Naval Submarine Base Kings Bay

For Information Contact:
Mr. Jim More
Naval Submarine Base Kings Bay
1063 USS Tennessee Avenue
Kings Bay, GA 31547
Phone: 912-573-4759
Email address: jim.more@navy.mil

DRAFT
Environmental Assessment for Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, Georgia

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Abstract:

The Department of the Navy proposes to repair in-water structures at Naval Submarine Base Kings Bay and construct a new pier associated with Transit Protection System functions. This Environmental Assessment discusses the purpose of and need for the proposed repair and new construction, identifies alternative actions, and examines the potential beneficial and adverse impacts on the human and natural environments that would result from the implementation of the Proposed Action.

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EXECUTIVE SUMMARY

Environmental Assessment for Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, Camden County, GA

ES-1 INTRODUCTION

Naval Submarine Base (SUBASE) Kings Bay is the United States (U.S.) Department of the Navy's (Navy) East Coast homeport for ballistic missile nuclear submarines supporting the Trident II (D-5) missile. SUBASE Kings Bay manages, maintains, and operates Trident ballistic missile (SSBN) and guided missile (SSGN) submarines, Trident II D-5 and Tomahawk Land Attack Missiles and systems, and infrastructure and quality of life facilities and programs.

The Navy has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act of 1969 (NEPA; 42 United States Code [U.S.C.] Sections 4321–4370), as implemented by the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Parts 1500–1508), and Navy regulations for implementing NEPA (32 CFR Part 775).

The Navy, as the lead agency, is responsible for supervising the development of the NEPA document. Per CEQ regulations implementing NEPA (40 CFR Section 1501.6), federal agencies can request the participation of other federal agencies to serve as a cooperating agency in the preparation of NEPA documents. The cooperating agency participates in the NEPA process by assisting in developing information and preparing the environmental analyses which the cooperating agency has special expertise. There are no cooperating agencies for this EA. The National Marine Fisheries Service (NMFS) was invited to participate as a cooperating agency, but their policy is to only participate as a cooperating agency in the preparation of Environmental Impact Statements and not EAs.

SUBASE Kings Bay is located in the southeastern corner of Georgia, approximately 8 miles north of the Georgia-Florida border, 4 miles inland from the Atlantic Ocean, and 2 miles north of the St. Marys River along the western shore of Cumberland Sound (**Figure ES-1**). The approximate 16,000-acre installation provides berthing and support services to naval submarines and other assets. The entirety of SUBASE Kings Bay, including the land areas and adjacent water areas along Kings Bay and Cumberland Sound between Marianna Creek to the north and Mill Creek to the south, is restricted from general public access.

ES-2 PROPOSED ACTION

The Navy proposes to repair (including direct repairs and repairs by replacement) in-water structures at SUBASE Kings Bay and construct a new pier to support Transit Protection System (TPS) functions at Site VI. These repairs, upgrades, and new construction would (1) address critical damage and mission and safety requirements, (2) where damage is less advanced, limit further deterioration and increase the useful life of the structures, and/or (3) upgrade infrastructure to meet the requirements of new submarine technology. The Proposed Action would occur in fiscal years (FY) 2017 through 2022.

Figure ES-1. SUBASE Kings Bay Location Map

ES.2.1 Alternatives Considered

ES.2.1.1 No Action Alternative

The CEQ regulations that implement NEPA require that a no action alternative be included and analyzed in an EA in order to provide a clear basis for choice among options by the decision maker and the public (40 CFR Section 1502.14[d]). For this EA, the No Action Alternative means the facilities would remain in their existing condition and none of the projects described under the Proposed Action would be implemented. Critical damage would not be addressed and it is expected the Navy would not be able to maintain the structural integrity of the in-water, pile-supported structures across the SUBASE Kings Bay Waterfront Restricted Area (WRA). This would result in non-compliance with current Department of Defense (DOD) and Navy security directives which would affect SUBASE Kings Bay's ability to meet mission requirements. Evaluation of the No Action Alternative is required by CEQ and Navy regulations and provides a benchmark so that decision makers can compare the magnitude of potential environmental effects of the proposed action and alternatives with the conditions that would occur if the action does not take place.

ES.2.1.2 Alternative 1

Alternative 1, the Navy's Preferred Alternative, is comprised of six distinct proposed projects. The titles of these six projects are listed below:

- **Project 1**: Port Operations Waterfront Facilities Repair
- **Project 2**: Unspecified Minor Construction (UMC) Layberth Fender Pile Modification
- **Project 3**: Waterfront Repair and Replacement Maintenance Program
- **Project 4**: TPS Pier and Offshore Vessel Berthing Modification Project
- **Project 5**: Trident Refit Facility Waterfront Facilities Repair, Magnetic Silencing Facility (MSF) with Crane
- **Project 6**: Demolition of the TPS Pier and Layberth North Trestle

Of those six projects, Projects 1, 3, 4, and 6 comprise multiple smaller projects. A summary of the proposed projects are provided in **Table ES-1**; a summary of pile removal and pile installation requirements associated with these proposed projects are summarized in **Table ES-2**. Refer to **Figure ES-2** for the general locations of the proposed projects and **Figure ES-3** for details associated with the construction of the TPS Pier at Site VI. **Figure ES-2** also shows the existing composite SUBASE Kings Bay Explosive Safety Quantity Distance Arcs for the inhabited building distance and public traffic route distance. The TPS Pier project would result in slightly larger arcs due to changes in berthing at Site VI. The DOD Explosive Safety Board has an extensive process for evaluating and obtaining approvals of changes to these arcs, and the Navy would adhere to this process. Detailed individual project information is provided immediately following **Figure ES-3**.

Table ES-1. Summary of Proposed Waterfront Repairs and Security-Related Upgrades

Project ID	Project Description	Facility Number (FAC #)	Project Summary
Project 1: Port Operations Waterfront Facilities Repair			
1A	Tug Pier	5926	Repair concrete structural piles, pile caps, utility cover grates, headwall, mooring support and hardware, and deck undersides; replace wooden fender piles with concrete piles; and modify the fender system on the south side of access pier.
1B	General Access Pier Crab Island	5888	Install new guide piles, and repair brow and handrails.
Project 2: Unspecified Minor Construction Layberth Fender Pile Modification			
2	Unspecified Minor Construction Layberth Fender Pile Modification P661 Project	5976	Install additional fender piles to shorten the distance between existing piles and provide the required support for hydro-pneumatic fenders.
Project 3: Waterfront Repair and Replacement Maintenance Program			
3A	Explosive Handling Wharf #2 Pier with Capstans (7)	5109	Repair high-density polyethylene (HDPE) fender pile wraps, sacrificial anodes attached to the steel fender piles, steel safety ladders and treated timber bracing; repair or replace various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings and two steel guide pipe piles on the diver's float.
3B	(Dry Dock) Interface Wharf	5995	Replace timber fender bearing strips and wales, repair concrete deck, bullrail, edge beams, and mooring foundations; and repair, paint and recoat cathodic protection on the steel H-pile fender system and sheet pile.
3C	Refit Wharf #1	5909	Replace various pile caps, piles, and the outboard edge beam; and repair, clean, and paint several mooring fittings.
3D	Refit Wharf #2	5910	Replace or repair various pile caps, piles, outboard edge beams, and mooring foundations; and reattach underdeck lighting conduit and clean and repaint various mooring fittings.
3E	Refit Wharf #3	5916	Replace or repair various pile caps, piles, the outboard edge beams, and mooring foundations; and clean and repaint various mooring fittings.
3F	Warping Wharf with Capstan (4)	5877	Repair HDPE fender pile wraps; replace or repair various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings.
3G	Tug Pier	5926	Replace timber fender piles with guide piles and small boat access floats; paint mooring fittings; and repair concrete pile caps, concrete piles, concrete underdeck, and storm drain.
Project 4: Transit Protection System Pier and Off-Shore Supply Vessel Berthing Modification Project			
4A	New TPS Pier	P617	Construct a new pier with full hotel service capability including power; potable water; fire protection; sewage connections; Ship Overboard Drainage collection; fuel; and telephone, cable, and Local Area Network services.

Table ES-1. Summary of Proposed Waterfront Repairs and Security-Related Upgrades

Project ID	Project Description	Facility Number (FAC #)	Project Summary
4B	Small Craft Berth Site VI	5936	Once the new TPS pier is constructed, floating berthing slips would be constructed and provided with full hotel service capability. The berthing pier would consist of a pile-supported, reinforced concrete structure with floating sections. This project includes the installation of two 5,000-gallon above ground storage tanks and provides two associated truck off-loading connections and fuel dispensing units.
Project 5: Trident Refit Facility Waterfront Facilities Repair, Magnetic Silencing Facility with Crane			
5	Magnetic Silent Facility with Cranes (RM14-1710 Trident Refit Facility Waterfront Facilities Repair)	5980	Replace timber fender piles, restraining chains, aluminum utility tray, and concrete pile utility guide bracket; and repair wooden hand rails and the cracked concrete deck underside.
Project 6: Demolition of the Transit Protection System Pier and Layberth North Trestle			
6A	Demolition of TPS Pier	5934	Remove the tip of the existing TPS Pier.
6B	Demolition of Layberth North Trestle	5977	Demolish the North Layberth Trestle.

Table ES-2. Summary of Proposed Pile Removal and Installation Requirements

Project ID	FAC #	Project Description	Projected Start (Fiscal Year)	Water Depth at Pile Driving Location (feet)	Pile Size (inch)	Pile Material[1]	Pile Type[2]	Total # of Piles		Primary Installation Method[3]	Removal Method	Estimated # of Strikes per Pile (Impact Driving only)	Total Maximum Number of In-Water Work Days Including Both Removal and Installation
								Installed	Removed				
Project 1: Port Operations Waterfront Facilities Repair													
1A	5926	Tug Pier	2017	24	18	Concrete	Square	148	0	Impact	N/A	60	30
					24	Concrete	Square	18	0	Impact	N/A	70	4
					16	Timber	Round	0	159	N/A	Vibratory	N/A	31
1B	5888	General Access Pier Crab Island	2017	15	16	Composite	Round	2	0	Vibratory	N/A	N/A	1
					16	Timber	Round	0	2	N/A	Vibratory	N/A	1
Project 2: Unspecified Minor Construction Layberth Fender Pile Modification													
2	5976	Unspecified Minor Construction Layberth Fender Pile Modification P661 Project	2017	46	14	Steel	H	55	0	Impact	N/A	80	7
Project 3: Waterfront Repair and Replacement Maintenance Program													
3A	5109	Explosive Handling Wharf #2 Pier with Capstans	2017	46	24	Steel	Round	2	2	Impact	Vibratory	70	2
			2022	46	24	Concrete	Square	3	3	Impact	Vibratory	75	2
				46	24	Steel	Round	10	10	Impact	Vibratory	70	7
3B	5995	(Dry Dock) Interface Wharf	2021	46	14	Steel	H	99	99	Impact	Vibratory	60	15

Table ES-2. Summary of Proposed Pile Removal and Installation Requirements

Project ID	FAC #	Project Description	Projected Start (Fiscal Year)	Water Depth at Pile Driving Location (feet)	Pile Size (inch)	Pile Material[1]	Pile Type[2]	Total # of Piles		Primary Installation Method[3]	Removal Method	Estimated # of Strikes per Pile (Impact Driving only)	Total Maximum Number of In-Water Work Days Including Both Removal and Installation
								Installed	Removed				
3C	5909	Refit Wharf #1	2018	46	24	Steel	Round	6	0	Impact	N/A	70	1
					30	Steel	Round	0	6	N/A	Vibratory	N/A	1
3D	5910	Refit Wharf #2	2017	46	24	Steel	Round	6	0	Impact	N/A	70	1
					30	Steel	Round	0	6	N/A	Vibratory	N/A	1
3E	5916	Refit Wharf #3	2018	46	24	Steel	Round	6	0	Impact	N/A	70	1
					30	Steel	Round	0	6	N/A	Vibratory	N/A	1
3F	5877	Warping Wharf with Capstan (4)	2021	46	30	Steel	Round	8	8	Impact	Vibratory	70	4
3G	5926	Tug Pier	2022	30	14	Steel	H	77	77	Impact	Vibratory	60	16
Project 4: Transit Protection System Pier and Off-Shore Supply Vessel Berthing Modification Project													
4A	P617	New TPS Pier	2020	35	24	Concrete	Square	165	0	Impact	N/A	200	55
					18	Concrete	Square	50	0	Impact	N/A	80	17
					24	Concrete	Square	0	121	N/A	Vibratory	N/A	8
4B	P617	Small Craft Berth Site VI	2020	35	24	Steel	Round	30	30	Impact	Vibratory	100	8

Table ES-2. Summary of Proposed Pile Removal and Installation Requirements

Project ID	FAC #	Project Description	Projected Start (Fiscal Year)	Water Depth at Pile Driving Location (feet)	Pile Size (inch)	Pile Material[1]	Pile Type[2]	Total # of Piles		Primary Installation Method[3]	Removal Method	Estimated # of Strikes per Pile (Impact Driving only)	Total Maximum Number of In-Water Work Days Including Both Removal and Installation
								Installed	Removed				
Project 5: Trident Refit Facility Waterfront Facilities Repair, Magnetic Silencing Facility with Crane													
5	5980	Magnetic Silent Facility with Cranes (RM14-1710 Trident Refit Facility Waterfront Facilities Repair)	2017	46	18	Composite	Round	18	0	Vibratory	N/A	N/A	3
					16	Timber	Round	0	18	N/A	Vibratory	N/A	3
Project 6: Demolition of the Transit Protection System Pier and Layberth North Trestle													
6A	5934	Demolition of TPS Pier	2022	46	24	Concrete	Square	0	649	N/A	Vibratory	N/A	41
6B	5977	Demolition of Layberth North Trestle	2022	46	24	Concrete	Square	0	121	N/A	Vibratory	N/A	6

Notes: [1]Composite piles refer to alternative pile foundations comprised of fiber-reinforced polymer, recycled plastics, and other materials.
[2]H-piles are steel piles that have an "H" shaped section.
[3]All pile driving would be attempted for completion with a vibratory hammer; however, it is anticipated that this pile driving method would be an impact driver.

