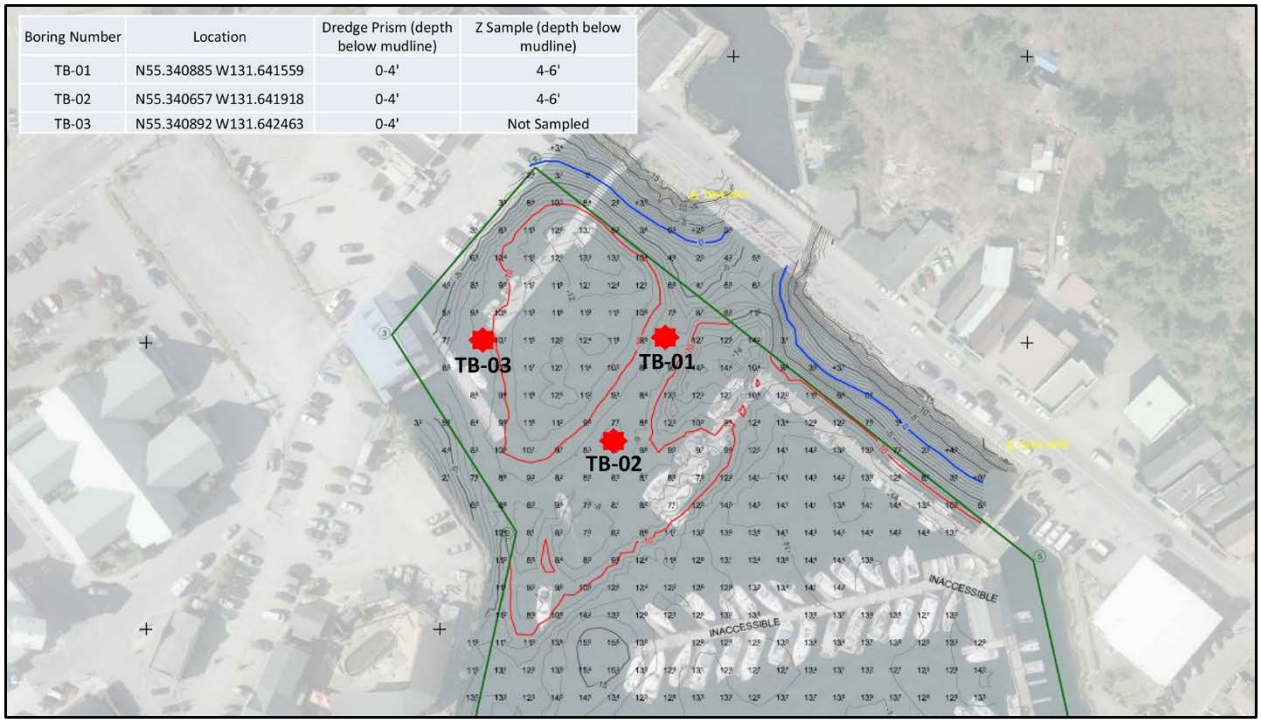

Figure 5. Locations of harbor sediment core samples collected September 2016 (adapted from USACE 2016).

The sample collection and analyses are discussed in detail in the December 2016 chemical data report (USACE 2016). Both the harbor sample and the Ward Cove samples were analyzed for: the following:

- Metals, total: antimony, arsenic, cadmium, chromium, copper, lead, nickel, selenium, silver, and zinc
- Tributyl tin
- Polychlorinated biphenyls (PCBs)
- Chlorinated pesticides
- Semivolatile organic compounds
- Polychlorinated dibenzo-dioxins and polychlorinated dibenzo-furans (dioxins and furans)

- Total organic carbon
- Ammonium
- Sulfide
- Total volatile solids
- Bulk density

The chemical analyses showed that the harbor sediment composite sample contained several chemical contaminants at concentrations that exceed the dredged material screening levels currently used by the Alaska District (DMMO 2016). Table 2 lists the chemical contaminants detected at concentrations above the dredged material screening levels currently used by the Corps' Alaska District to determine suitability for in-water disposal (DMMO 2016); all are organic chemical compounds with low solubility in water. The first six compounds in Table 2 are polyaromatic hydrocarbons associated with fuels and other petroleum products, and are common contaminants in small boat harbors. Dimethyl phthalate is a chemical most often used in plastics manufacture. It often appears in chemical analyses as a laboratory contaminant, but was not detected in the laboratory quality control blank for these samples, and so is presumed to be present in the sediment (USACE 2016). Heptachlor is a pesticide banned for most uses since 1988, but is highly persistent in the environment. Dioxins and furans can be the result of industrial processes such as paper pulp bleaching or from the open burning of household trash; very low levels are ubiquitous in the environment. The concentrations of contaminants detected are not markedly elevated above the associated screening levels that would allow unrestricted in-water disposal (Table 2).

Table 2. Concentrations of contaminants detected above screening levels in the Thomas Basin dredging prism in 2016

Chemical compound(s)	Screening Level[a]	Maximum concentration detected[b]
Benzo(b)- and benzo(k)fluoranthenes (mg/kg)	3.2	4.0
Chrysene (mg/kg)	1.4	2
Dibenzo(a,h)anthracene (mg/kg)	0.23	0.38
Fluoranthene (mg/kg)	1.7	2.1
Indeno(1,2,3)pyrene (mg/kg)	0.6	0.96
Pyrene (mg/kg)	2.6	5.1
Dimethyl phthalate (mg/kg)	0.071	0.18
Heptachlor (mg/kg)	0.0015	0.0076
Dioxins and Furans (TEQ[c]; pg/g)	4	12.4

a: DMMO 2016.
b: USACE 2016
c: Toxicity Equivalent

The bulk of the material to be dredged is in a shoal near the mouth of Ketchikan Creek (figure 2), which is believed to be primarily silt, sand, and organic debris from the Ketchikan Creek watershed flushed into the harbor during heavy rainstorms in the 2007-2012 timeframe. The sediment core samples from the shoal contained high proportions of leaves, wood fragments, and other terrestrial material. The low water solubility and modest concentrations of the organic contaminants detected, the very high organic content (e.g., a Total Organic Carbon value of 110,000 mg/kg, or 11 percent) of the material to be dredged, and the fact that the material would have been violently agitated while it was transported to and deposited in the harbor, lead the Corps to conclude that the contamination remaining in the material to be dredged is tightly bound to the organic matter in the sediment, and is not likely to release detectable dissolved-phase contaminants into the water column during dredging.

The Z-layer composite, representing harbor sediments in the dredging area that will remain after dredging is completed, contained concentrations of contaminants lower than that detected in the overlaying sediments, and below the dredged material screening levels. The TB-3 sample also contained contaminant concentrations much lower than the TB-1/TB-2 dredging interval composite and below screening levels; this supports the idea that the contaminants detected were carried into the harbor via Ketchikan Creek, rather than originating within the harbor. The composite of surface sediment from Ward Cove, interestingly, contained a higher concentration of dioxins and furans than the TB-1/TB-2 harbor composite (21 vs. 12 pg/g of a calculated aggregate "toxicity equivalent" or TEQ value; the DMMO screening level is 4 pg/g), but lower concentrations of PAHs and heptachlor.

Previous sediment sampling in Thomas Basin has also found low to moderate levels of chemical contamination. Samples collected in 2015 in support of upland placement found that the harbor sediment contained concentrations of diesel fuel and fuel-related PAHs slightly above the most stringent State of Alaska soil cleanup standards. The 2015 analyses also detected arsenic and chromium that exceed State of Alaska soil cleanup standards, but which are not statistically different from the background concentrations of those metals found in the sediment samples from Ketchikan Creek or from soil sampled at two prospective upland placement areas (USACE 2015). Sampling efforts in 1993 and 1994 detected mercury (up to 1.2 mg/kg), PCBs (up to 0.4 mg/kg), and solvents such as dichlorobenzenes (up to 0.011 mg/kg). A bioassay suggested that the sediment sampled was suitable for open water disposal. The 8,678 cubic yards of sediment dredged in 1996 was ultimately used beneficially within Thomas Basin itself in the construction of a boat service tidal grid (USACE 2014).