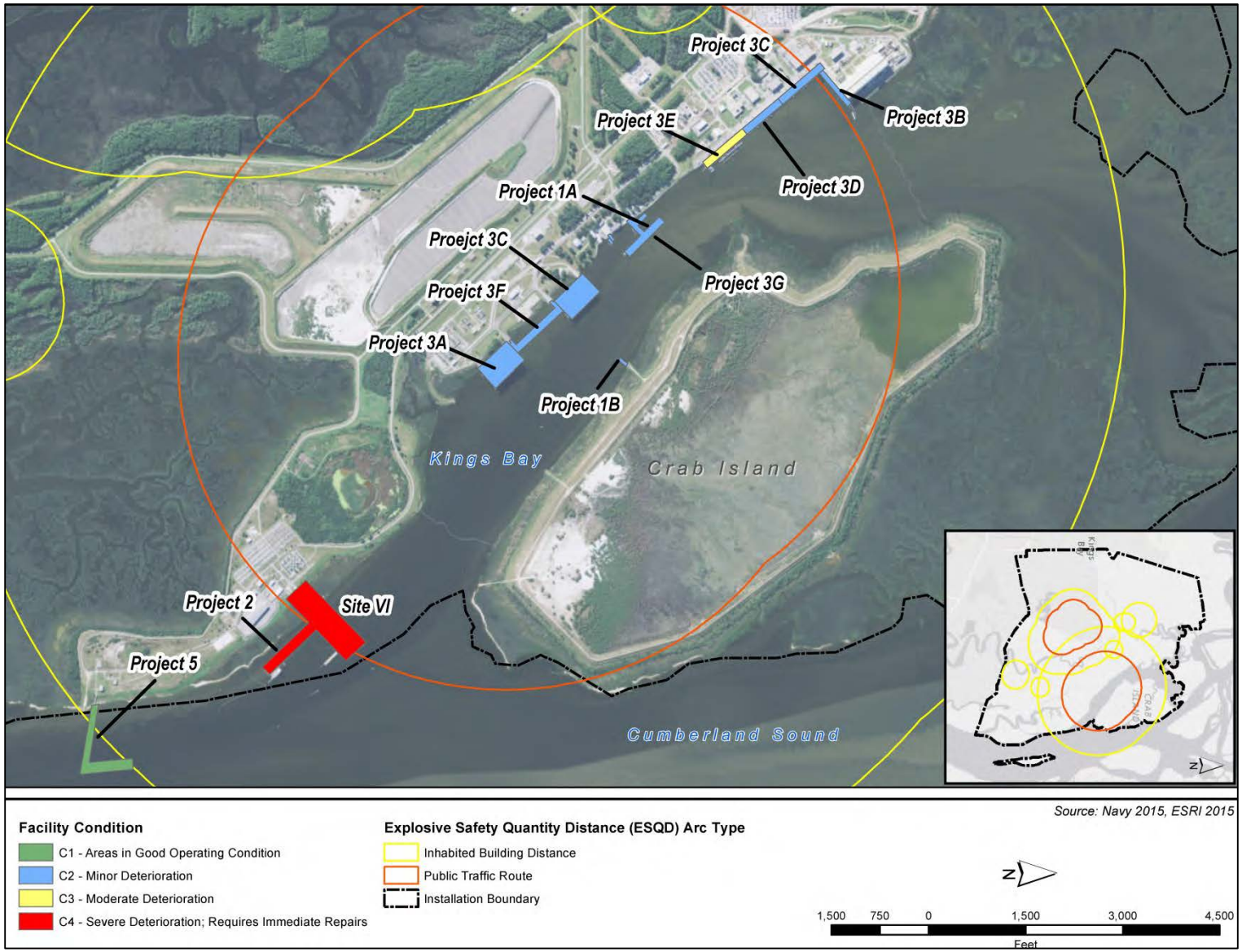

Figure ES-2. General Locations of the Proposed Projects

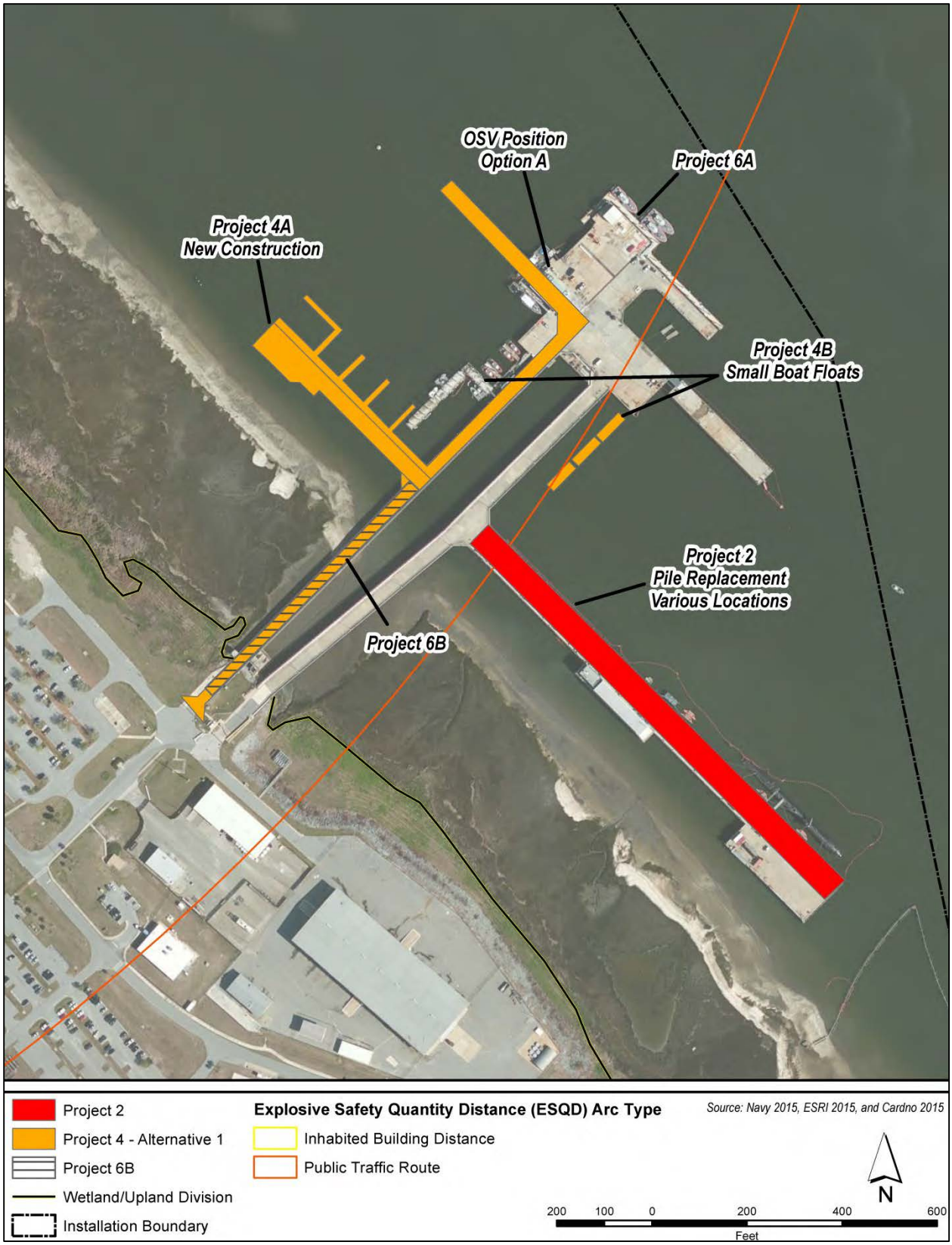

Figure ES-3. Site VI Proposed Projects under Alternative 1

For all Proposed Action projects involving replacement of piles, the replacement piles would be brought to SUBASE Kings Bay via barge and staged on the delivering barge. If necessary, the piles would be placed onshore adjacent to the construction site on previously disturbed areas for temporary staging. Pile-driving equipment would be barged-mounted and placed immediately adjacent to the piles being removed or installed.

A vibratory hammer would be used for all pile removal work. If the use of vibratory hammer is not feasible for pile installation (i.e., with steel piles), a Delmag Pile Hammer D62-22 or equivalent impact hammer would be used.

ES.2.1.3 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, the location of Project 4 would differ as shown in **Figure ES-4**. Specifically, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1.

ES.3 ENVIRONMENTAL CONSEQUENCES

The environmental resource areas analyzed in this EA include air quality, water resources, geological resources, cultural resources, coastal resources, noise, socioeconomics, environmental justice, hazardous materials and waste, and biological resources. Because potential impacts were considered to be negligible or nonexistent, the following resource areas were not evaluated in this EA: land use, infrastructure, public health and safety, transportation, and recreation and visual resources.

Projects 1, 2, 3, 5, and 6 would be implemented the same way under either Alternatives 1 or 2. Under Alternative 1, Project 4 would be located in Site VI; however, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier (refer to Figures ES-2 and ES-3). In general, the components of the repair projects (Projects 1, 2, 3, 5, and 6) that have the potential to impact the environment are the pile repair, removal, and installation activities. **Table ES-3** provides a summary of the potential impacts to the resources associated with each of the alternative actions analyzed. The level of detail in the summary analysis varies by resource area as it is commensurate with the level of potential effect to the resource.

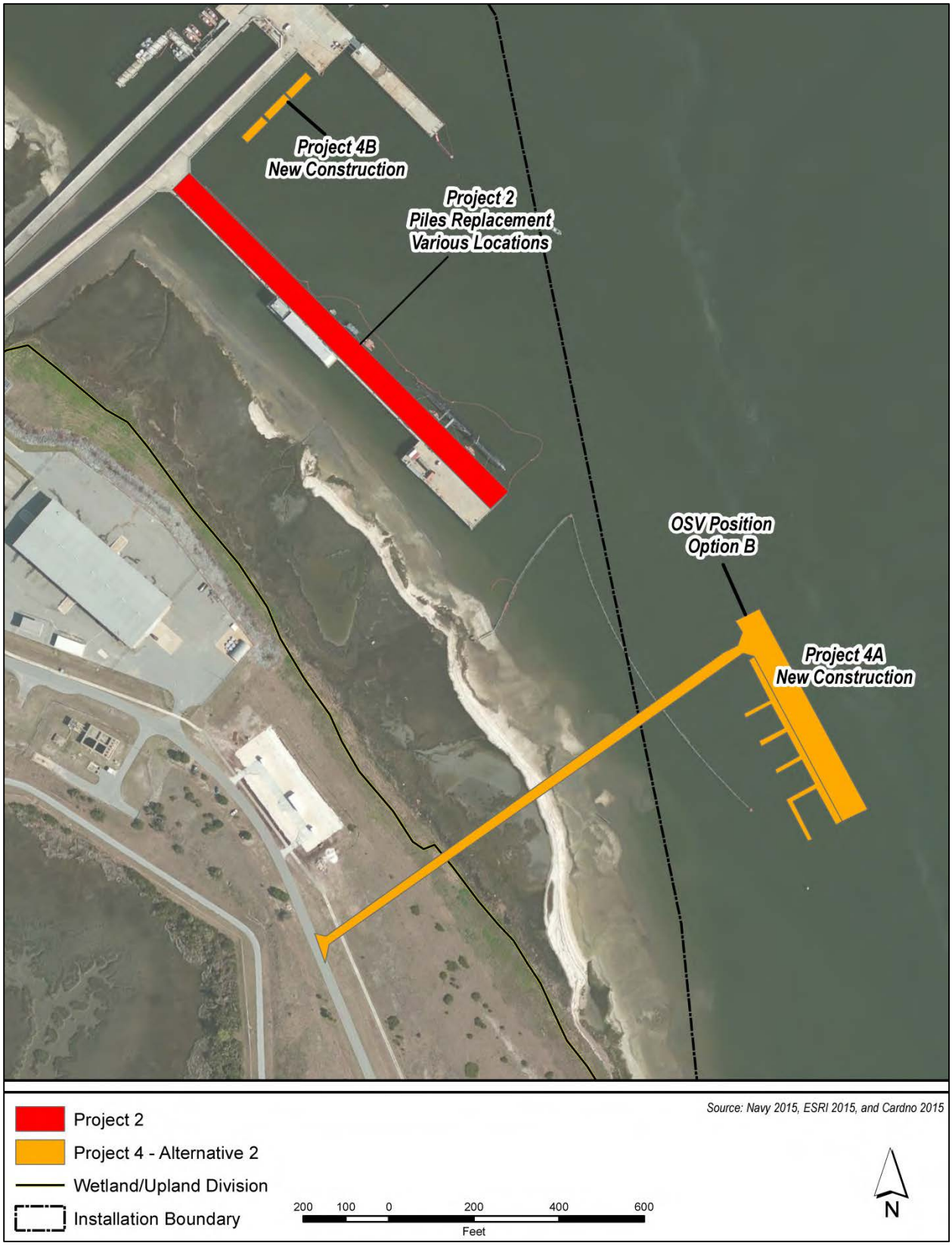

Figure ES-4. Proposed Projects under Alternative 2

Table ES-3. Summary of Potential Impacts to Resource Areas

Resource Area	No Action Alternative	Alternative 1-Preferred Alternative	Alternative 2
Air Quality	• Existing conditions would continue, and no change to air quality would occur.	• Air emissions would be short-term, transitory, and appear to be less than significant.	• Same as Alternative 1.
Water Resources	• Existing conditions would continue, and no change to water resources would occur.	• Potential short-term localized impacts to surface water quality from increased turbidity. • Potential release of contaminants such as polycyclic aromatic hydrocarbons during pile removal. • Use of vibratory equipment to loosen soils may cause redistribution of sediments resulting in temporary turbidity. • Impacts would be minimized with the use of floating booms and turbidity curtains to control dispersion of floating debris, lessen the temporary elevated turbidity, and ensure pile removal contamination is constrained to the construction site (where applicable). • All pile repair, removal, and installation would require permitting under both Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. • Section 401 Water Quality Certification from the Georgia Environmental Protection Division would be obtained to minimize potential impacts to water quality. • During construction, the contractor would adhere to all permit requirements as well as develop an Environmental Protection Plan to control water runoff. • During construction, the contractor would develop a project-specific Spill Prevention, Control, and Countermeasure Plan that would provide the clean-up, containment, and restoration procedures, instructions and reports to be used in the event of an unforeseen spill or a substance regulated by federal, state and local laws and regulations. In addition, the construction contractor would develop a project-specific Hazardous Materials Management Plan that identifies the hazardous substances to be used on the job site, the actions to prevent introduction of such materials into the environment, and detail provisions for compliance with federal, state, and local laws and regulations for storage and handling of these materials. • No impacts to groundwater and wetlands.	• Impacts would be similar to Alternative 1 for surface water, stormwater, and floodplains. • No net loss of wetlands pursuant to Section 404 of Clean Water Act, however pursuant to State of Georgia Coastal Marshlands Protection Act, “type for type” mitigation would be required due to the salt marsh habitat lost from shading from construction of the TPS Pier.

Table ES-3. Summary of Potential Impacts to Resource Areas

Resource Area	No Action Alternative	Alternative 1-Preferred Alternative	Alternative 2
		• All six projects are located in the 100-year floodplain. Management measures addressed in the SUBASE Kings Bay Integrated Natural Resources Management Plan (INRMP) for development within floodplains would be followed.	
Geological Resources	• Existing conditions would continue, and no change to geological resources would occur.	• No changes to terrain would occur. • No apparent significant impacts to geology and topography. • During construction, the contractor will be required to prepare a project-specific Stormwater Pollution Prevention Plan to minimize impacts to soils and surface waters.	• Same as Alternative 1.
Cultural Resources	• Existing conditions would continue, and no change to cultural resources would occur.	• No effects to architectural resources would occur. • No apparent significant impacts to archaeological resources would occur. • In accordance with Section 106 of the National Historic Preservation Act (NHPA), there would be no adverse effect from implementation of the Proposed Action	• Same as Alternative 1.
Coastal Zone Management Act	• Existing conditions would continue, and no change to coastal resources would occur.	• Alternative 1 is consistent to the maximum extent practicable with the Georgia Coastal Management Program. • A Coastal Consistency Determination was completed and sent to the Georgia Department of Natural Resources Coastal Resources Division for concurrence.	• Same as Alternative 1.
Ambient Sound and Noise	• Existing conditions would continue, and no change to noise environment would occur.	• No impact to humans from underwater noise. (Impacts to biological resources addressed in assessment of impacts to Terrestrial Wildlife, Marine Wildlife, and Federally-Listed Threatened and Endangered Species.) • All human sensitive receptors would experience less than a 60 decibel, A-weighted noise exposure. Temporary, minor adverse impacts to in-air human noise environment.	• Same as Alternative 1.
Socioeconomics	• Existing conditions would continue, and no change to socioeconomics would occur.	• No noticeable direct or indirect regional economic effects. • Overall negligible impacts to socioeconomics.	• Same as Alternative 1.
Environmental Justice	• Existing conditions would continue, and no change to environmental justice would occur.	• No disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.	• Same as Alternative 1.

Table ES-3. Summary of Potential Impacts to Resource Areas

Resource Area	No Action Alternative	Alternative 1-Preferred Alternative	Alternative 2
		• No disproportionate environmental health and safety risks to children.	
Hazardous Materials and Waste	• Existing conditions would continue, and no impacts from hazardous materials and wastes would occur.	• During construction, the contractor would be required to prepare an Environmental Protection Plan, project-specific Spill Prevention, Control, and Countermeasure Plan, project-specific Hazardous Materials Management Plan, and a project-specific Stormwater Pollution Prevention Plan. • The Hazardous Materials Management Plan would include a Hazardous Waste Management Plan that would delineate measures required to handle and dispose of any hazardous waste or excess hazardous materials. • Negligible to minor adverse impacts from hazardous materials and waste.	• Same as Alternative 1.
Vegetation	• Existing conditions would continue, and no change to wetlands would occur.	• Temporary minor impacts to aquatic vegetation from pile repair, removal, and installation activities. • Increase in approximately 2 acres of unshaded area from demolition of the TPS Pier (Project 6A). • Negligible to minor impacts to salt marsh shoreline community. • Pursuant to State of Georgia Coastal Marshlands Protection Act, a permit application to perform construction would be submitted to Georgia Department of Natural Resources, Coastal Resources Division. • It is anticipated that the new access trestle for the TPS Pier (Project 4A) would be within the same footprint as the Layberth North Trestle (Project 6B); therefore, no wetland shading is anticipated. • Approximately 0.06 acres of transition zone communities would be permanently impacted from construction of the new access trestle for the TPS Pier (Project 4A), resulting in minor upland habitat loss. • Overall, minor adverse impacts to vegetation.	• Similar to Alternative 1 except approximately 0.18 acres of transition zone communities would be permanently impacted from construction of the new access trestle for the TPS Pier (Project 4A), resulting in minor upland habitat loss. • Approximately 0.19 acres of wetland shading would occur as a result of the new access trestle for the TPS Pier (Project 4A). • Wetland mitigation would occur to ensure no net loss of wetlands, pursuant to the State of Georgia Coastal Marshlands Protection Act. • Overall, no apparent significant impacts to vegetation.
Terrestrial Wildlife	• Existing conditions would continue, and no change to terrestrial wildlife would occur.	• Possible minor, short-term intermittent disturbance to mammals, reptiles, and amphibians associated with construction activity and noise. • Standard protective measures for migratory birds would be implemented, consistent with SUBASE Kings Bay's INRMP.	• Same as Alternative 1.

Table ES-3. Summary of Potential Impacts to Resource Areas

Resource Area	No Action Alternative	Alternative 1-Preferred Alternative	Alternative 2
		• Overall, no apparent long-term, significant impacts to wildlife.	
Marine Wildlife	• Existing conditions would continue, and no change to marine wildlife would occur.	• Temporary minor impacts to marine fish and fisheries from underwater noise, increased turbidity, and reduced dissolved oxygen. • Minimal impacts to Essential Fish Habitat (EFH); best management practices and mitigations measures as detailed in the Essential Fish Habitat (EFH) Assessment would be implemented. • Over a 5-year period, there would be no Level A incidental takes for marine mammals from underwater noise. There may be up to 845 Level B incidental takes for bottlenose dolphins from underwater noise. An application for a Letter of Authorization for incidental takes was submitted to National Marine Fisheries Service (NMFS) in accordance with the MMPA. The Letter of Authorization application includes best management practices to minimize impacts to bottlenose dolphins.	• Same as Alternative 1.
Federally-Listed Threatened and Endangered Species (Including Candidate Species)	• Existing conditions would continue, and no change to federally-listed threatened and endangered species would occur.	• Biological Evaluation submitted to NMFS and U.S. Fish and Wildlife Service for regulatory review. • No effect to the following species: o Striped newt (candidate species) o Red-cockaded woodpecker o Smalltooth sawfish o North Atlantic right whale o Eastern indigo snake o Nesting hawksbill sea turtle o Nesting Green sea turtle o Nesting Kemp's Ridley sea turtle o Nesting Leatherback sea turtle o Nesting Loggerhead sea turtle o Gopher tortoise (candidate species) • May Affect, but Not Likely to Adversely Affect the following species: o Piping plover o Red knot o Wood stork o Atlantic Sturgeon o Shortnose Sturgeon o West Indian manatee	• Same as Alternative 1.

Table ES-3. Summary of Potential Impacts to Resource Areas

Resource Area	No Action Alternative	Alternative 1-Preferred Alternative	Alternative 2
		o At-sea hawksbill sea turtle o At-sea green sea turtle o At-sea Kemp's Ridley sea turtle o At-sea Leatherback sea turtle o At-sea Loggerhead sea turtle • No effect to designated critical habitat for the following species: o Piping plover o West Indian manatee o Hawksbill sea turtle o Green sea turtle o Leatherback sea turtle o Loggerhead sea turtle	

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ACRONYMS AND ABBREVIATIONS

ADP	Area Development Plan
BMP	best management practice
CAA	Clean Air Act
CATEX	Categorical Exclusion
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
CWA	Clean Water Act
dBA	A-weighted
dB re 1μPa rms	dB referenced to 1 micro Pascal root mean square
DOD	Department of Defense
EA	Environmental Assessment
EFH	Essential Fish Habitat
EFS	Enclave Fence System
EO	Executive Order
ESA	Endangered Species Act
FAC	Facility
FONSI	Finding of No Significant Impact
FY	Fiscal Year
GA DNR	Georgia Department of Natural Resources
GA EPD	Georgia Environmental Protection Division
GHG	greenhouse gases
GNARHGIS	Georgia's Natural, Archaeological, and Historic Resources GIS
HAP	hazardous air pollutant
HAPC	Habitat Areas of Potential Concern
HDPE	high-density polyethylene
INRMP	Integrated Natural Resources Plan
IDP	Installation Development Plan
LWI	Land/Water Interface
MBTA	Migratory Bird Treaty Act
MHW	mean high water
MLW	mean low water
MMPA	Marine Mammal Protection Act
MSF	Magnetic Silencing Facility
N/A	not applicable
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAVFAC	Naval Facilities Engineering Command
Navy	United States Department of the Navy
NEPA	National Environmental Policy Act
NHPA	National Historic Protection Act
NO_2	nitrogen dioxide
NMFS	National Marine Fisheries Service
NOA	Notice of Availability
NRHP	National Register of Historic Places
O.C.G.A.	Official Code of Georgia
OEA	Overseas Environmental Assessment
PM_{10}	particulate matter less than 10 microns in diameter
$PM_{2.5}$	particulate matter less than or equal to 2.5 microns in diameter
PSB	Port Security Barrier
RCE	Record of Categorical Exclusion
SAFMC	South Atlantic Fishery Management Council
SO_2	sulfur dioxide
SSBN	ballistic missile submarine
SSGN	guided missile submarine
SUBASE	(Naval) Submarine Base
SV	Screening Vessels
TPS	Transit Protection System
UMC	Unspecified Minor Construction
U.S.	United States
U.S.C.	United States Code
USEPA	U.S. Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VOC	volatile organic compound
WRA	Waterfront Restricted Area

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1.0 INTRODUCTION

Naval Submarine Base (SUBASE) Kings Bay is the United States (U.S.) Department of the Navy's (Navy) East Coast homeport for ballistic missile nuclear submarines supporting the Trident II (D-5) missile. SUBASE Kings Bay manages, maintains, and operates Trident ballistic missile (SSBN) and guided missile (SSGN) submarines, Trident II D-5 and Tomahawk Land Attack Missiles and systems, and infrastructure and quality of life facilities and programs.

The Navy has prepared this Environmental Assessment (EA) in accordance with the National Environmental Policy Act (NEPA) of 1969 (NEPA, 42 United States Code [U.S.C.] Sections 4321–4370), as implemented by the Council on Environmental Quality (CEQ) regulations (40 Code of Federal Regulations [CFR] Parts 1500–1508), and Navy regulations for implementing NEPA (32 CFR Part 775).

The Navy, as the lead agency, is responsible for supervising the development of the NEPA document. Per CEQ regulations implementing NEPA (40 CFR Section 1501.6), federal agencies can request the participation of other federal agencies to serve as a cooperating agency in the preparation of NEPA documents. Cooperating agencies may participate in the NEPA process by assisting in developing information and preparing the environmental analyses for which the cooperating agency has special expertise. There are no cooperating agencies for this EA. However, since the National Marine Fisheries Service (NMFS) is responsible for rulemaking under the Marine Mammal Protection Act (MMPA), NMFS participated in development of this EA to ensure the document is suitable for their adoption.

SUBASE Kings Bay is located in the southeastern corner of Georgia, approximately 8 miles north of the Georgia-Florida border, 4 miles inland from the Atlantic Ocean, and 2 miles north of the St. Marys River along the western shore of Cumberland Sound (**Figure 1.1-1**). The approximate 16,000-acre installation provides berthing and support services to naval submarines and other assets. The entirety of SUBASE Kings Bay, including the land areas and adjacent water areas along Kings Bay and Cumberland Sound between Marianna Creek to the north and Mill Creek to the south, is restricted from general public access.

Figure 1.1-1. SUBASE Kings Bay Location Map

1.1 PROPOSED ACTION

The Navy proposes to repair (including direct repairs and repairs by replacement) in-water structures at SUBASE Kings Bay and construct a new pier associated with Transit Protection System (TPS) functions. The Proposed Action would occur in Fiscal Years (FY) 2017 through 2022. The level of operations and frequency of maintenance activities is expected to remain relatively constant through the foreseeable future.

1.2 PURPOSE AND NEED FOR PROPOSED ACTION

The purpose of the Proposed Action is to maintain the structural integrity of the in-water pile supported pier structures across the installation's waterfront. This action would be accomplished by repairing damaged and aged piles and installing new piles, and ensuring compliance with the current revisions to Department of Defense (DOD) and Navy security directives. The Proposed Action is needed because the in-water pile-supported pier structures and associated infrastructure are deteriorating and do not provide adequate and stable mooring (i.e., the system used to secure a ship or submarine) facilities for ships, submarines, and security vessels and do not comply with recent DOD and Navy security directives. Sustainment level maintenance is no longer sufficient for these 20- to 30-year-old facilities. Restoration and modernization level maintenance is necessary to extend the service life of these facilities.

A specific study of SUBASE Kings Bay waterfront support facilities found the conditions varied from good to seriously deteriorated (Naval Facilities Engineering Command [NAVFAC] 2010). Continuous monitoring of these conditions by SUBASE Kings Bay logistical support staff confirm the advanced deterioration and critical nature of some issues that pose operational and safety risks. Additionally, other areas of initial deterioration were identified which require remedy in order to maintain the useful life of existing pier structures. Damage observed includes deteriorated concrete piles, pile caps, and deck components (cracked, spalled, delaminated, exposed/corroded internal reinforcing steel structures); marine pest (wood borer) damage on wooden piles; broken

Concrete bullrail with delamination (layers of material have become separated)

Concrete pile cap corrosion spall (broken into small pieces) and exposed steel reinforcements members

Double bitt concrete mooring foundation with an open corrosion spall

View of an open corrosion spall with exposed reinforcing on a concrete pile cap

or unmaintained moorings fittings; and corrosion on steel piles and pile caps.

1.3 SCOPE OF ENVIRONMENTAL ANALYSIS

This EA includes an analysis of potential environmental impacts associated with the action alternatives and the No Action Alternative. The environmental resource areas analyzed in this EA include air quality; water resources, geological resources, cultural resources, coastal resources, noise, socioeconomics, environmental justice, hazardous materials and waste, and biological resources. Several resource areas were considered, but not carried forward for detailed analysis because there would be no potential for environmental impacts or the environmental impacts would be considered negligible. Resources not evaluated further in this EA are discussed below.

Land Use: The Proposed Action involves six distinct projects. Of these six projects, five projects are maintenance and repair projects and one project (TPS Pier) is new construction. The maintenance and repair projects do not require any changes in land use. In general, the majority of the area in and around the waterfront has been previously disturbed by construction projects, dredging and filling, and the construction of facility security systems. Therefore, the construction of the TPS Pier would convert previously disturbed areas into an operational structure. The new construction project is consistent with the SUBASE Kings Bay Master Plan and negligible impacts to land use would occur. In addition, though the exact locations of the construction laydown areas for the Proposed Action have not been identified, replacement piles would be brought to SUBASE Kings Bay via barge and staged on the delivering barge. If necessary, the piles would be placed onshore adjacent to the construction site on previously disturbed areas for temporary staging to minimize potential impacts to current land uses.

Infrastructure: The proposed repair projects would not require additional power, communication, sewage, and solid waste capacity. The new TPS pier would be provided with full hotel service capability including power; potable water; fire protection; sewage connections; Ship Overboard Drainage collection; fuel; and telephone, cable, and Local Area Network services. The September 2014 SUBASE Kings Bay Installation Development Plan (IDP) evaluated the future infrastructure requirements and determined the capacity of the electrical, natural gas/steam, wastewater, and potable water systems are adequate to accommodate future growth (Navy 2014). In regard to the communications network, SUBASE Kings Bay's has projects planned to address previously identified deficiencies associated with their obsolete communication infrastructure. Therefore, there would be negligible impacts to the infrastructure at SUBASE Kings Bay.

Public Health and Safety: Public health includes fire and police protection, health services, and traffic hazards. Following implementation of the Proposed Action, there would not be an increase in the number of personnel at SUBASE Kings Bay, a change in the type or amount of operations at SUBASE Kings Bay, or result in a change to public health and safety. During implementation of the Proposed Action, all construction activities would be performed in compliance with occupational health and safety requirements. Once the activities are completed, existing installation safety procedures would continue as under existing conditions.