2.5 Construction Considerations and Minimization of Environmental Impacts

Most project activities will occur within the confines of the harbor. To a large degree the specific methods of dredging and dredged material management will be left to the prospective contractors to propose to the Corps, but the Corps expects that the dredging will be done with either a small

clamshell dredge or an excavator seated on a barge or other floating work platform, placing the dredged material directly into another barge or scow. The highly restricted maneuvering space within the harbor will limit the size of barge that can enter the harbor basin. The contractor may need to use multiple barges, staging one or more barges near or outside of the harbor entrance. The contractor will be required to propose methods of minimizing the spread of sediment during dredging (e.g., turbidity curtains or "environmental" dredge buckets), minimizing the discharge of sediment from the barge receiving the dredged material (e.g., lining the barge with a sand bed and/or geotextile), and reducing the risk of a discharge of dredged material into the marine environment during transport. The dredging process itself is expected to last 1 to 3 weeks.

Steps to avoid or minimize environmental impacts will include the following:

- The contractors will be required to propose and implement effective methods of reducing the spread of contaminated sediment during dredging, sediment processing, and transport, to the minimum practicable levels, subject to approval by the Corps. Environmental dredge buckets and/or turbidity curtains, or other approved equipment suited to the expected conditions, will be employed. The sediment contained in seawater returned to the harbor during or after dewatering will be reduced to the minimum practicable concentration through a combination of filtration and/or holding and settling. Other methods, such as timing the dredging for periods when harbor current velocities are low, may be evaluated. The contractor will be required to subcontract with a qualified environmental professional (as defined by the State of Alaska in 18 AAC 75.3333) to aid in the preparation of an Environmental Protection Plan (EPP) and in the selection of effective sediment control measures. Additional best management practices (BMPs) to reduce the suspension of sediment during dredging will include:

    - No multiple "bites" with the dredge/excavator bucket during a single dredging cycle;
    - Avoiding leveling of sediment on the seafloor with the dredge/excavator bucket;
    - No stockpiling or intermediate placement of dredged sediment on the seafloor;
    - Slowing the velocity of the ascending loaded bucket through the water column;
    - Pausing the bucket near the bottom while descending, and again near the water line while ascending.

- To the extent practicable, dredging and any other activity with a direct risk of re-suspending harbor sediment or reintroducing dredged material back into the waters of Thomas Basin will be performed between 1 November and 1 March in order to minimize impacts to both out-migrating and in-migrating anadromous fishes or spawning herring, and aquatic animals that may enter the harbor to feed on the fish.

- The dredging crew will pause operation of the dredge if a marine mammal is spotted within 50 meters of the dredge bucket, and not resume dredging until the mammal has been observed again outside of this range, or until 15 minutes have elapsed since the mammal was last sighted. This monitoring will be performed by the standard crew of the dredge during the course of their duties. If a marine mammal is seen within a turbidity curtain or other confining device deployed for the project, dredging operations will cease and the contractor will take necessary steps to release the mammal unharmed.

- To minimize the danger to marine mammals from project-related vessels, speed limits (e.g. less than 8 knots) will be imposed on vessels moving in and around the project area.

- An oil spill/pollution prevention plan will be prepared by the contractor.

- The Corps will conduct post-dredging bathymetry surveys to ensure that only the material identified to be dredged was removed to the authorized depth and that the design depth was achieved by the dredging action.

3.0 Affected Environment

3.1 Community and People

Ketchikan is in Southeast Alaska, on Revillagigedo Island and the Tongass Narrows strait (figure 1). One of the southern-most communities in Alaska, it is closer to Seattle, Washington (680 air miles) than to Anchorage, Alaska (772 air miles). The area road system extends only to portions of Revillagigedo and Gravina Islands, and the community is accessible from outside only by air or water. The City of Ketchikan had a population of about 8,000 in 2014, with about 14,000 in the larger Ketchikan Gateway Borough that includes communities such as Saxman and Ward Cove. The population is a mix of Caucasian, Alaska Native, and Asian cultural groups (ADCRA 2016).

The mouth of Ketchikan Creek, where Thomas Basin Harbor is now, was used as a seasonal fish camp by local Tlingit tribes. The abundant fish and timber attracted non-Native setters to the area. The first cannery was opened near the mouth of Ketchikan Creek in 1886, and the city was incorporated in 1900. Fishing and wood production sustained Ketchikan through most of the 20th century, with tourism becoming increasingly important beginning as early as the 1960s (ADCRA 2016).

3.2 Project Setting and Current Land Use

The primary project site is the Thomas Basin small boat harbor, which has reserved moorage for 202 boats and 417 linear feet of open moorage for boats up to 65 feet in length. The harbor has a tidal grid that will hold boats up to 100 tons, but no launch ramp (City of Ketchikan 2017). The

entire harbor area defined by the breakwater is about 15 acres, of which 11.35 acres is the Federal project. The land surrounding the harbor is heavily developed and occupied by cruise ship docks, tourist attractions and other business, parking lots, and roadways (figure 6).

3.3 Climate

Ketchikan has a typical temperate maritime climate of cool summers, mild winters, and heavy precipitation throughout the year, with an average of 174 inches annually (ADCRA 2016).

3.4 Topography, Soils, and Hydrology

Ketchikan is mostly built along a narrow strip of relatively flat land along the shoreline, with a few areas of development extending into valleys and benches of higher land. The 3,000-foot Deer Mountain rises immediately east of the city, and much of Revillagigedo Island is similarly rugged. Native soils in the area are thin, and consist primarily of outwash materials from the mountainous island interior; much of the land surrounding the harbor is probably fill, and largely paved (figure 6). Ketchikan Creek discharges directly into the northern end of the harbor (figure 3).

Figure 6. An aerial view of Thomas Basin harbor from the southeast, showing the dense urban development surrounding the harbor (undated).

3.5 Tides, Currents, and Sediment Transport

Tongass Narrows at Ketchikan sees tides with a mean range of 12.97 feet and a diurnal range (the difference between mean higher high water and mean lower low water) of 15.45 feet (NOAA 2017a). Tidal currents in Tongass Narrows do not exceed 2 knots, despite the confined channel (NOAA 2017b). Little is known about sediment transport within Tongass Narrows, but Thomas Basin appears to receive little marine sediment. Ketchikan Creek appears to contribute significant sediment to the harbor only in the wake of unusually heavy precipitation. The inflow from Ketchikan Creek creates currents within the harbor that vary with the tide stage and stream discharge rates.

3.6 Water Quality

The ambient water quality within Thomas Basin harbor has not been directly assessed. The continuous flow of fresh water into the harbor from Ketchikan Creek presumably reduces salinity within the harbor and may create a halocline in some areas. The inflow from the creek probably also creates more circulation and water exchange in the small, enclosed harbor than if the creek were not present, and the long intervals between the need for maintenance dredging suggests that on average the suspended sediment within the harbor water column is relatively low. Thomas Basin will be subject to the low-level contamination from fuels, lubricants, paints, and other sources that are common to all small boat harbors.

3.7 Air Quality and Noise

Ketchikan presumably enjoys good air quality because of the community's isolation, the small number of pollutant emission sources, and persistent winds from the nearby ocean. The primary sources of air pollutants are ocean vessels such as cruise ships and ferries, along with individual fuel oil or wood stoves, and vehicles such as trucks, cars, boats, and snowmachines. There is no established ambient air quality monitoring program at Ketchikan, however, and little existing data to compare with the National Ambient Air Quality Standards (NAAQS) established under the Clean Air Act (CAA). These air quality standards include concentration limits on the "criteria pollutants" carbon monoxide, ozone, sulfur dioxide, nitrogen oxides, lead, and particulate matter. The community is not in a CAA "non-attainment" area, and the "conformity determination" requirements of the CAA would not apply to the proposed project at this time.