Transportation: Transportation resources refer to the infrastructure and equipment required for the movement of people, manufactured goods, and raw materials in geographic space. The Proposed Action would occur over a 5-year period with in-water work time ranging in durations of 2 to 80 days with no simultaneous work anticipated. During implementation of the Proposed Action, traffic at access control points for outside construction crews may be slowed as construction equipment and materials are brought

onto SUBASE Kings Bay. If needed, the Navy could stagger arrival times to reduce capacity concerns during peak travel periods, or employ management strategies such as encouraging carpooling, implementing tandem processing, or change in-bound vehicle processing. It is anticipated some construction materials (such as replacement piles) would be brought in via barge; however anticipated construction-related barge traffic would be well within the normal range of vessel movement on affected waterways. Additionally, the Proposed Action is located inside a restricted navigational area and civilian vessels would not be affected. Therefore, any potential impacts to transportation, both landside and waterside, would be minor and short in duration. Following implementation of the Proposed Action, there would not be an increase in the number of personnel at SUBASE Kings Bay or change the type or amount of operations at SUBASE Kings Bay; therefore, there would be no change to transportation following implementation of the Proposed Action. Negligible impacts to transportation would occur during implementation of the Proposed Action.

Recreation and Visual Resources: Visual resources include the natural and manmade physical features that give a particular landscape its aesthetic character and value. Viewer perceptions are formed through the impression of scenic quality in elements such as landform, vegetation, water, color, adjacent scenery, and man-made (cultural) modifications. Visibility and visual sensitivity evaluations are based on public viewing opportunities and concern for the potential for changes to the landscape. The Proposed Action would remain consistent with the SUBASE Kings Bay Master Plan and SUBASE Kings Bay's military mission. Specifically, the Proposed Action would occur in the waterfront area of SUBASE Kings Bay, which is restricted to authorized military personnel and public recreation is prohibited. The designated recreation areas of SUBASE Kings Bay are located in the Town Center area near the on-base Youth Center located in Building 0166, approximately 2.5 miles west of the waterfront area; the on-base Kings Bay Community Center, located on Wren Court, approximately 2.6 miles west of the waterfront area; and the SUBASE Kings Bay housing area (nearest neighborhood is approximately 2 miles west of the waterfront area). Views of Proposed Action activities from areas accessible to the general public would primarily be background views from recreational and commercial vessels within the Cumberland Sound and Intracoastal Waterway. These views would be mostly screened by Crab Island and similar in character to existing views and consistent with viewer expectations. Recreation activity is prohibited within the WRA and would be limited to transitory vessels. Other nearby areas outside the zone of influence for the Proposed Action, such as the eastern side of Cumberland Island, provides opportunities for in-water recreation activities such as swimming and fishing. Thus, there would be no impact to recreation and visual resources as a result of the Proposed Action.

1.4 DOCUMENTS INCORPORATED BY REFERENCE

In accordance with CEQ regulations for implementing NEPA and with the intent of reducing the size of this document, the 2012 EA for Security Fencing System Land/Water Interface at SUBASE Kings Bay, GA is incorporated by reference (Navy 2012). This EA assessed the construction of an Enclave Fencing System around the Waterfront Restricted Area (WRA) at SUBASE Kings Bay. Specifically, under this action the Navy would construct a continuous physical security barrier around the WRA to strengthen the existing physical security at SUBASE Kings Bay. Potential cumulative impacts associated with this project are addressed in Section 3.14.

1.5 INTERGOVERNMENTAL COORDINATION, PUBLIC AND AGENCY PARTICIPATION

In a letter dated May 26, 2015, the Navy solicited comments from regulatory agencies, non-governmental organizations, and federally recognized Native American tribes known or expected to be interested in the Proposed Action per 40 CFR Section 1506.6. Comments received during the scoping period were considered in the preparation of the Draft EA (Appendix A).

As part of the NEPA process, the Navy has coordinated or consulted with NMFS (Appendices B though D), U.S. Fish and Wildlife Service (USFWS) (Appendix E), and the U.S. Army Corps of Engineers regarding the Proposed Action. In addition, the Navy prepared and submitted a Coastal Consistency Determination (Appendix F) to the Georgia Department of Natural Resources (GA DNR) on December 11, 2015.

The Navy published a Notice of Availability (NOA) for the Draft EA in the *Florida Times-Union* (Jacksonville, FL) on January 22-24, 2016 and in the *Tribune and Georgian* (St. Marys, GA; serving Camden County, GA) on January 21, 28, and February 4, 2016. Publication of the NOA began a 30-day public review period which ended on February 22, 2016. The NOA described the Proposed Action, solicited public comments on the Draft EA, provided dates of the public comment period, and announced that a copy of the EA would be available for review at the NAVFAC's web portal with the following link: http://www.navfac.navy.mil/navfac_worldwide/atlantic/fecs/southeast/about_us/environmental_planning.html. All comments on the Draft EA will be reviewed, considered, and addressed appropriately in the Final EA.

2.0 PROPOSED ACTION AND ALTERNATIVES

2.1 DESCRIPTION OF THE PROPOSED ACTION

The Navy proposes to repair (including direct repairs and repairs by replacement) in-water structures at SUBASE Kings Bay and construct a new pier to support TPS functions at Site VI. These repairs, upgrades, and new construction would (1) address critical damage and mission and safety requirements, (2) where damage is less advanced, limit further deterioration and increase the useful life of the structures, and/or (3) upgrade infrastructure to meet the requirements of new submarine technology.

2.2 SCREENING CRITERIA

Federal agencies are required to rigorously explore and objectively evaluate all reasonable alternatives. Only those alternatives determined to be reasonable and meet the project purpose and need require detailed analysis. The SUBASE Kings Bay September 2014 IDP was developed through a multi-faceted and interdisciplinary planning process that was forward looking to 2028 (Navy 2014). Future planning elements addressed in the IDP process included new mission requirements, security requirements, significant facility deficiencies, capability gap analysis results, and Global Shore Infrastructure Plan recommendations. Two Area Development Plans (ADPs) were developed as part of the IDP, one for the WRA and the other for Site VI area. As part of development of the two ADPs, a charrette was held in March 2014 to review ADP issues that were identified during the December 2013 on-site interviews. Three courses of actions were developed which were then reviewed with stakeholders during a May 2014 workshop. Workshop discussions resulted in a preferred alternative for each ADP. Subsequent to the workshop, new mission requirements, significant facility deficiencies, capability gap analysis results, and Global Shore Infrastructure Plan recommendations were considered and incorporated into the preferred alternatives. For the purposes of this EA, the ADP development process was used to determine whether an alternative was considered reasonable and met the purpose and need. Sections 2.3 and 2.4 provide a summary of the alternatives considered.

2.3 DESCRIPTION OF ALTERNATIVES

2.3.1 Alternative 1

Alternative 1, the Navy's Preferred Alternative, is comprised of six distinct proposed projects. Of those six projects, Projects 1, 3, 4, and 6 comprise multiple smaller projects. The titles of these six projects are listed below:

- **Project 1**: Port Operations Waterfront Facilities Repair
- **Project 2**: Unspecified Minor Construction Layberth Fender Pile Modification
- **Project 3**: Waterfront repair and Replacement Maintenance Program
- **Project 4**: Transit Protection System Pier and Offshore Vessel Berthing Modification Project
- **Project 5**: Trident Refit Facility Waterfront Facilities Repair, Magnetic Silencing Facility with Crane
- **Project 6**: Demolition of the Transit Protection System Pier and Layberth North Trestle

A summary of the proposed projects are provided in **Table 2.3-1**; a summary of pile removal and pile installation requirements associated with these proposed projects are summarized in **Table 2.3-2**.

Table 2.3-1. Summary of Proposed Waterfront Repairs and Security-Related Upgrades

Project ID	Project Description	Facility Number (FAC #)	Project Summary
Project 1: Port Operations Waterfront Facilities Repair			
1A	Tug Pier	5926	Repair concrete structural piles, pile caps, utility cover grates, headwall, mooring support and hardware, and deck undersides; replace wooden fender piles with concrete piles; and modify the fender system on the south side of access pier.
1B	General Access Pier Crab Island	5888	Install new guide piles, and repair brow and handrails.
Project 2: Unspecified Minor Construction Layberth Fender Pile Modification			
2	Unspecified Minor Construction Layberth Fender Pile Modification P661 Project	5976	Install additional fender piles to shorten the distance between existing piles and provide the required support for hydro-pneumatic fenders.
Project 3: Waterfront Repair and Replacement Maintenance Program			
3A	Explosive Handling Wharf #2 Pier with Capstans (7)	5109	Repair high-density polyethylene (HDPE) fender pile wraps, sacrificial anodes attached to the steel fender piles, steel safety ladders and treated timber bracing; repair or replace various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings and two steel guide pipe piles on the diver's float.
3B	(Dry Dock) Interface Wharf	5995	Replace timber fender bearing strips and wales, repair concrete deck, bullrail, edge beams, and mooring foundations; and repair, paint and recoat cathodic protection on the steel H-pile fender system and sheet pile.
3C	Refit Wharf #1	5909	Replace various pile caps, piles, and the outboard edge beam; and repair, clean, and paint several mooring fittings.
3D	Refit Wharf #2	5910	Replace or repair various pile caps, piles, outboard edge beams, and mooring foundations; and reattach underdeck lighting conduit and clean and repaint various mooring fittings.
3E	Refit Wharf #3	5916	Replace or repair various pile caps, piles, the outboard edge beams, and mooring foundations; and clean and repaint various mooring fittings.
3F	Warping Wharf with Capstan (4)	5877	Repair HDPE fender pile wraps; replace or repair various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings.
3G	Tug Pier	5926	Replace timber fender piles with guide piles and small boat access floats; paint mooring fittings; and repair concrete pile caps, concrete piles, concrete underdeck, and storm drain.
Project 4: Transit Protection System Pier and Off-Shore Supply Vessel Berthing Modification Project			
4A	New TPS Pier	P617	Construct a new pier with full hotel service capability including power; potable water; fire protection; sewage connections; Ship Overboard Drainage collection; fuel; and telephone, cable, and Local Area Network services.

Table 2.3-1. Summary of Proposed Waterfront Repairs and Security-Related Upgrades

Project ID	Project Description	Facility Number (FAC #)	Project Summary
4B	Small Craft Berth Site VI	5936	Once the new TPS pier is constructed, floating berthing slips would be constructed and provided with full hotel service capability. The berthing pier would consist of a pile-supported, reinforced concrete structure with floating sections. This project includes the installation of two 5,000-gallon above ground storage tanks and provides two associated truck off-loading connections and fuel dispensing units.
Project 5: Trident Refit Facility Waterfront Facilities Repair, Magnetic Silencing Facility with Crane			
5	Magnetic Silent Facility with Cranes (RM14-1710 Trident Refit Facility Waterfront Facilities Repair)	5980	Replace timber fender piles, restraining chains, aluminum utility tray, and concrete pile utility guide bracket; and repair wooden hand rails and the cracked concrete deck underside.
Project 6: Demolition of the Transit Protection System Pier and Layberth North Trestle			
6A	Demolition of TPS Pier	5934	Remove the tip of the existing TPS Pier.
6B	Demolition of Layberth North Trestle	5977	Demolish the North Layberth Trestle.

Table 2.3-2. Summary of Proposed Pile Removal and Installation Requirements

Project ID	FAC #	Project Description	Projected Start (Fiscal Year)	Water Depth at Pile Driving Location (feet)	Pile Size (inch)	Pile Material[1]	Pile Type[2]	Total # of Piles		Primary Installation Method[3]	Removal Method	Estimated # of Strikes per Pile (Impact Driving only)	Total Maximum Number of In-Water Work Days Including Both Removal and Installation
								Installed	Removed				
Project 1: Port Operations Waterfront Facilities Repair													
1A	5926	Tug Pier	2017	24	18	Concrete	Square	148	0	Impact	N/A	60	30
					24	Concrete	Square	18	0	Impact	N/A	70	4
					16	Timber	Round	0	159	N/A	Vibratory	N/A	31
1B	5888	General Access Pier Crab Island	2017	15	16	Composite	Round	2	0	Vibratory	N/A	N/A	1
					16	Timber	Round	0	2	N/A	Vibratory	N/A	1
Project 2: Unspecified Minor Construction Layberth Fender Pile Modification													
2	5976	Unspecified Minor Construction Layberth Fender Pile Modification P661 Project	2017	46	14	Steel	H	55	0	Impact	N/A	80	7
Project 3: Waterfront Repair and Replacement Maintenance Program													
3A	5109	Explosive Handling Wharf #2 Pier with Capstans	2017	46	24	Steel	Round	2	2	Impact	Vibratory	70	2
			2022	46	24	Concrete	Square	3	3	Impact	Vibratory	75	2
				46	24	Steel	Round	10	10	Impact	Vibratory	70	7
3B	5995	(Dry Dock) Interface Wharf	2021	46	14	Steel	H	99	99	Impact	Vibratory	60	15

Table 2.3-2. Summary of Proposed Pile Removal and Installation Requirements

Project ID	FAC #	Project Description	Projected Start (Fiscal Year)	Water Depth at Pile Driving Location (feet)	Pile Size (inch)	Pile Material[1]	Pile Type[2]	Total # of Piles		Primary Installation Method[3]	Removal Method	Estimated # of Strikes per Pile (Impact Driving only)	Total Maximum Number of In-Water Work Days Including Both Removal and Installation
								Installed	Removed				
3C	5909	Refit Wharf #1	2018	46	24	Steel	Round	6	0	Impact	N/A	70	1
					30	Steel	Round	0	6	N/A	Vibratory	N/A	1
3D	5910	Refit Wharf #2	2017	46	24	Steel	Round	6	0	Impact	N/A	70	1
					30	Steel	Round	0	6	N/A	Vibratory	N/A	1
3E	5916	Refit Wharf #3	2018	46	24	Steel	Round	6	0	Impact	N/A	70	1
					30	Steel	Round	0	6	N/A	Vibratory	N/A	1
3F	5877	Warping Wharf with Capstan (4)	2021	46	30	Steel	Round	8	8	Impact	Vibratory	70	4
3G	5926	Tug Pier	2022	30	14	Steel	H	77	77	Impact	Vibratory	60	16
Project 4: Transit Protection System Pier and Off-Shore Supply Vessel Berthing Modification Project													
4A	P617	New TPS Pier	2020	35	24	Concrete	Square	165	0	Impact	N/A	200	55
					18	Concrete	Square	50	0	Impact	N/A	80	17
					24	Concrete	Square	0	121	N/A	Vibratory	N/A	8
4B	P617	Small Craft Berth Site VI	2020	35	24	Steel	Round	30	30	Impact	Vibratory	100	8

Table 2.3-2. Summary of Proposed Pile Removal and Installation Requirements

Project ID	FAC #	Project Description	Projected Start (Fiscal Year)	Water Depth at Pile Driving Location (feet)	Pile Size (inch)	Pile Material[1]	Pile Type[2]	Total # of Piles		Primary Installation Method[3]	Removal Method	Estimated # of Strikes per Pile (Impact Driving only)	Total Maximum Number of In-Water Work Days Including Both Removal and Installation
								Installed	Removed				
Project 5: Trident Refit Facility Waterfront Facilities Repair, Magnetic Silencing Facility with Crane													
5	5980	Magnetic Silent Facility with Cranes (RM14-1710 Trident Refit Facility Waterfront Facilities Repair)	2017	46	18	Composite	Round	18	0	Vibratory	N/A	N/A	3
					16	Timber	Round	0	18	N/A	Vibratory	N/A	3
Project 6: Demolition of the Transit Protection System Pier and Layberth North Trestle													
6A	5934	Demolition of TPS Pier	2022	46	24	Concrete	Square	0	649	N/A	Vibratory	N/A	41
6B	5977	Demolition of Layberth North Trestle	2022	46	24	Concrete	Square	0	121	N/A	Vibratory	N/A	6

Notes: [1]Composite piles refer to alternative pile foundations comprised of fiber-reinforced polymer, recycled plastics, and other materials.
[2]H-piles are steel piles that have an "H" shaped section.
[3]All pile driving would be attempted for completion with a vibratory hammer; however, it is anticipated that this pile driving method would be an impact driver.

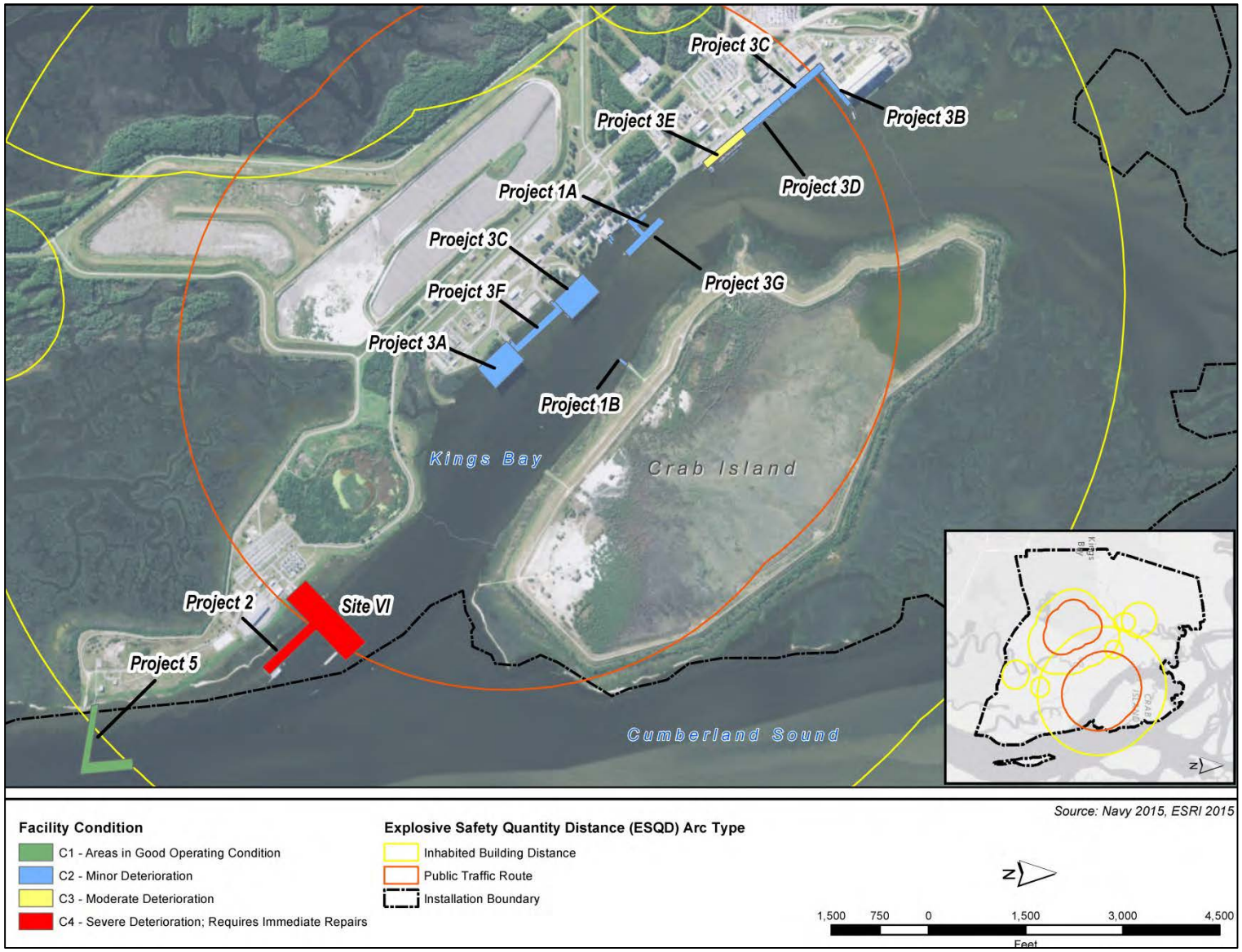

Figure 2.3-1. General Locations of the Proposed Projects

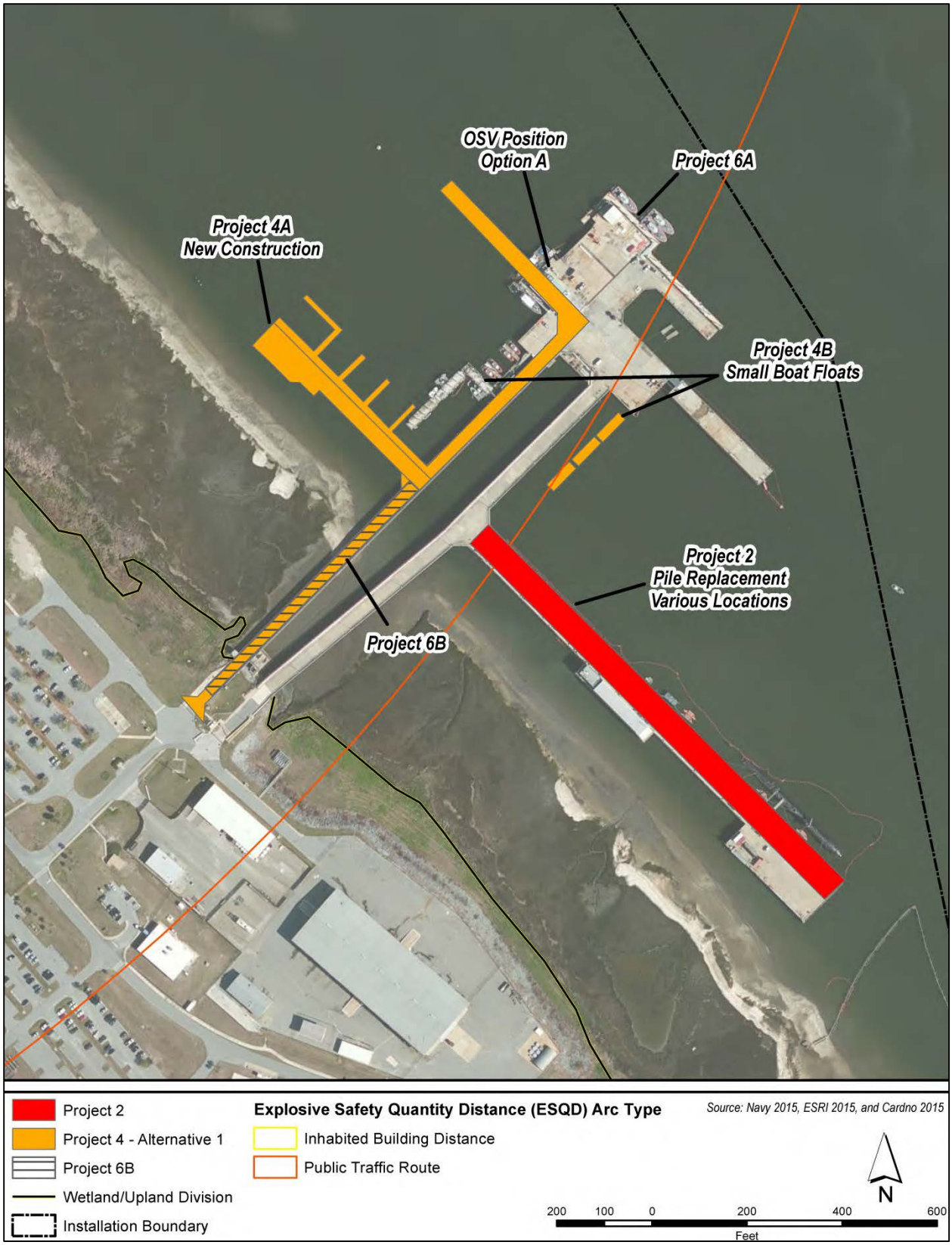

Figure 2.3-2. Site VI Proposed Projects under Alternative 1

Refer to **Figure 2.3-1** for the general locations of the proposed projects and **Figure 2.3-2** for details associated with the construction of the TPS Pier in Site VI. **Figure 2.3-1** also shows the existing composite SUBASE Kings Bay Explosive Safety Quantity Distance Arcs for the inhabited building distance and public traffic route distance. The TPS Pier project would result slightly larger arcs due to changes in berthing at Site VI. The DOD Explosive Safety Board has an extensive process for evaluating and obtaining approvals of changes to these arcs, and the Navy would adhere to this process. Detailed individual project information is provided immediately following **Figure 2.3-2**.

For all Proposed Action projects involving replacement of piles, the replacement piles would be brought to SUBASE Kings Bay via barge and staged on the delivering barge. If necessary, the piles would be placed onshore adjacent to the construction site on previously disturbed areas for temporary staging. Pile-driving equipment would be barged-mounted and placed immediately adjacent to the piles being removed or installed.

A vibratory hammer would be used for all pile removal work. If the use of vibratory hammer is not feasible for pile installation (i.e., with steel piles), a Delmag Pile Hammer D62-22 or equivalent impact hammer would be used. Estimates of the numbers of pile driven per day are given in the text descriptions for each project. These estimates are based on previous construction projects at given locations within SUBASE Kings Bay. The per-pile drive time for each pile type and method vary based on the project location and the environmental conditions (including substrate) where each pile would be driven. In general, it should take no more than one hour to drive each pile.

The most effective and efficient method of pile installation available would be implemented for each project. The method fitting these criteria may vary based on specific project requirements and local conditions. In some areas of SUBASE Kings Bay, a limestone layer can be found relatively close to the substrate/water interface. This type of layer requires impact driving because a vibratory hammer would not capable of driving the piles to a sufficient depth. As compared to vibratory driving, impact driving generally produces higher source levels but requires less active driving time.

2.3.1.1 Project 1: Port Operations Waterfront Facilities Repair

In order to maintain the waterfront infrastructure and security required to carry out homeport and refit services to SSBN and SSGN submarines, repairs to the Port Operations Water Facilities are required. Under the Proposed Action, structural concrete and steel repairs and corrosion protection is needed on the following waterfront facilities:

- Tug Pier (Facility Number [FAC] #5926; Project 1A)
- General Access Pier Crab Island (FAC #5888; Project 1B)

1A: Tug Pier Repair. The existing Tug Pier is currently operating in a generally dilapidated and unsafe condition. Spalling (i.e., cracked, flaking, pitted), delamination (i.e., separation along a plane parallel to the surface), and corrosion of internal reinforcing steel are occurring on six concrete piles, 23 concrete pile caps, and 20 square feet of concrete deck underside. Forty-four mooring fittings show areas of coating loss and surface corrosion.

Corrosion is the deterioration of a metal through a reaction with its environment. The corrosion process of metals is an electrochemical process involving a transfer of electrons from the metals surface to ions in the environment.

Under the Proposed Action, the Tug Pier concrete structural piles, pile caps, headwall, and deck undersides would be repaired. Concrete would be removed to expose the corroded steel reinforcing bars in areas where the concrete has already cracked and spalled, the steel would be repaired or replaced, and the overlying concrete restored using new concrete to eliminate the cracks and spalled concrete. Wooden fender piles would be replaced with concrete piles. The steel reinforcing bars and utility cover grates would be replaced as needed. The fender system on the south side of the access pier would be modified with floats on guide piles to allow mooring of smaller vessels. The concrete base support structures on mooring hardware would be repaired and the mooring hardware would be repainted. All broken and cracked fenders piles and fender piles with wooden guide piles would be replaced with concrete piles.

Marine borers are organisms that bore into and eat submerged wood; infestation results in piles becoming riddled and eventually collapsing.

Pile caps transmit the load from the structure to the pile group.

Spalling/delamination are the separation and breaking away of layers or small pieces of concrete.

Fenders protect the vessel and shore facility from damage due to contact between the two during berthing and mooring.

Repairing the Tug Pier would require the installation of 148 new 18-inch square concrete piles, the installation of 18 new 24-inch square concrete piles, and the removal of 159 existing 16-inch wood fender piles. The piles would be removed with a vibratory hammer. If the use of vibratory hammer is not feasible for installation, the concrete piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that 5 to 16 piles would be removed or installed per day for a maximum total of 65 days of in-water work. In-water work is scheduled to begin in FY17.

1B: Crab Island Access Pier Repairs. The Access Pier was impacted by tropical storms in 2012 and the wooden guide piles are damaged. New fiberglass re-enforced plastic composite guide piles with high-density polyethylene (HDPE) jackets would be installed at the Access Pier and the gangplank and handrails would be repaired. Repairing the Access Pier would require the installation of two, 16-inch round composite piles and the vibratory removal of two wooden guide piles. The piles would be removed with a vibratory hammer. The new composite piles would be driven by a vibratory hammer. It is anticipated that an average of two piles would be installed or removed per day for a maximum total of 2 days of in-water work. In-water work is scheduled to begin in FY17.

Gangplank refers to boards or a movable platform used in transferring passengers or cargo from a vessel to or from a dock.

Composite piles refer to alternative pile foundations comprised of fiber-reinforced polymer, recycled plastics, and other materials.

2.3.1.2 Project 2: Unspecified Minor Construction Layberth Fender Pile Modification P661 (FAC#5976)

The Layberth Pier serves the critical functions of weapons loading and unloading, resupply, and maintenance activities for allied vessels visiting SUBASE Kings Bay. The Pier is currently designated as a site for loading Tomahawk missiles in the event weapons loading operations are underway in one of the Explosive Handling Wharfs. The loss of the use of this pier would significantly impact SUBASE Kings Bay's ability to berth SSBNs, SSGNs, and foreign vessels. The existing Layberth fenders are currently installed on 5-foot centers (i.e., center of pile to center of pile), and the gaps between the fender piles are too wide to adequately support the necessary fender system.