No specific noise data exist for Ketchikan, but noise levels are probably comparable with other coastal Alaskan cities. At the harbor, noise levels probably fluctuate with the seasons, with the nearby cruise ships, boat traffic, vehicles, aircraft, construction equipment, and generators as the most significant sources of human generated noise.

3.8 Biological Resources

3.8.1 Habitat and Wildlife

Aquatic vegetation within Thomas Basin is understood to be minimal; the periodic dredging of the Federal project, combined with occasional high-flow discharges from Ketchikan Creek,

presumably make the area to be affected by the dredging a poor setting for eelgrass or other rooted aquatic plants. In-migrating adult salmon and out-migrating juvenile salmon swim through the harbor between Tongass Narrows and Ketchikan Creek; salmon are discussed further in Section 3.8.3. Herring spawn in Tongass Narrows in the spring (NMFS 2006), but it is not clear whether they enter the harbor.

Harbor seals, river otters, and sea lions may appear in the harbor when adult salmon are running, but move on to other food sources when salmon are no longer present (Berg 2015). Birds using the harbor area may include herring and glaucous winged gulls, belted kingfishers, and cormorants.

3.8.2 Protected Species

Endangered Species Act. The Corps reviewed online information provided by the National Marine Fisheries Service (NMFS 2017a) and the U.S. Fish and Wildlife Service (USFWS 2017a), and engaged in informal consultation with the NMFS (Jensen 2017). No species listed under the Endangered Species Act (ESA) within the jurisdiction of the USFWS are present in the project area. The only ESA-listed species under the jurisdiction of the NMFS that is likely to be in the Tongass Narrows area is the humpback whale (*Megaptera novaeangliae*), Mexico Distinct Population Segment (DPS), listed as threatened. Recent guidance from the NMFS on humpback whales (NMFS 2016) discusses the three DPS of humpback whales that occur in Alaskan waters: the Western North Pacific DPS (an endangered species under the ESA), the Mexico DPS (a threatened species), and the Hawaii DPS (not listed under the ESA). Whales from these three DPSs overlap to some extent on feeding grounds off Alaska. An individual humpback whale encountered in Southeast Alaskan waters has a 93.9 percent probability from being from the unlisted Hawaii DPS, a 6.1 percent chance of being from the threatened Mexico DPS, and a 0 percent chance of being from the endangered Western North Pacific DPS. The probability of an individual whale being from the Mexico DPS increases to 41.9 percent in waters off southern British Columbia and Washington, and to 89.6 percent off the coast of Oregon and California (NMFS 2016). No critical habitat is currently designated for any humpback whale DPS that occurs in U.S. waters.

The Eastern DPS of the Steller sea lion, formerly listed as "threatened" under the ESA, was de-listed in November 2013 (NMFS 2013); this would include Steller sea lions in the project area, as Ketchikan (at roughly 132°W longitude) is well east of the 144°W longitude demarcation between the Eastern and Western DPSs. Individuals from the Western DPS, still listed as "endangered", commonly range east of 144°W; however, the NMFS has stated that Steller sea lions from the Western DPS are "extremely unlikely" to be found south of Sumner Strait (NMFS 2013), which is about 90 miles north of Ketchikan.

Marine Mammal Protection Act. Marine mammals in the area not listed under the ESA but protected by the Marine Mammal Protection Act (MMPA) include Steller sea lion, harbor seal,

sea otters, harbor porpoise, Pacific white-sided dolphin, killer whale, and gray whale (NMFS 2017a, Jensen 2017).

Bald and Golden Eagle Protection Act. The bald eagles commonly seen along the Southeast Alaska coast are protected under the Bald and Golden Eagle Protection Act, as well as the Migratory Bird Treaty Act (see below). In addition to prohibiting direct takes such as killing eagles or destroying nests, this act also regulates human activity or construction that may interfere with eagle's normal breeding, feeding, or sheltering habits (USFWS 2011).

Migratory Bird Treaty Act. With the exception of State-managed ptarmigan and grouse species, all native birds in Alaska (including active nests, eggs, and nestlings) are protected under the Federal Migratory Bird Treaty Act (MBTA; USFWS 2009).

3.8.3 Anadromous Streams and Essential Fish Habitat

Ketchikan Creek, which empties into Thomas Basin, is listed as an anadromous stream in the Alaska Department of Fish & Game's (ADFG) anadromous waters catalog (AWC), and designated with the AWC catalog number 101-47-10250 (ADFG 2017). Ketchikan Creek receives runs of pink, chum, coho, and king salmon as well as steelhead trout. Pink, chum, and coho salmon and steelhead trout spawn in Ketchikan Creek and its tributary Schoenbar Creek (cataloged in the AWC as 101-47-10250-2007). King salmon do not spawn in the creek but return to the Deer Mountain tribal hatchery located on upper Ketchikan Creek (Minilllo 2015).

These anadromous fish do not spawn or rear in Thomas Basin, but move through the harbor while in-migrating from the ocean to Ketchikan Creek as adults, or out-migrating from the creek as juveniles. The timing of these migrations through the harbor is shown in Table 3; anadromous fish are present in the harbor from March through October (USFS 2015).

Table 3. Timing of Salmonid In- and Out-Migration through Thomas Basin

Species	Adult In-Migration	Juvenile Out-Migration
King salmon	15 May – 30 July	June - July
Coho salmon	15 July – 31 October	June - October
Chum salmon	15 July – 30 September	March
Pink salmon	15 July – 31 August	March
Steelhead trout	March - May	May - June

Adapted from U.S. Forest Service interpretive display at Ketchikan Creek.

Thomas Basin is located within an area designated by the NMFS as essential fish habitat (EFH) for all five species of Pacific salmon: chum, pink, coho, sockeye, and king (NMFS 2017b). The EFH definition also extends to all estuarine and freshwater bodies necessary for the development of salmon. Portions of the harbor near the creek outlet may serve as estuarine habitat for juvenile salmon during their out-migration transition from freshwater to marine life phases, but it functions primarily as a migration corridor between Tongass Narrows and Ketchikan Creek.

3.9 Cultural and Historic Resources

Corps archaeologists have reviewed the Alaska Heritage Resources Survey (AHRS) database, and determined that although there are cultural resources in the general vicinity, there are no known historic properties within the dredging area of potential effect (APE). There are no known shipwrecks listed in the National Oceanic and Atmospheric Administration's (NOAA) Wrecks and Obstructions Database. Further examination of the Bureau of Ocean Energy Management (BOEM) shipwreck database shows three shipwrecks and three incidents where ships were damaged in the Thomas Basin Small Boat Harbor between 1932 and 1962. Due to subsequent dredging projects in the harbor (1950-1996), it is unlikely that any of the shipwrecks are still present within the APE (Eldridge 2017).

4.0 Environmental Consequences

4.1 No-Action Alternative

The no-action alternative would avoid the direct and indirect environmental impacts described below, but would not accomplish the objective of returning Thomas Basin harbor to its authorized design depth.

4.2 Action Alternatives

As described in chapter 2, the Corps has identified mechanical dredging of harbor sediments and disposal of the dredged material at a landfill facility capable of managing large volumes of non-hazardous contaminated media as the most effective and timely alternatives for the proposed maintenance dredging.

4.2.1 Effects on Community and People

The intent of the proposed maintenance dredging is to benefit economic activity by ensuring local vessels have safe, effective access to the harbor. The presence of the dredging barges and scows within the confines of Thomas Basin may cause significant obstruction of the harbor channels and restricted access to moorage, but will be limited to one to several weeks in duration. Limitations on harbor access and inconvenience to harbor users will be minimized by close coordination with the Ketchikan harbormaster and other stakeholders, and will be scheduled to the least disruptive time periods to the extent possible. The Corps believes there will be no significant impacts to economic or subsistence activities in the limited area affected by the dredging activities.

4.2.2 Effects on Land Use

The proposed alternatives will not change the use of the harbor or any surrounding lands except for the short-term limitations on harbor access during dredging, as described above.

4.2.3 Effects on Topography and Hydrology

The dredging action will remove recently deposited material from the bottom of the harbor, returning it to its design contours; it will have no effect on upland topography or hydrology.

4.2.4 Effects on Tides, Currents, and Sediment Transport

The removal of sediment from the harbor will return the harbor contours to their original design; this may have a small effect on water movement through the harbor versus pre-dredging conditions.

4.2.5 Effects on Water Quality

The dredged material will be disposed of upland, but the dredging and dewatering activities will cause some sediment to become suspended in the water column and potentially migrate away from the work site during dredging and sediment management activities. In general, contaminants in disturbed sediment may be transported either as dissolved-phase constituents entering the water-column and migrating independently from the sediment particles or as contaminants bound to the sediment particles and transported with the sediment. It is the Corps' assessment that the contaminants remaining in the material to be dredged are most likely tightly bound to the sediment and will not enter the water-column as dissolved constituents to any significant degree:

- The contaminants in Table 2 are all compounds with very limited water solubility, especially in seawater.
- The sediment contains a large percentage of organic carbon to which these compounds will tend to preferentially bind.
- The material to be dredged from the shoal will have been violently agitated while being transported down the creek and deposited in the harbor, which will have flushed any dissolvable contaminants out of the sediment and debris at that time.

The Corps strategy to limit the spread of contamination will therefore concentrate on limiting the spread of sediment in general. The fact that much of the area to be dredged is directly in the path of the Ketchikan Creek discharge may increase the risk of contaminated material being carried from the dredging site. On the other hand, much of the material to be dredged is sufficiently dense that it was be deposited onto the harbor floor quickly after being discharged from Ketchikan Creek under high-flow conditions, forming the shoal just beyond the creek mouth that now needs to be removed (figure 3). This suggests that the shoal material should not migrate far when again re-suspended during maintenance dredging.

To a large degree, the means of limiting the spread of sediment will be developed by the contractors. The Corps will require bidding contractors to propose methods of minimizing the spread of sediment during dredging (e.g., turbidity curtains or "environmental" dredge buckets),

minimizing the discharge of sediment from the barge receiving the dredged material and reducing the risk of a discharge of dredged material into the marine environment during transport. The dredging is expected to take 1 to 3 weeks or less, so the duration of any impacts to water quality will be short.

4.2.6 Effects on Air Quality and Noise

The dredging action will not increase airborne particulate matter in the project area above acceptable threshold levels. Operation of dredging machinery and other equipment will cause a minor, temporary increase in air emissions because of exhaust, which will cease promptly once dredging is completed. To be considered "regionally significant" emissions associated with the project must exceed 10 percent or more of the region's emissions for a particular pollutant. Although no quantitative analysis was done, it is unlikely that this short-term project will cause a 10 percent increase of pollutants such as carbon monoxide (CO), volatile organic carbon (VOC), particulate matter (10 micrometers or less, PM_{10}), and NOx (nitric oxide and nitrogen dioxide). National ambient air quality standards are not expected to be exceeded.

The operation of the dredge and tug boat will cause a temporary increase in air-transmitted noise similar to that of construction equipment, which in the setting of downtown Ketchikan will have a negligible impact. The dredging activity will create some water-transmitted noise, but little or no high-amplitude percussive noise having the potential to harm aquatic animals. The enclosed shape of the harbor will confine nearly all water-transmitted noise to the harbor basin, and the dredging work will be scheduled for a period when relatively few aquatic animals should be present.

4.2.7 Effects on Biological Resources

The proposed project will have no significant adverse effects on animals, plants, or their habitat. The dredging will be timed to occur when migrating fish and their predators are less likely to be present in the harbor. The spread of suspended sediment and contaminants within and outside of the harbor will be minimized to the extent practical.

4.2.8 Effects on Protected Species

The only ESA-listed species likely to be in the Tongass Narrows project vicinity is the humpback whale, Mexico DPS. The primary potential threat to humpback whales is direct injury from contact with project vessels or equipment. The probability that a humpback whale will appear in the shallow confines of Thomas Basin Harbor during dredging operations is low enough to be discounted. The water-transmitted noise from the operation of a clamshell dredge or excavator will be low-frequency and low-amplitude, as the material to be dredged is soft, and the drop-distance for a clamshell bucket will be minimal. Any noise generated during dredging will be largely limited to the enclosed harbor basin. Barges being maneuvered and staged outside the harbor during the project may have a somewhat higher potential to come within proximity of humpback whales that may be traveling past the harbor. Noise generated by project

tugs outside the harbor will be comparable to that generated routinely by heavy vessel traffic along the busy Ketchikan waterfront.

Barges, scows, and tug boats moving within Tongass Narrows and *en route* between Ketchikan and Seattle or another Pacific Northwest port will presumably follow standard established shipping lanes, and will represent a small incremental increase in the existing shipping traffic along that route. While ship-strikes on whales are an issue of increasing concern (Neilson et al, 2012; Jensen & Silber 2004), the relatively low speed of an ocean-going barge and tug (typically no more than 9 knots), together with a barge's blunt prow and shallow draft, make it far less likely to strike and inflict injury upon a whale than larger, faster ocean-going vessels such as cruise ships and cargo ships. The vessel traffic associated with the maintenance dredging project will not represent a significant increase in the risk of ship strikes to humpback whales or other ESA-listed marine mammals.

The maneuvering of tugs and barges within the confined Tongass Narrows outside the harbor represents a small additional risk to humpback whales; the Corps has determined that the project may affect, but not adversely affect, humpback whales (USACE 2017). The NMFS concurred with this determination in a letter dated 22 March 2017 (NMFS 2017c).

Smaller marine mammals, such as Steller sea lions and harbor porpoise, are more likely to enter the harbor basin and have a greater potential for interacting with the dredging operations. These smaller, more nimble animals are at less risk of injury from project vessel movements, but could conceivably come in contact with a dredge bucket during operations. As described above for humpback whales, the Corps does not expect water-transmitted noise or exposure to contaminants to pose a significant risk to marine mammals in this setting. The Corps will adopt avoidance measures to limit the risk to marine mammals, such as scheduling the dredging project to occur during the time of year when few fish prey species are present in the harbor, and pausing operations if a marine mammal is spotted approaching the dredge (section 2.5). With the adoption of these measures, the Corps has determined that the proposed action will not result in a taking under the MMPA.

The dredging will be targeted to occur from November to March; this time period avoids much of the Alaskan bald eagle nesting season, except for initial nest-building that generally starts in February. The area surrounding Thomas Basin harbor is mostly urbanized, with very little potential eagle nesting habitat within the recommended 660-foot buffer distance (USFWS 2011) except for a few large trees remaining along Ketchikan Creek to the north. Any eagles frequenting the area will be highly acclimated to human noise and activity. The Corps determines that the project will not result in a taking under the Bald and Golden Eagle Protection Act.

No other bird nesting habitat that could be disturbed by project activities is known to exist in or near the project area, and the probable November-March project timing would entirely avoid the nesting periods for southeast Alaska bird species (generally, mid-April to mid-July) identified by the USFWS (USFWS 2009). The Corps determines that the project will not result in a taking under the MBTA.