The Unspecified Minor Construction (UMC) Layberth Fender Pile Modification P661 would provide homeport berthing for the Submarine Group 10 SSGN at SUBASE Kings Bay, berthing for visiting vessels, and overflow berthing for Tridents homeported at SUBASE Kings Bay. By reducing the distance between existing piles by installing additional piles, the pier would provide necessary structural support required for the installation and operation of an upgraded fender system, which is necessary to safely moor submarines.

Upgrading the Layberth pier would require the installation of 55 new 14-inch steel H-piles. No existing piles would need to be removed. If the use of vibratory hammer is not feasible for installation, the steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of eight piles would be installed per day for a maximum total of seven days of in-water work. In-water work is scheduled to begin in FY17.

2.3.1.3 Project 3: Waterfront Repair and Replacement Maintenance Program

The Waterfront Pile Repair and Replacement Maintenance Program consist of repairing and/or replacing structurally unsound piles along the WRA.

This project includes multiple individual projects as follows:

- Explosives Handling Wharf #2, Pier with Capstans (7), FAC #5109
- (Dry Dock) Interface Wharf, FAC #5995
- Refit Wharf #1, FAC #5909
- Refit Wharf #2, FAC #5910
- Refit Wharf #3, FAC #5916
- Warping Wharf with Capstan (4), FAC #5877
- Tug Pier, FAC #5926

3A: Explosives Handling Wharf #2 Pier with Capstans (7). The Explosive Handling Wharves at SUBASE Kings Bay serve as covered, deep water facilities for the loading and off-loading of munitions and other heavy objects onto submarines. Without this facility in operational condition, the secondary loading location would be the only place for such actions to take place. In the event of a mechanical failure or any other event causing the secondary location to be disabled, munitions or heavy supplies could not be loaded or unloaded from the submarines.

Explosives Handling Wharf #2 displays significant deterioration of a non-rated cleat mooring fitting on the diver's float, various HDPE fender pile wraps, sacrificial anodes attached to the steel fender piles, steel safety ladders and treated timber bracing; damaged reinforced concrete on various pile caps, piles, and mooring foundations. Likewise, mooring fittings and two steel guide pipe piles on the diver's float require cleaning and repainting.

Upgrading Explosives Handling Wharf #2 would require the installation of two new 24-inch round steel piles and the removal of two guide piles. The piles would be removed with a vibratory hammer. If the use of vibratory hammer is not feasible for installation, the steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated two piles would be installed or removed per day for a maximum total of 2 days of in-water work. The in-water work is scheduled to begin in FY17.

Additional future repair projects at this location may include the installation of three, 24-inch square concrete and 10, 24-inch round steel piles and the removal of three dolphins and 10 fender piles. The piles would be removed and installed as described in the above paragraph. For these future projects, it is anticipated that three to eight piles would be removed or installed per day for a maximum total of nine days of in-water work. The in-water work is scheduled to begin in FY22.

Dolphin refers to an isolated marine structure used for berthing and mooring vessels.

3B: (Dry Dock) Interface Wharf. The Interface Wharf serves as a loading and unloading for the submarine fleet as well as a service and storage wharf for non-dry-dock repairs and maintenance. Without this facility in operational condition, other refit wharves or the dry dock would have to be used to complete such tasks.

The existing Interface Wharf is increasingly deteriorating. Marine borer damage and subsequent peeling and rot are documented on 96 timber fender members at and below mean high water (MHW). Fifteen linear feet of timber wale at the curb elevation has impact and rot damage. Spalled concrete occurs at one location on the bullrail corner, on one mooring foundation, on one location on the deck at the handrail attachment, and on 2 linear feet of the beam seat on the east side of the dry dock gate. All steel fender piles show areas of surface corrosion within and immediately above the tidal zone. (Visual examination and ultrasonic thickness testing indicates the steel piles have up to 0.25 inch of rust scale; the actual loss of steel is less than 0.125 inch of actual steel thickness.)

Under the Proposed Action, the timber fender bearing strips and wales would be replaced, and the concrete deck, bullrail, edge beams, and mooring foundations would be repaired. Additionally, the steel H-pile fender system would be repaired by removing corrosion and painted. Corrosion effects can be minimized a variety of ways including using cathodic protection systems and/or applying a protective coating. Cathodic protection is an electrochemical technique used to control corrosion. Using a cathodic protection system, degradation is minimized by reversing the natural electrical current flow that is occurring during the corrosion process. Protective coatings work by interrupting the electrical path between the anode and cathode. For steel immersed in seawater, the anode (attracts negative ions) and cathode (attracts positive ions) are actually different parts in the steel since steel is not a homogenous material. Coatings work by keeping the seawater (electrolyte) from touching both the anode and cathode at the same time thus breaking the electrical path. For this repair, corrosion on the steel H-pile fender system and sheet pile above the water line would be remedied using a process suitable for marine environments. The Navy has not determined which method would be employed to address corrosion at previously identified pier structures. However, any technique implemented would be suitable for marine environments. As such, individual corrosion minimization measures are not addressed in this EA.

Bullrails are curbs along waterside edges of piers and wharves.

H-piles are steel piles that have an "H" shaped section.

Wales refers to horizontal members of a shoring system.

Cathodic Protection is an electrochemical technique used to control corrosion. Cathodic protection systems are active systems that rely on the application of electric current to control corrosion.

Repairing the Interface Wharf would require the installation of 99 new 14-inch steel H-piles and removal of 99 existing 14-inch steel H-piles. The piles would be removed with a vibratory hammer. If the use of vibratory hammer is not feasible for installation, the steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of 14 piles would be removed or

installed per day for a maximum total of 15 days of in-water work. The in-water work is scheduled to begin in FY21.

3C: Refit Wharf 1. Refit Wharfs 1, 2, and 3 provide storage and maintenance services to Trident Submarines and others as requested, including incremental overhaul, modernization, and repair support. All three Refit Wharfs are in disrepair and present a safety risk to the personnel and heavy equipment utilizing the pier; in certain areas, it is recommended that vehicles, mobile cranes, storage and any other heavy loads be prohibited from within the areas supported by deteriorated pile cap locations to limit the possibility of further damage or structural failures. Without the wharves in operational condition, submarines would need to be docked at other locations for repairs, reducing the operational efficiency of SUBASE Kings Bay's maintenance mission, extending the length of vessel docking times, and creating congestion with other vessels already in port.

Refit Wharf 1 displays damaged steel beams supporting the outboard access walkway; damaged reinforced concrete on various pile caps, piles, and the outboard edge beam. Likewise, several mooring fittings require repair, cleaning, and painting.

Repairing Refit Wharf 1 would require the installation of six, 24-inch round steel guide piles and the removal of six existing 30-inch fender piles. The piles would be removed with a vibratory hammer. If the use of vibratory hammer is not feasible for installation, the steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of six piles would be removed or installed per day for a maximum total of 2 days of in-water work. The in-water work is scheduled to begin in FY18.

3D: Refit Wharf 2. Refit Wharf 2 displays broken steel beams supporting the outboard access walkway and damaged reinforced concrete on various pile caps, piles, outboard edge beams, and mooring foundations. Additionally, some of the underdeck lighting conduit is detached and various mooring fittings require cleaning and repainting.

Repairing Refit Wharf 2 would require the installation of six, 24-inch round steel guide piles and the removal of six existing 30-inch fender piles. The piles would be removed with a vibratory hammer. If the use of vibratory hammer is not feasible for installation, the steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of six piles would be removed or installed per day for a maximum total of 2 days of in-water work. The in-water work is scheduled to begin in FY17.

3E: Refit Wharf 3. Refit Wharf 3 displays broken steel beams supporting the outboard access walkway and damaged reinforced concrete on various pile caps, piles, the outboard edge beams, and mooring foundations. Likewise, the mooring fittings require cleaning and painting.

Repairing Refit Wharf 3 would require the installation of six, 24-inch round steel guide piles and the removal of six, 30-inch fender piles. The piles would be removed with a vibratory hammer. If the use of vibratory hammer is not feasible for installation, the steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of six piles would be removed or installed per day for a maximum total of 2 days of in-water work. The in-water work is scheduled to begin in FY18.

3F: Warping Wharf with Capstan (4). The Warping Wharf serves as a non-covered extension of the inboard leg of the Explosives Handling Wharfs used for aligning submarines prior to berthing in the covered

facilities. This facility provides for quick transfer from one Explosives Handling Wharf to the other, as well as protection for the submarines as there is a continuous barrier beside the submarine and attached capstans during docking. The Warping Wharf also functions as a berthing facility for Fleet Ballistic Cargo Ships.

Deterioration at the Warping Wharf includes various degraded HDPE fender pile wraps and damaged reinforced concrete on various pile caps, piles, and mooring foundations. Likewise, the mooring fittings require cleaning and painting.

Repairing the Warping Wharf would require the installation of eight, 30-inch round steel piles and the removal of eight existing fender piles. The piles would be removed with a vibratory hammer. If the use of vibratory hammer is not feasible for installation, the steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of five piles would be removed or installed per day for a maximum total of four days of in-water work. The in-water start work is scheduled to begin in FY21.

3G: Tug Pier FAC. Whereas Project 1A addresses shore side pilings, Project 3G addresses channel side pilings. Additional future repair projects at this location may include the installation of 77 new 14-inch steel H-piles and removal of 77 existing steel fender piles. The piles would be removed with a vibratory hammer. If the use of vibratory hammer is not feasible for installation, the steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of 10 piles would be removed or installed per day for a maximum total of 16 days of in-water work. The in-water work is scheduled to begin in FY22.

2.3.1.4 Project 4: Transit Protection System Pier and Off-Shore Supply Vessel Berthing Modification Project

This project includes the construction of a new pier associated with TPS functions and the modification of the existing berthing pier on the north trestle at Site VI to comply with current DOD and Navy security directives.

- New TPS Pier, P617
- Modification of Small Craft Berth Site VI, P617, FAC #5936

4A: New TPS Pier. The new TPS pier would be provided with full hotel service capability including power, potable water, fire protection, wastewater, Ship Overboard Drainage collection, fuel, and telecommunications (i.e., telephone, cable, and Local Area Network services). The construction of the new pier would require the installation of 165 new 24-inch square concrete piles and 50 new 18-inch square concrete piles. Approximately 121 piles would be removed with a vibratory hammer. If the use of vibratory hammer is not feasible for installation, the steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated 16 to 22 piles would be removed and 3 to 12 piles would be installed per day for a maximum total of 80 days of in-water work. The in-water work is scheduled to begin in FY20.

4B: Small Craft Berth Site VI P617. The existing berthing pier on the north trestle at Site VI would be relocated to align with the new TPS pier and modified to accommodate two Off-shore Supply Vessels; two, 87-foot Coast Guard Cutters; six, 33-foot long Screening Vessels (SVs); and six, 72-foot long SVs in accordance with current DOD and Navy security directives. The berthing pier would consist of a pile-supported, reinforced concrete structure including floating sections to berth the smaller craft. Two 5,000-gallon horizontal, protected above-ground storage tanks and two associated truck off-loading connections

(one for each tank) and fuel dispensing units for refueling the U.S. Coast Guard escort vessels would be installed.

As with the new TPS Pier described as Project 4A, the floating berthing slips would be provided with full hotel services. Drainage water from the piers would be collected, run through oil-water separators, and then disposed through existing sewage connections. The modification of the small craft berthing site associated with the TPS Pier would require the installation of 30 new 24-inch round steel piles and the removal of 30 existing piles. The piles would be removed with a vibratory hammer. If the use of vibratory hammer is not feasible for installation, the steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of eight piles would be installed or removed per day for a maximum total of eight days of in-water work. The in-water work is scheduled to begin in FY20.

2.3.1.5 Project 5: RM14-1710 Trident Refit Facility Waterfront Facilities Repair, Magnetic Silencing Facility with Cranes (FAC #5980)

The Magnetic Silencing Facility (MSF) serves as a degaussing (process of decreasing or eliminating a remnant magnetic field) station for Trident Submarines. During normal oceanic operations ships and submarines naturally build up a magnetic signature, which can be visible and exploitable by enemy craft as well as damaging to sensitive equipment aboard the ship. The earth's magnetic fields between the North and South Poles are being crossed routinely at sea, and while either traversing these natural fields or lying dormant for extended periods of time during scheduled maintenance, a vessel's magnetic signature changes. To minimize the level of permanent magnetism, the MSF treatment slip is the first structure vessels encounter on their way into or out of SUBASE Kings Bay facilities.

The MSF at Kings Bay is in a deteriorated condition. Deterioration includes a broken 5-linear foot aluminum utility tray, one fender system restraining chain, and one utility guide bracket. Marine borer damage is occurring on one timber fender pile at and below the MLW level. The concrete underdeck has a 6-linear foot crack (0.125 inch wide).

The Proposed Action would replace the MSF and MSF trestle timber fender piles, restraining chains, aluminum utility tray, and concrete pile utility guide bracket. Wooden hand rails and the cracked concrete deck underside would be repaired. Repairing the MSF and MSF trestle would require the removal of 18 existing timber piles and the installation of 18 new 18-inch round composite piles. The fiberglass re-enforced plastic composite piles would be driven by a vibratory hammer. It is anticipated that an average of six piles would be installed per day for a maximum total of 6 days of in-water work. The in-water work is scheduled to begin in FY17.

2.3.1.6 Project 6: Demolition Project using Restoration Modernization Funds: TPS Pier and North Trestle

As part of this project, the existing TPS Pier and the North Trestle would be demolished. The North Trestle and TPS Pier were designed to meet the short-term need to moor a floating dry dock and med-moor a submarine tender for Poseidon Class submarines.

- Demolish TPS Pier, FAC #5934

- Demolish Layberth North Trestle, FAC #5977

6A: TPS Pier. Demolition of the TPS pier would require the vibratory removal of 649 existing 24-inch square concrete piles. It is anticipated that an average of 16 piles would be removed per day for a maximum total of 41 days of in-water work. The in-water work is scheduled to begin in FY22.

Med-moor is derived from a type of docking that has been used in parts of the Mediterranean for centuries, where the vessel drops anchor in the port and backs parallel with other vessels into an opening that is perpendicular to a seawall.

6B: Layberth North Trestle. The Layberth North Trestle was intended as an interim fix during the transition to the newer Ohio Class submarines as the Poseidon Class submarines were decommissioned. The facility is obsolete, in poor condition, and cannot meet any current or future mission needs cost effectively. Demolition of the Layberth North Trestle would require the removal of 121 existing 24-inch square concrete piles. The piles would be removed with a vibratory hammer. It is anticipated that an average of 20 piles would be removed per day for a maximum total of 6 days of in-water work. The in-water work is scheduled to begin in FY22.

2.3.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, the location of Project 4 would differ as shown in **Figure 2.3-3**.

Specifically, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1.