4.2.9 Effects on Anadromous Streams and Essential Fish Habitat

While Thomas Basin is within an area broadly designated as EFH for Pacific salmon, the harbor basin itself offers little in the way of salmon habitat features as defined in the Pacific salmon Fisheries Management Plan (NWFMC 2012), except as a migration corridor between Ketchikan Creek and the marine environment, and perhaps as an estuarine setting for out-migrating juvenile salmon transitioning between freshwater and marine environments. The project will be scheduled to avoid impacts on in-migrating and out-migrating fish within Thomas Basin and will have no effect on Ketchikan Creek itself. The Corps determines that the project will not have an adverse effect on EFH or anadromous streams.

4.2.10 Effects on Cultural and Historic Resources

The Corps determines that the project will result in no historic properties affected, as none exist within the project APE, and has made that determination to the State Historic Preservation Officer (SHPO; Eldridge 2017).

4.2.11 Effects on Coastal Zone Management

Alaska withdrew from the voluntary National Coastal Zone Management Program (http://coastalmanagement.noaa.gov/programs/czm.html) on July 1, 2011. Within the State of Alaska, the Federal consistency requirements under the Coastal Zone Management Act do not apply to Federal agencies, those seeking forms of Federal authorization, and state and local government entities applying for Federal assistance.

4.2.12 Effects on Environmental Justice and Protection of Children

On February 11, 1994, Executive Order 12898, Federal Actions to Address Environmental Justice in Minority and Low-Income Populations was issued. The purpose of the order is to avoid the disproportionate placement of Federal actions and policies having adverse environmental, economic, social, or health effects on minority and low-income populations. Construction of the proposed corrective action will have beneficial effects on the Ketchikan community. No racial, ethnic, age, or other population group will be adversely affected disproportionately.

On April 21, 1997, Executive Order 13045, Protection of Children from Environmental Health and Safety Risks, was issued to identify and assess environmental health and safety risks that may disproportionately affect children. The proposed action will affect the community as a whole, and there will be no environmental health or safety risks associated with the action that will disproportionately affect children. All the alternatives considered in detail are located

offshore, in proximity to commercially developed areas, and away from homes, schools, and playgrounds. Children will not be put at risk by the proposed corrective action.

4.2.13 Cumulative Effects

Federal law (40 CFR 651.16) requires that NEPA documents assess cumulative effects, which are the impact on the environment resulting from the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions.

No other similar in-water activities are planned at Ketchikan. By its nature, maintenance dredging is intended to return the Federal project to its designed configuration rather than expand upon it. No direct or indirect cumulative effects are anticipated.

5.0 Public Involvement, Regulatory Compliance, and Agency Coordination

5.1 Compliance with Laws and Regulations

This EA and unsigned Finding of No Significant Impact (FONSI) were prepared using information gathered during several iterations of this project, and the most recent correspondence with state and Federal resource agencies. Per the NEPA process and Corps regulations and guidance, the EA and unsigned FONSI are subject to a public review period. If requested, a public meeting may be held to discuss project alternatives and solicit public views and opinions.

The dredged material will not be discharged to waters of the U.S., and sediment disturbed during dredging operations, i.e., “incidental fallback”, is not subject to regulation under the Clean Water Act (CWA). However, the management of contaminated sediment and dewatering effluent for this project warrants additional consideration. Therefore, an evaluation under CWA section 404(b)(i) has been prepared, and is appended to this EA.

The Corps has engaged in informal consultation under the ESA with the NMFS; no species listed under the ESA under USFWS jurisdiction are present in the project area. The NMFS has concurred with the Corps’ determination that the project activities may affect, but not adversely affect, humpback whales (NMFS 2017c).

Maintenance dredging projects that return established navigation projects to their design parameters and use upland or established in-water disposal sites are generally regarded by the Corps, in the absence of unusual impacts or circumstances, to not be subject to the Fish and Wildlife Coordination Act (FWCA).

Alaska withdrew from the voluntary National Coastal Zone Management Program (http://coastalmanagement.noaa.gov/programs/czm.html) on July 1, 2011. Within the State of

Alaska, the Federal consistency requirements under the Coastal Zone Management Act do not apply to Federal agencies, those seeking forms of Federal authorization, and state and local government entities applying for Federal assistance.

A checklist of project compliance with relevant Federal, state, and local statutes and regulations is shown in Table 4.

Table 4. Environmental Compliance Checklist

FEDERAL	Compliance
Archeological & Historical Preservation Act of 1974*	FC
Clean Air Act	FC
Clean Water Act*	PC
Coastal Zone Management Act of 1972	NA
Endangered Species Act of 1973*	PC
Estuary Protection Act	FC
Federal Water Project Recreation Act	FC
Fish and Wildlife Coordination Act	NA
National Environmental Policy Act *	PC
Land and Water Conservation Fund Act	FC
Marine Protection, Research & Sanctuaries Act of 1972	NA
National Historic Preservation Act of 1972*	FC
River and Harbors Act of 1899	FC
Magnuson-Stevens Fishery Conservation & Management Act *	PC
Marine Mammal Protection Act	FC
Bald Eagle Protection Act	FC
Watershed Protection and Flood Preservation Act	FC
Wild & Scenic Rivers Act	NA
Executive Order 11593, Protection of Cultural Environment	FC
Executive Order 11988, Flood Plain Management	FC
Executive Order 11990, Protection of Wetlands	FC
Executive Order 12898, Environmental Justice	FC
Executive Order 13045, Protection of Children	FC
STATE AND LOCAL	
State Water Quality Certification *	PC
Alaska Coastal Management Program *	NA

PC = Partial compliance, FC = Full compliance
*Full compliance will be attained upon completion of the Public Review process and/or completion of coordination with the responsible agency.

6.0 Conclusion

The completed environmental assessment supports the conclusion that the proposed maintenance dredging does not constitute a major Federal action significantly affecting the quality of the human and natural environment. An environmental impact statement (EIS) is therefore not necessary for the annual maintenance dredging, and the prepared Finding of No Significant Impact (FONSI) may be signed.

7.0 Document Preparation

This environmental assessment was prepared by Chris Floyd, and Diane Walters, of the Environmental Resources Section, Alaska District, U.S Army Corps of Engineers. The Corps of Engineers Project Manager is Michael Tencza.

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APPENDIX A

SECTION 404(b)(1) EVALUATION

EVALUATION UNDER
SECTION 404(b)(1) CLEAN WATER ACT 40 CFR PART 230

Maintenance Dredging
Thomas Basin Small Boat Harbor
Ketchikan, Alaska

I. Project Description and Background

A. Location: Ketchikan is in Southeast Alaska, on Revillagigedo Island. Thomas Basin Harbor was built in 1933, making use of a cove where Ketchikan Creek discharges into Tongass Narrows, a strait between Revillagigedo and Gravina Islands (figure 1). A 940-foot-long stone breakwater partially encloses an 11.35-acre basin to form the small boat harbor (figure 2; USACE 2014).

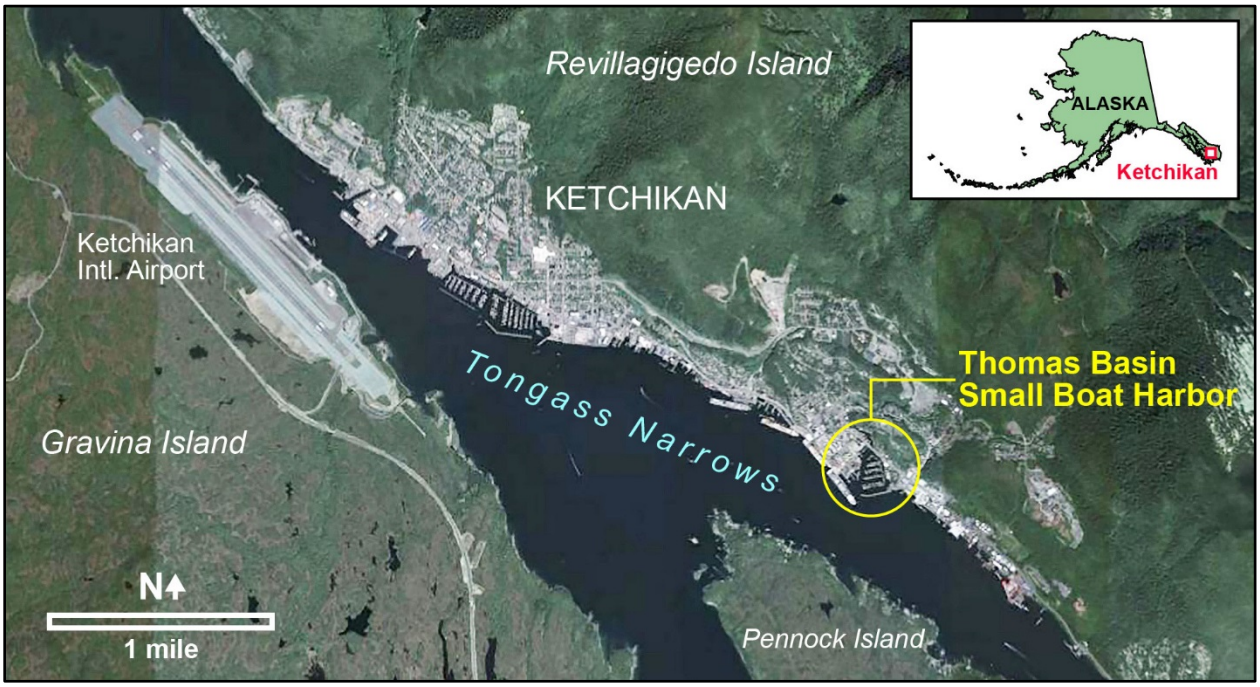

Figure 1. Location and vicinity of Thomas Basin harbor.

B. General Description: Approximately 5,100 cubic yards of material needs to be dredged from the federally maintained basin to return high-use areas to the Federal project depth, plus an allowed 2-foot "overdredge." Thomas Basin Harbor requires maintenance dredging at relatively long (10 to15-year) intervals, receiving little sediment

from Ketchikan Creek or Tongass Narrows in a typical year. However, high flow periods in Ketchikan Creek caused by unusually heavy precipitation can result in large quantities of riverine sediment being deposited in the harbor in a short period of time. A routine condition survey of Thomas Basin in 2012 found a lens of new material extending from the creek mouth into the harbor, which raised the harbor bottom above its project depth of -10 feet MLLW in some areas (figure 2). Maintenance dredging is planned for late 2017.

The dredged material will be disposed of upland, not discharged into waters of the U.S. However, because the dredged material is contaminated, and will likely be dewatered within the harbor, this 404(b)(i) evaluation has been prepared to address potential water quality impacts.

C. Authority: The Rivers and Harbors Act, 3 July 1930 (House Doc. 113, 70th Congress, 1st Session) as adopted, provides for construction of a stone breakwater with concrete cap, 940 feet in length, to protect the harbor in the vicinity of Ketchikan Creek, and dredging the protected area (11.35 acres) to a depth of 10 feet below mean lower low water (MLLW).

D. General Description of Dredged or Fill Material: The bulk of the material to be dredged is in a shoal near the mouth of Ketchikan Creek, and is believed to be primarily silt, sand, and organic debris from the Ketchikan Creek watershed flushed into the harbor during heavy rainstorms in the 2007-2012 timeframe. The sediment core samples collected from the shoal in September 2016 contained high proportions of leaves, wood fragments, and other terrestrial material. Chemical analyses of composited sediment core samples revealed chemical contaminants at concentrations that exceed the dredged material screening levels currently used by the Alaska District (DMMO 2016).

E. Description of the Proposed Discharge Site: For the purposes of this evaluation, the discharge site is the north end of Thomas Basin small boat harbor (figure 2), which may be impacted by contaminated sediment resuspended by dredging and dewatering activities. The bulk dewatered sediment will be disposed of upland.

F. Description of Disposal Method: To a large extent the means of dredging will be selected and proposed by the contractor. However, because of the close confines of the small harbor, and the lack of a nearby ocean disposal site or space for an upland dewatering site into which hydraulically dredged sediment could be discharged, the Corps expects mechanical dredging with a barge-mounted excavator or clamshell dredge to be the only practicable dredging method. The dredged material will most likely be placed on a scow, also in the harbor, for dewatering or other processing.

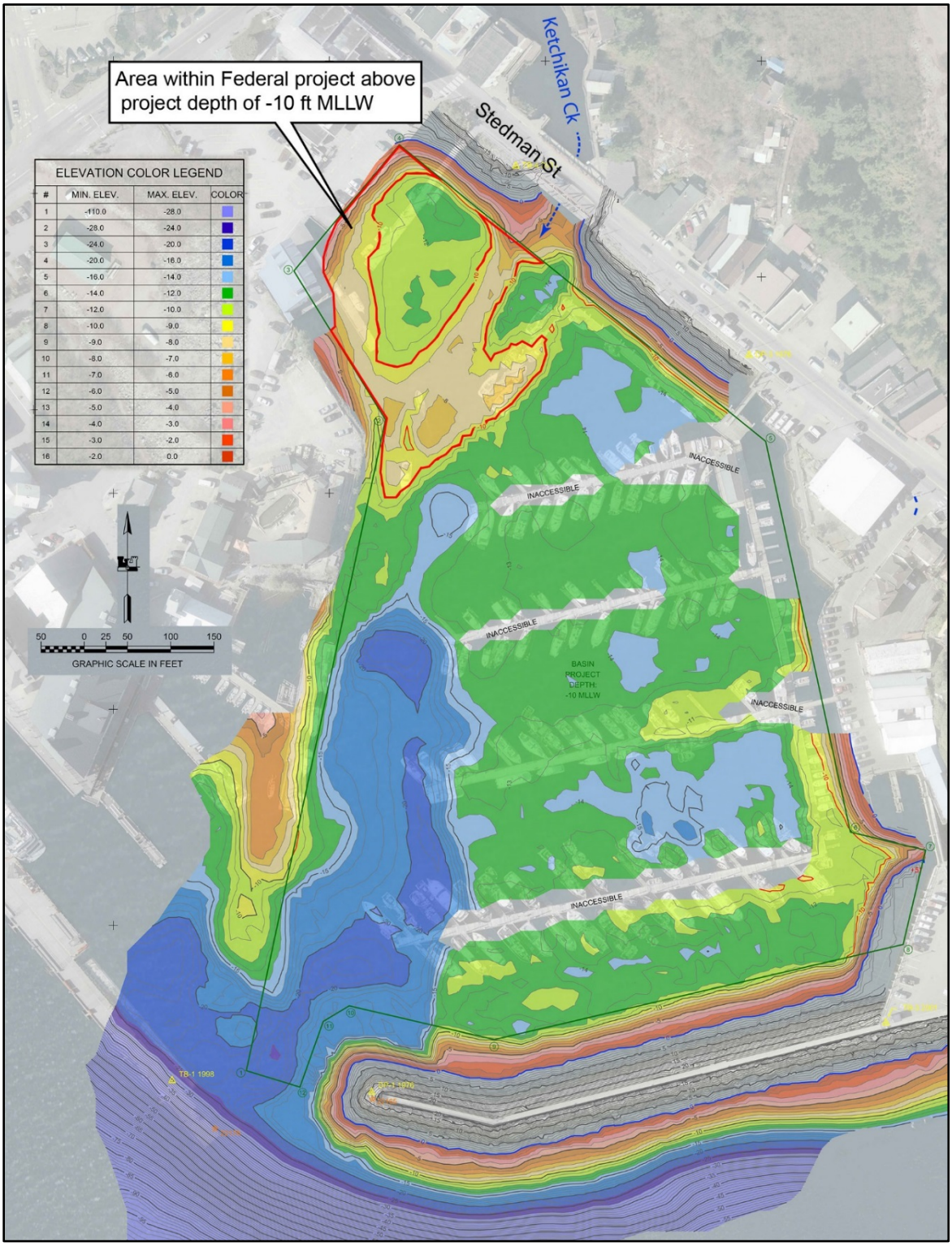

Figure 2. Depth contours (relative to MLLW) generated from a Corps hydrographic survey conducted August 2015. The heavy red line indicates the area of the Federal project above the design depth of -10 feet MLLW.