2.3.3 No Action Alternative

Under the No Action Alternative, the facilities would remain in their existing condition and none of the projects described in the Proposed Action would be implemented. Critical damage would not be addressed and it is expected the Navy would not be able to maintain the structural integrity of the in-water pile-supported structures across the SUBASE Kings Bay WRA. This would result in non-compliance with current DOD and Navy security directives which would affect SUBASE Kings Bay's ability to meet mission requirements. Evaluation of the No Action Alternative is required by CEQ and Navy regulations and provides a benchmark so that decision makers can compare the magnitude of potential environmental effects of the proposed action or alternatives with the conditions that would occur if the action does not take place.

2.4 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM FURTHER ANALYSIS

Alternatives that would relocate existing infrastructure through new construction were not carried forward due to the exorbitant costs associated with new construction and because the existing infrastructure within SUBASE Kings Bay WRA is strategically and functionally located for operational purposes. Therefore, relocation alternatives to the repairs were not considered.

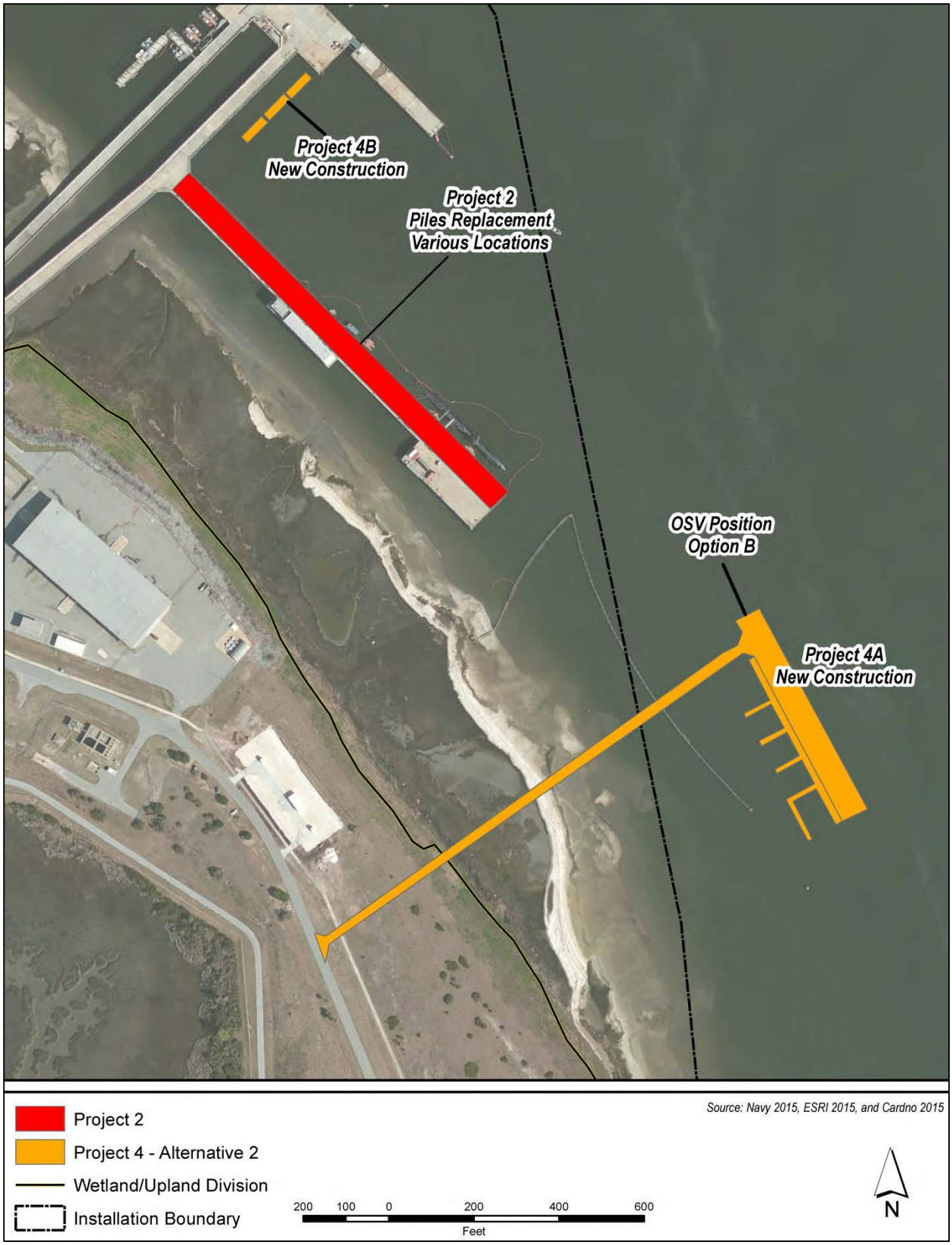

Figure 2.3-3. Proposed Project Under Alternative 2

2.5 PREFERRED ALTERNATIVE

This EA analyzes two action alternatives and the No Action Alternative. As discussed in Section 2.3, Projects 1, 2, 3, 5, and 6 would be implemented the same under Alternatives 1 and 2. However, under Alternative 2, the location of Project 4 would be located at the south end of the existing Layberth Pier. Factors that influenced selection of Alternative 1 as the Preferred Alternative included impact analyses presented in Chapter 3 and the operational flexibility afforded by constructing the TPS Pier in Site VI. Specifically, as described in Section 3.10, the construction of Project 4 under Alternative 2 would result in the shading of 0.19 acre of wetlands. Under Alternative 1, there would be no shading of wetlands. Therefore, Alternative 1 was selected as the Preferred Alternative because it meets the purpose and need of the Proposed Action, and minimizes environmental impacts.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 AIR QUALITY

3.1.1 Affected Environment

The Clean Air Act (CAA) and its subsequent amendments established the National Ambient Air Quality Standards (NAAQS) for what are commonly referred to as "criteria" pollutants: ozone, sulfur dioxide (SO_2), carbon monoxide (CO), nitrogen dioxide (NO_2), particulate matter less than or equal to 10 microns in diameter (PM_{10}), particulate matter less than or equal to 2.5 microns in diameter ($PM_{2.5}$), and lead. Volatile organic compounds (VOCs) are important ozone precursors emitted via anthropogenic sources, and are therefore analyzed to assess potential ozone formation. The region of influence (affected environment) for air quality for this EA is defined as the Jacksonville (Florida) - Brunswick (Georgia) Interstate Air Quality Control Region (defined in 40 CFR Section 81.91). This Air Quality Control Region includes Camden County, where the SUBASE is located, as well as the Georgia counties of Appling, Atkinson, Bacon, Brantley, Charlton, Clinch, Coffee, Glynn, Long, McIntosh, Pierce, Ware, and Wayne County and the Florida counties of Alachua, Baker, Bradford, Clay, Columbia, Dixie, Duval, Flagler, Franklin, Gadsden, Gilchrist, Hamilton, Jefferson, Lafayette, Leon, Liberty, Madison, Marion, Nassau, Putnam, St. Johns, Suwannee, Taylor, Union, and Wakulla County. Camden County and the surrounding environs are in attainment of the NAAQS for all criteria pollutants.

SUBASE Kings Bay has a Title V Operating Permit (Permit Number 9711-039-0003-V-01-0) issued by the GA DNR Environmental Protection Division, Air Protection Branch. This permit provides authorization for and monitoring of air emissions discharged from stationary sources located at the installation.

In addition to the ambient air quality standards for criteria pollutants, national standards exist for hazardous air pollutants (HAPs) which are regulated under Section 112(b) of the 1990 CAA Amendments. The National Emission Standards for Hazardous Air Pollutants regulate HAP emissions from stationary sources (40 CFR Part 61 and 63).

Unlike the criteria pollutants, there are no NAAQS for benzene and other HAPs. The primary control methodologies for these pollutants for mobile sources involves reducing their content in fuel and altering the engine operating characteristics to reduce the volume of pollutant generated during combustion. Because of the intermittent operational use of construction equipment and short term, temporary nature of the construction activities, HAPs are not further evaluated in this EA.

3.1.2 Environmental Consequences

Pollutant emissions resulting from proposed construction and operation activities have been evaluated for the Proposed Action. Because the Proposed Action would occur in an area that is in attainment for all criteria pollutants, the "major stationary source" definition (250 tons per year or more of any air pollutant subject to regulations under the CAA) from the Prevention of Significant Deterioration program was selected as a comparative measure. The emissions associated with the Proposed Action are associated with the operation of equipment, delivery of materials, and worker transport for pier repair projects (Projects 1, 2, 3, 5, and 6) and the construction of a new pier (Project 4).

3.1.2.1 Alternative 1

In order to assess air emissions associated with the construction and demolition activities, the following assumptions were made:

- Material deliveries would be made via barge from Jacksonville, Florida.
- The in-water work would be performed using equipment on barges (primarily the impact and vibratory hammers on cranes and excavators).
- Demolition material would be staged on land near the construction areas and subsequently removed via semi-truck to an area landfill that accepts construction and demolition debris.
- The construction work-force would predominantly come from the Jacksonville area as the closest urban area.
- No cement batch plants are required, but up to six generators may be used during construction activities.

The calculations of potential emissions estimated with the Alternative 1 construction and demolition activities are included in Appendix G along with associated assumptions; a summary of estimated annual construction emissions are presented in **Table 3.1-1**.

Table 3.1-1. Estimated Annual Construction Emission Totals

Construction	Tons per Year					
Year	**VOC**	**CO**	**NO_x**	**SO_2**	**PM_{10}**	**$PM_{2.5}$**
2017	0.28	8.66	4.95	0.55	0.21	0.20
2018	0.03	0.94	0.52	0.05	0.02	0.02
2020	0.36	9.46	6.66	0.79	0.28	0.27
2021	0.11	3.85	1.81	0.21	0.08	0.07
2022	0.42	15.87	7.24	0.84	0.31	0.30
Comparative Threshold	250	250	250	250	250	250
Exceedance?	No	No	No	No	No	No

Construction emissions are anticipated to be greatest in 2022, with CO emissions less than 16 tons per year. The emissions associated with the Proposed Action are, for each year, far less than the comparative threshold. Thus, the short-term, transitory emissions associated with the construction and demolition activities would have little impact. In addition, the contractor will be required to adhere to recordkeeping requirements, including maintaining usage logs, for generators and other temporary air emitting sources during construction activities.

3.1.2.2 Alternative 2

The implementation of Alternative 2 would have the same potential impacts to air quality as assessed for Alternative 1. Although Project 4 would be located at the south end of the existing Layberth Pier under Alternative 2, the mobile source emissions would be the same as for Alternative 1. Therefore, the analysis and conclusions for Alternative 1 apply to Alternative 2 and no impacts would occur from the implementation of Alternative 2. In addition, the contractor will be required to adhere to recordkeeping requirements, including maintaining usage logs, for generators and other temporary air emitting sources during construction activities.

3.1.2.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented; therefore, baseline air quality conditions would remain unchanged.

3.2 WATER RESOURCES

Water resources for this EA include surface water, groundwater, wetlands, floodplains, and stormwater. Water resources are discussed in this EA because of the potential impacts to water quality and tidal wetlands.

3.2.1 Affected Environment

3.2.1.1 Surface Water/Stormwater

For the purposes of this EA, surface water includes streams, rivers, lakes, and reservoirs. Surface waters nearest to SUBASE Kings Bay's WRA include Kings Bay, Cumberland Sound, and the Crooked River (refer to **Figure 1.1-1**). Water samples from Kings Bay, the Crooked River, and Cumberland Sound were collected in January 1999 and analyzed for concentrations of total trace metals, oil and grease, orthophosphate as phosphorous, total Kjeldahl nitrogen, nitrite plus nitrate (as nitrogen), and total organic carbon. In addition, measurement of biochemical oxygen demand, total and fecal coliform, and in-place field parameters were also collected. In general, water quality did not exceed Georgia Environmental Protection Division (GA EPD) ambient water-quality criteria; however, two of seven samples had copper concentrations that exceeded GA EPD guidelines (the concentrations were below U.S. Environmental Protection Agency's [USEPA] method detection limit) (Leeth and Holloway 2000).

Water quality conditions near Cumberland Island were measured between 2000 and 2004. Dissolved nutrient concentrations (orthophosphate, total dissolved phosphorous, nitrate plus nitrite) were considered fair to good according to USEPA National Coastal Condition Report II criteria. In addition, bacterial concentrations (fecal coliform) were normal, but dissolved oxygen levels were sometimes critically low, especially in the summer (Alber et al. 2005). In addition, when the Crooked River was assessed in 2012, the overall water quality assessment status of the river was considered "good" (USEPA 2015a; 2015b).

For the last 15 years (1999–2015, with exception of 2000), estuarine water and sediment data have been collected from sites on the Crooked River, Kings Bay, and Cumberland Sound; and surface water runoff was collected from streams that discharge from SUBASE Kings Bay. In August 2015, samples were collected and analyzed as follows:

- estuarine water and surface water: analyzed for metals, nutrients, selected organics, biochemical oxygen demand, total coliform, and fecal coliform; and
- estuarine sediment: analyzed for total metals, nutrients, selected organics, percent moisture, and oil and grease.

In general, the results have been consistent over the 15-year period, and there are no noteworthy trends or observations in the data (Navy 2015a).

The majority of stormwater at SUBASE Kings Bay is conveyed by overland flow, open drainage systems, and culverts under roadways. Underground storm sewers are only common along the waterfront area. A large system of open drainage swales conveys stormwater runoff into man-made retention ponds that help

control the quality and quantity of stormwater before it is discharged into surrounding estuaries. The majority of the drainage swales are vegetated; however, there are a few concrete lined drainage swales on the installation (Navy 2014a, SAIC 2008). Stormwater controls and best management practices (BMPs) are outlined in the installation's Storm Water Pollution Prevention Plan.

3.2.1.2 Groundwater

Groundwater is defined as subsurface water contained within aquifers. Groundwater aquifers are usually relatively deep under the ground surface.

There are two major groundwater aquifers in the SUBASE Kings Bay area. The Surficial aquifer is found beneath the ground surface with an average depth of 40 to 300 feet and is used primarily for irrigation purposes. The Floridan aquifer ranges in depth from 40 to 900 feet. The Floridan aquifer is the primary artesian aquifer that is used as the source of potable water for SUBASE Kings Bay (Navy 2014a). A nanofiltration plant uses reverse osmosis to remove organics and hardness from the drinking water (Navy 2014b).

Every July 1st, SUBASE Kings Bay releases the results from monitoring of these wells for potable use in compliance with the Georgia Drinking Water Standards, as well as to inform the public about its water consumption and efforts to minimize the need for withdrawals of groundwater supplies. According to the 2014 Community Confidence Report, the drinking water at SUBASE Kings Bay meets all regulatory standards (Navy 2015b). In addition, in July 2015, groundwater data was collected from six groundwater monitoring wells and analyzed for total and dissolved metals, nutrients, selected organics, oil, and grease. None of the detected constituents exceeded maximum contaminant levels for drinking water (Navy 2015a).