II. Factual Determinations

A. Physical Substrate Determinations: The bottom sediments in the area to be dredged are overlain with recently-deposited intermixed sand, silt, and organic debris of mostly terrestrial origin. A fan of similar material presumably extends beyond the dredging area in a thin surface layer. Bottom sediments exposed by dredging below the -10-foot MLLW project elevation are expected to consist of silt and sand with less organic debris.

B. Water Circulation, Fluctuations, and Salinity Determinations: Tongass Narrows at Ketchikan sees tides with a mean range of 12.97 feet and a diurnal range (the difference between mean higher high water and mean lower low water) of 15.45 feet. Tidal currents in Tongass Narrows do not exceed 2 knots, despite the confined channel. The inflow from Ketchikan Creek creates currents within the harbor that vary with the tide stage and stream discharge rates, although understanding of these currents is limited. The removal of sediment from the harbor will return the harbor contours to their original design; this may have a small effect on water movement through the harbor versus pre-dredging conditions.

The ambient water quality within Thomas Basin harbor has not been directly assessed. The continuous flow of fresh water into the harbor from Ketchikan Creek presumably reduces salinity within the harbor and may create a halocline in some areas. The inflow from the creek probably also creates more circulation and water exchange in the small, enclosed harbor than if the creek were not present. The dredging and removal of the recently-deposited shoal should have no overall effect on salinity patterns within the harbor.

C. Suspended Particulate/Turbidity Determinations: Thomas Basin appears to receive little marine sediment, while Ketchikan Creek appears to contribute significant sediment to the harbor only in the wake of unusually heavy precipitation. Ambient turbidity levels within the harbor have not been directly measured, but are presumed to be low during much of the year. To a large degree, the means of limiting the spread of sediment will be developed by the contractors. The Corps will require bidding contractors to propose methods of minimizing the spread of sediment during dredging (e.g., “environmental” dredge buckets and/or turbidity curtains), minimizing the discharge of sediment from the barge receiving the dredged material and reducing the risk of a discharge of dredged material into the marine environment during transport. The dredging is expected to take 1 to 3 weeks or less, so the duration of any impacts to water quality will be short.

D. Contaminant Determinations: The sediment to be dredged is moderately contaminated with several chemicals. Table 1 lists the chemical contaminants detected at concentrations above the dredged material screening levels currently used by the Corps' Alaska District to determine

Table 1. Concentrations of contaminants detected above screening levels in the Thomas Basin dredging prism in 2016

Chemical compound(s)	Screening Level[a]	Maximum concentration detected[b]
Benzo(b)- and benzo(k)fluoranthenes (mg/kg)	3.2	4.0
Chrysene (mg/kg)	1.4	2
Dibenzo(a,h)anthracene (mg/kg)	0.23	0.38
Fluoranthene (mg/kg)	1.7	2.1
Indeno(1,2,3)pyrene (mg/kg)	0.6	0.96
Pyrene (mg/kg)	2.6	5.1
Dimethyl phthalate (mg/kg)	0.071	0.18
Heptachlor (mg/kg)	0.0015	0.0076
Dioxins and Furans (TEQ[c]; pg/g)	4	12.4

a: DMMO 2016.
b: USACE 2016
c: Toxicity Equivalent

suitability for in-water disposal (DMMO 2016); all are organic chemical compounds with low solubility in water. It is the Corps' assessment that the contaminants remaining in the material to be dredged are most likely tightly bound to the sediment and will not enter the water-column as dissolved constituents to any significant degree:

- The contaminants in Table 2 are all compounds with very limited water solubility, especially in seawater.
- The sediment contains a large percentage of organic carbon (110,000 mg/kg) to which these compounds will tend to preferentially bind.
- The material to be dredged from the shoal will have been violently agitated while being transported down the creek and deposited in the harbor, which will have flushed any dissolvable contaminants out of the sediment and debris at that time.

E. Aquatic Ecosystems and Organism Determinations: Aquatic vegetation within Thomas Basin is understood to be minimal; the periodic dredging of the Federal project, combined with occasional high-flow discharges from Ketchikan Creek, presumably make the area to be affected by the dredging a poor setting for eelgrass or other rooted aquatic plants. In-migrating adult salmon and out-migrating juvenile salmon swim through the harbor between Tongass Narrows and Ketchikan Creek. Harbor seals, river otters, and

sea lions may appear in the harbor when adult salmon are running, but move on to other food sources when salmon are no longer present.

The proposed project will have no significant adverse effects on animals, plants, or their habitat. The dredging will be timed to occur when migrating fish and their predators are less likely to be present in the harbor. The spread of suspended sediment and contaminants within and outside of the harbor will be minimized to the extent practical.

F. Proposed Disposal Site Determinations: The dredging and dredged material management will cause contaminated sediment to become temporarily suspended in the water column within a portion of the harbor. The Corps will require bidding contractors to propose methods of minimizing the spread of sediment during dredging (e.g., turbidity curtains and/or "environmental" dredge buckets), minimizing the discharge of sediment from the barge receiving the dredged material and reducing the risk of a discharge of dredged material into the marine environment during transport. Much of the material to be dredged is sufficiently dense that it was deposited onto the harbor floor quickly after being discharged from Ketchikan Creek under high-flow conditions, forming the shoal just beyond the creek mouth that now needs to be removed This suggests that the shoal material should not migrate far when again re-suspended during maintenance dredging. The dredging is expected to take 1 to 3 weeks or less, so the duration of any impacts to water quality will be short.

G. Determination of Cumulative and Secondary Effects on the Aquatic Ecosystem: The federal project within Thomas Basin harbor requires maintenance dredging at relatively long (10- to 20-year) intervals; the last federal dredging action was in 1996. The City of Ketchikan performed discretionary dredging within a small area of the harbor in 2009, and a section of sheet-pile along a portion of the harbor may be replaced in the near future, with the potential for altering the adjacent harbor bottom. The spacing of these projects, with their transitory effects on water quality, are unlikely to result in cumulative effects on water quality or what habitat resources exist within the harbor. Since the passage of vessels over shoaling portions of the harbor can lead to frequent uncontrolled suspension of sediment into the water column, maintaining the federal portion of the harbor at design depth through dredging will lead to improved water quality over the long term.

III. Findings of Compliance or Non-Compliance with the Restrictions on Discharge

A. Adaptation of the Section 404 (b)(1) Guidelines to this Evaluation: The Section 404(b)(i) guidelines are modified here to address the resuspension and discharge of sediment during dredging and dredged material management.

B. Evaluation of Availability of Practicable Alternatives to the Proposed Discharge Site Which Would Have Less Adverse Impact on the Aquatic Ecosystem: The impact to the aquatic ecosystem is greatly reduced through the upland disposal of the bulk of the dredged material. Physical constraints at the project site, such as a lack of practical upland dewatering sites, limit the alternatives available to further reduce water quality impacts.

LEDPA. The alternatives available for dredged material management for this project are greatly limited by regulatory and physical constraints. Upland disposal of the bulk dredged material, together with minimizing the spread of sediment during dredging, minimizing the discharge of sediment from the barge receiving the dredged material and reducing the risk of a discharge of dredged material into the marine environment during transport, effectively constitutes a "least environmentally damaging practicable alternative" (LEDPA) for this project.

C. Compliance with Applicable State Water Quality Standards: The State of Alaska, in consultation on this project, has recommended a "best practices" approach to this small, short-term action. Water quality will be maintained through minimizing the suspension and spread of sediment through the use of turbidity curtains and/or "environmental" dredge buckets, minimizing the discharge of sediment from the barge receiving the dredged material and reducing the risk of a discharge of dredged material into the marine environment during transport. The proposed project would not be expected to have an appreciable adverse effect on water supplies, recreation, growth and propagation of fish, shellfish and other aquatic life, or wildlife. It would not be expected to introduce detectable petroleum hydrocarbons, radioactive materials, residues, or other pollutants into the waters near Ketchikan.

D. Compliance with Applicable Toxic Effluent Standards or Prohibition Under Section 307 of the Clean Water Act: The controlled resuspension of contaminated sediments within the dredging area is not subject to this section.

E. Compliance with Endangered Species Act of 1973: The only ESA-listed species under the jurisdiction of the NMFS that is likely to be in the Tongass Narrows area is the humpback whale **(***Megaptera novaeangliae*), Mexico Distinct Population Segment (DPS), listed as threatened**.** The Corps has made a determination to the National Marine Fisheries Service (NMFS) that the dredging project may affect but not adversely affect humpback whales; the identified potential effects to humpback whales consisted of physical contact with project vessels and equipment, not water quality issues.

F. Compliance with Specified Protection Measures for Marine Sanctuaries Designated by the Marine Protection. Research, and Sanctuaries Act of 1972: Not applicable; no marine sanctuaries are present near the project site.

G. Evaluation of Extent of Degradation of the Waters of the United States: There are no municipal or private water supplies or freshwater bodies in the area that could be negatively affected by the proposed project. There would be no significant adverse impacts to plankton, fish, shellfish, or wildlife.

H. Appropriate and Practicable Steps Taken to Minimize Potential Adverse Impacts of the Discharge on the Aquatic Environment: Incorporating the following avoidance, minimization, and conservation measures into the proposed project would help to ensure that no significant adverse impacts will occur:

- The contractors will be required to propose and implement effective methods of reducing the spread of contaminated sediment during dredging, sediment processing, and transport, to the minimum practicable levels, subject to approval by the Corps. Environmental dredge buckets and/or turbidity curtains, or other approved equipment suited to the expected conditions, will be employed. The sediment contained in seawater returned to the harbor during or after dewatering will be reduced to the minimum practicable concentration through a combination of filtration and/or holding and settling. Other methods, such as timing the dredging for periods when harbor current velocities are low, may be evaluated. The contractor will be required to subcontract with a qualified environmental professional (as defined by the State of Alaska in 18 AAC 75.3333) to aid in the preparation of an Environmental Protection Plan (EPP) and in the selection of effective sediment control measures. Additional best management practices (BMPs) to reduce the suspension of sediment during dredging will include:

    - No multiple “bites” with the dredge/excavator bucket during a single dredging cycle;
    - Avoiding leveling of sediment on the seafloor with the dredge/excavator bucket;
    - No stockpiling or intermediate placement of dredged sediment on the seafloor;
    - Slowing the velocity of the ascending loaded bucket through the water column;
    - Pausing the bucket near the bottom while descending, and again near the water line while ascending.

- To the extent practicable, the in-water dredging work will be performed between 1 November and 1 March in order to minimize impacts to both out-migrating and in-migrating anadromous fishes, and aquatic animals that may enter the harbor to feed on the fish.

- The dredging crew will pause operation of the dredge if a marine mammal is spotted within 50 meters of the dredge bucket, and not resume dredging until the mammal has been observed again outside of this range, or until 15 minutes have elapsed since the mammal was last sighted. This monitoring will be performed by the standard crew of the dredge during the course of their duties. If a marine mammal is seen within a turbidity curtain or other confining device deployed for the project, dredging operations will cease and the contractor will take necessary steps to release the mammal unharmed.

- To minimize the danger to marine mammals from project-related vessels, speed limits (e.g. less than 8 knots) will be imposed on vessels moving in and around the project area.

- An oil spill/pollution prevention plan will be prepared by the contractor.

- The Corps will conduct post-dredging bathymetry surveys to ensure that only the material identified to be dredged was removed to the authorized depth and that the design depth was achieved by the dredging action.

I. On the Basis of the Guidelines the Proposed Site for the Discharge of Fill Material is: Specified as complying with the requirements of these guidelines, with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects on the aquatic ecosystem.

FINDING OF COMPLIANCE
For
Maintenance Dredging
Thomas Basin Small Boat Harbor
Ketchikan, Alaska

1. These guidelines were adapted to the discharge of sediment during dredged material management.

2. The principle discharge to waters of the U.S. proposed in this project would be the release of minimal quantities of sediment during maintenance dredging and dredged material management.

3. The planned discharge would not violate any applicable State water quality standards, or violate the Toxic Effluent Standards of Section 307 of the Clean Water Act.

4. Use of the selected discharge site will not harm any endangered species or their critical habitat.

5. The proposed discharge will not result in significant adverse effects on human health and welfare, including municipal and private water supplies, recreation and commercial fishing, plankton, fish, shellfish, wildlife, and special aquatic sites. The life stages of aquatic life and other wildlife will not be adversely affected. Significant adverse effects on aquatic ecosystem diversity, productivity and stability, and recreational, aesthetic and economic values will not occur.

6. Appropriate steps to minimize potential adverse impacts of the discharge on aquatic systems include:

- The contractors will be required to propose and implement effective methods of reducing the spread of contaminated sediment during dredging, sediment processing, and transport, to the minimum practicable levels subject to approval by the Corps. Environmental dredge buckets and/or turbidity curtains, or other approved equipment suited to the expected conditions, will be employed. The sediment contained in seawater returned to the harbor during or after dewatering will be reduced to the minimum practicable concentration through a combination of filtration and/or holding and settling. Other methods, such as timing the dredging for periods when harbor current velocities are low, may be evaluated. The contractor will be required to subcontract with a qualified environmental

professional (as defined by the State of Alaska in 18 AAC 75.3333) to aid in the preparation of an Environmental Protection Plan (EPP) and in the selection of effective sediment control measures. Additional best management practices (BMPs) to reduce the suspension of sediment during dredging will include:

  - No multiple "bites" with the dredge/excavator bucket during a single dredging cycle;
  - Avoiding leveling of sediment on the seafloor with the dredge/excavator bucket;
  - No stockpiling or intermediate placement of dredged sediment on the seafloor;
  - Slowing the velocity of the ascending loaded bucket through the water column;
  - Pausing the bucket near the bottom while descending, and again near the water line while ascending.

- To the extent practicable, the in-water dredging work will be performed between 1 November and 1 March in order to minimize impacts to both out-migrating and in-migrating anadromous fishes or spawning herring, and aquatic animals that may enter the harbor to feed on the fish.

- The dredging crew will pause operation of the dredge if a marine mammal is spotted within 50 meters of the dredge bucket, and not resume dredging until the mammal has been observed again outside of this range, or until 15 minutes have elapsed since the mammal was last sighted. This monitoring will be performed by the standard crew of the dredge during the course of their duties. If a marine mammal is seen within a turbidity curtain or other confining device deployed for the project, dredging operations will cease and the contractor will take necessary steps to release the mammal unharmed.

- To minimize the danger to marine mammals from project-related vessels, speed limits (e.g. less than 8 knots) will be imposed on vessels moving in and around the project area.

- An oil spill/pollution prevention plan will be prepared by the contractor.

- The Corps will conduct post-dredging bathymetry surveys to ensure that only the material identified to be dredged was removed to the authorized depth and that the design depth was achieved by the dredging action.

7. On the basis of the guidelines, the proposed discharge is specified as complying with the inclusion of appropriate and practical conditions to minimize pollution or adverse effects to the aquatic ecosystem.