3.2.1.3 Wetlands

Salt marsh wetlands are the largest wetland community type found on SUBASE Kings Bay. Salt marsh communities cover approximately 30 percent of the SUBASE Kings Bay property. These wetlands form a continuous border along the edges of the estuaries extending into the mouths of creeks and rivers as far upstream as the zone of tidal influence extends. Salt marshes are an important component of the ecosystem in this area because they provide important functions that include shoreline stabilization, storm buffering, water quality improvement, nutrient cycling, and wildlife habitat for a wide variety of species and uses (including nesting and nursery grounds, forage areas, and cover/protection from predation). Most of these areas are dominated by perennial grasses and rushes (Navy 2014a).

Two distinct sub-communities are recognized in the local salt marshes: high marsh and low marsh. High marsh is the highest zone along the upper edge of the salt marsh. Within this area, black needlerush (*Juncus roemerianus*) is the dominant species, forming extensive, dense stands. Other perennial herbs such as marsh dropseed (*Sporobolus virginicus*), salt meadow cordgrass (*Spartina patens*), salt marsh fleabane (*Pluchea purpurascens*), sea lavender (*Limonium carolinianum*), and sea ox-eye (*Borrichia frutescens*) are common, as well as shrubs such as groundsel tree (*Baccharis halimifolia*), and marsh elder (*Iva frutescens*) (Navy 2014a).

Low marsh areas are lower elevation salt marsh zones flooded by tides for the longest periods of time and at the greatest depths. At high tide, the water in the low marsh may be several feet deep. Smooth cordgrass (*Spartina alterniflora*) forms dense monotypical stands in the low marsh (Navy 2014a).

Projects 1, 2, 3, 5, and 6 would all occur on existing structures located in developed areas of the WRA. The primary wetland habitat in the vicinity of Site VI is low salt marsh dominated by smooth cordgrass. The high marsh areas are restricted to a narrow band along the base of the slope along Site VI (refer to Figures 2-2 and 2-3). Wetlands are considered waters of the U.S.; therefore, the tidal wetlands in the vicinity of Site VI are regulated under Section 404 of the Clean Water Act (CWA). In addition, the tidal wetlands in the vicinity of Site VI are regulated under the Georgia Coastal Marshlands Protection Act.

3.2.1.4 Floodplains

Floodplains at SUBASE Kings Bay occur along the edges of surface waters. The 100-year floodplain on the base occurs at 12.4 feet above mean sea level, or 15.4 feet above the mean low water (MLW) level (Navy 2014a). Construction in floodplain areas is typically limited to uninhabitable structures such as berms, pile-supported barriers, and piers. All portions of the Proposed Action are located in the 100-year floodplain.

3.2.2 Environmental Consequences

3.2.2.1 Alternative 1

<u>Surface Water/Stormwater</u>

Under Alternative 1, the pile repair, removal, and/or installation projects (pile repairs under Projects 1, 2, 3, 5, and 6 and construction of a new pier under Project 4) would result in short-term localized impacts on Kings Bay's surface water quality from increased turbidity. There may also be a release of contaminants such as polycyclic aromatic hydrocarbons from creosote-treated timber piles as the sediments are disturbed during pile removal. In addition, the existing piles would be removed by pulling them using a barge-mounted excavator with vibratory attachment to loosen the sediment around the piles, which may cause sediments to be redistributed resulting in temporary turbidity. To minimize the impacts from temporary elevated turbidity, control floating debris, and to ensure that floating creosote-related contamination is constrained to the construction site (where applicable), floating booms and turbidity curtains, as appropriate, would be in place for the duration of the pile removal, repair, and installation activities. Floating booms are temporary floating barriers that control the dispersion of floating debris as well as floating contaminants released into the surface water such as oils and greases.

All pile repair, removal, and installation would require permitting under both Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the CWA. Section 10 of the Rivers and Harbors Act regulates the placement of structures into waters of the United States and Section 404 of the CWA governs the placement of fill into waters of the United States. Due to the *de minimis* amount of fill associated with the sloughing of sediment from the pilings being removed with the Proposed Action, the U.S. Army Corps of Engineers may determine that a Section 404 permit is not required. A Section 401 Water Quality Certification from GA EPD would be required to minimize potential impacts to water quality. None of the projects would be completed simultaneously and all of the projects have a surface area footprint of less than 1 acre. As such, none of the individual projects would require a National Pollutant Discharge Elimination System Construction Activity General Permit (40 CFR Parts 122–124).

As stated in Section 2.3.1, the replacement piles for all projects would be brought to and staged at SUBASE Kings Bay on a barge. If necessary, the piles would be placed onshore adjacent to the construction site on previously disturbed areas for temporary staging. The pile-driving equipment would be barge-mounted and placed immediately adjacent to the piles being removed or installed. Elevated turbidity levels in stormwater

runoff during construction would occur where construction laydown areas are located. Although the specific construction laydown area locations are not currently known due to the early planning stages of this project, areas previously disturbed such as existing parking lots or open-grassed areas in proximity to the individual projects would be designated for laydown purposes. The contractor would adhere to all permit requirements as well as develop an Environmental Protection Plan. The Environmental Protection Plan would contain, but is not limited to, drawings depicting material storage areas, construction material containment, and methods to control water runoff. The methods used to control water runoff may include items such as hay bales and/or silt fences which would contain erosion within the construction laydown sites thereby protecting any nearby environmentally sensitive areas from increased turbidity.

During construction, the contractor may use petroleum products, lubricants, and other hazardous materials in operating construction equipment; therefore, there could be minor impacts to surface waters resulting from the use of these materials. Equipment and materials are anticipated to be stored in designated laydown areas while construction is ongoing. If concrete is used, the contractor would be required to contain and properly dispose of concrete truck process water (washwater) and equipment washdown water generated during construction activities to prevent it from combining with stormwater or being discharged into nearby surface water bodies. The construction contractor would develop a project-specific Spill Prevention, Control, and Countermeasure Plan that would provide the clean-up, containment, and restoration procedures, instructions and reports to be used in the event of an unforeseen spill of a substance regulated by federal, state and local laws and regulations. In addition, the construction contractor would develop a project-specific Hazardous Materials Management Plan that identifies the hazardous substances to be used on the job site, the actions to prevent introduction of such materials into air, water, or ground, and detail provisions for compliance with federal, state, and local laws and regulations for storage and handling of these materials. A Hazardous Waste Management Plan would be included in the Hazardous Materials Management Plan to delineate measures required to handle and dispose of any hazardous waste or excess hazardous materials.

Impacts from stormwater would be manageable as the six projects comprising the Proposed Action would be implemented over a 2- to 80-day period with the maximum total number of in-water work days for the entire Proposed Action totaling 267 days. Given the relatively short duration of each project and the fact that the projects would not occur simultaneously, the impacts from stormwater would be readily manageable. Additionally, the construction contractor would be required to implement prudent best management practices to control stormwater. As a result, any adverse impacts to surface water and/or stormwater from the implementation of Alternative 1 would be temporary and minor.

Groundwater

The Surficial and Floridan Aquifers would not be impacted by implementation of Alternative 1 and there would not be any increases in risk of groundwater pollutants at SUBASE Kings Bay. Therefore, no impacts to groundwater from the implementation of Alternative 1 are expected.

Wetlands

The Navy has determined there would be no loss of wetlands pursuant to Section 404 of the CWA from the implementation of Alternative 1. With regard to the Georgia Coastal Marshlands Protection Act of 1970 (Official Code of Georgia [O.C.G.A.] 12-5-280), the access trestle for the TPS Pier would remain in the same footprint as the existing Layberth North Trestle as shown in **Figure 2.3-2**; as such, no mitigation for shading would be required. However, the Georgia Coastal Marshlands Protection Act grants the GA DNR

Coastal Resources Division the authority to protect tidal wetlands. Specifically, a permit is required for any structures, dredging, or filling projects that are located in coastal Georgia areas (GA DNR 2015). Prior to commencing any work, a permit application would be submitted to the GA DNR Coastal Resources Division.

Floodplains

All six projects are located in the 100-year floodplain. Executive Order (EO) 13690, *Establishing a Federal Flood Risk Management Standard and a Process for Further Soliciting and Considering Stakeholder Input*, amended EO 11988, *Floodplain Management*. EO 11988 required agencies to avoid, to the extent possible, the adverse impacts associated with the occupancy and modification of floodplains and to avoid direct or indirect support of floodplain development wherever there is a practicable alternative. EO 13690 requires the Federal Emergency Management Agency to prepare Floodplain Management Guidelines for public comment. Draft Guidelines for Implementing EO 11988 were released for stakeholder input, which concluded on May 6, 2015 (FEMA 2015).

Consistent with EO 11988, the Navy has determined there is no practicable alternative to locating the Proposed Action outside the 100-year floodplain. The Integrated Natural Resource Management Plan (INRMP) addresses the minimization of impacts from the development within floodplains. Specifically, if there is no suitable location outside the 100-year floodplain that would satisfy the need of the SUBASE military mission (*e.g.*, proximity to dependent function), preferred sites for development would be within previously disturbed areas of the 100-year floodplain (Navy 2014a). SUBASE Kings Bay's current policy is to build to a minimum floor height of 17 feet above mean low water which corresponds to the 100-year flood event (Navy 2014b).

3.2.2.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1. Therefore, impacts to surface water, stormwater, and floodplains from construction of the TPS pier under Alternative 2 would not be measurably different from those described for Alternative 1.

With regard to wetlands, no loss of wetlands pursuant to Section 404 of the CWA would occur from implementation of Alternative 2. With regard to the Georgia Coastal Marshlands Protection Act, approximately 0.19 acre of salt marsh habitat would be permanently impacted from shading due to construction of the TPS Pier. As a result, the State of Georgia, pursuant to their Coastal Marshlands Protection Act, would require "type for type" mitigation. Prior to commencing any work, a permit application would be submitted to the GA DNR Coastal Resources Division.

3.2.2.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented; therefore, baseline conditions would remain unchanged.

3.3 GEOLOGY, TOPOGRAPHY AND SOILS

SUBASE Kings Bay is located in the coastal plain physiographic province of Georgia. The area underlying SUBASE Kings Bay is composed of limestone, sandstone, and shale sediments that are mixed with layers of sand and clay. These sediments were deposited during the Pleistocene and Holocene epochs when the sea level rose and fell. The bedrock under SUBASE Kings Bay is mainly stratified limestone and sediment depth ranges from 40 to 100 feet below the surface (Navy 2014).

The topography of SUBASE Kings Bay is virtually flat with no outstanding natural landforms. Natural elevations range from even with mean sea level along Kings Bay and Cumberland Sound to approximately 30 feet above mean sea level in the western portion of SUBASE Kings Bay. However, areas where man-made earthen berms have been built potentially have slightly higher elevations. The only significant slopes occur along creek banks, along the eastern shore line, and in areas with man-made earthen berms (Navy 2014).

There are seven different soils found within the boundaries of SUBASE Kings Bay. **Table 3.1-1** provides specific information on each of the different soil types. All of the soils at SUBASE Kings Bay were derived from marine sediments. Mandarin fine sand covers approximately 75 percent of the Base, but the salt marsh areas are composed of Bohicket-Capers soil association (Navy 2014).

Table 3.3-1. Soils on SUBASE Kings Bay

Soil	Drainage Class	Flooding Potential	Hydric	Erosion Potential
Cainhoy fine sand, 0-5 percent slopes	Excessively drained	None	No	Low
Meggett fine sandy loam	Poorly drained	None	Yes	Moderate
Pelham loamy sand	Poorly drained	Frequent	Yes	Moderate
Mandarin fine sand	Somewhat poorly drained	None	Yes	Low
Rutlege fine sand	Very poorly drained	None	Yes	Low
Pottsburg sand	Poorly drained	None	Yes	Low
Bohicket-Capers association	Very poorly drained	Very Frequent	Yes	Moderate

Source: Navy 2014.

3.3.1 Environmental Consequences

3.3.1.1 Alternative 1

No changes to terrain would occur as a result of the proposed repair activities as the repair projects would occur within previously developed areas. Minor alterations of the subsurface topography may occur from the removal and installation of steel, concrete, and composite piles for the in-water work. However, any minimal surficial modifications associated with the project repairs would not result in impacts to geology and topography

Since the trestle for the new TPS Pier is anticipated to overlay the footprint of the existing Layberth North Trestle, only minor landside grading would be needed to support it. In order to minimize impacts to soils and surface waters during construction, the construction contractor would be required to prepare a project-specific Storm Water Pollution Prevention Plan which identifies the type and location of the erosion and sediment controls that would be used. The plan would include reporting requirements to ensure control measures are in compliance with the Stormwater Pollution Prevention Plan, as well as applicable

regulations. As such, implementation of Alternative 1 would result in minor adverse impacts to soils and topography. Since the project would occur within previously developed areas within SUBASE Kings Bay, no changes to terrain would occur; thus, negligible impacts to geology would be anticipated.

3.3.1.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1. Therefore, impacts to geology, topography, and soils from construction of the TPS pier under Alternative 2 would not be measurably different as those described for Alternative 1.

3.3.1.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented; therefore, baseline conditions would remain unchanged.

3.4 CULTURAL RESOURCES

Cultural resources consist of prehistoric and historic archaeological sites; historic buildings, structures, and districts; and physical entities and human-made or natural features important to a culture, a subculture, or a community for traditional, religious, or other reasons. Cultural resources can be divided into three major categories:

- Archaeological resources (prehistoric and historic) are locations where human activity measurably altered the earth or left deposits of physical remains.
- Architectural resources include standing buildings, structures, landscapes, and other built-environment resources of historic or aesthetic significance.
- Traditional cultural properties may include archaeological resources, structures, neighborhoods, prominent topographic features, habitat, plants, animals, and minerals that Native Americans or other groups consider essential for the preservation of traditional culture.

3.4.1 Affected Environment

3.4.1.1 Architectural Resources

There are no historic properties, structures, or districts that are eligible for or listed in the National Register of Historic Places in the Area of Potential Effects.

3.4.1.2 Archaeological Resources

A search of the Georgia's Natural, Archaeological, and Historic Resources GIS website identified 17 previously identified archaeological sites within 1 mile of the Proposed Action area (**Table 3.4-2**). Eleven of these sites have prehistoric Indian components, including mounds, shell middens, artifact scatters, and villages. Five are historic sites with components dating from the 18th through the 20th centuries. One site has historic and prehistoric components.

Table 3.4-2. Archaeological Sites within 1 mile of the Proposed Action Area

Site No.	Site Name	Source	Status
9CM1	Fairview	GNARHGIS	Unknown
9CM166	Mill Creek Shell Midden	Johnson 1989, 1990a; Rock 1996	Eligible
9CM167	Mill Creek MI	Johnson 1990b	Ineligible; Destroyed
9CM170	Rabbit Run	Johnson 1989, 1990a; Rock 1985, 1996	Eligible
9CM171	Kings Bay-Etowah Park Extension	Johnson 1989, 1990a, 1990b; Rock 1996a; Yaros 1979; Smith 1986a, Smith 1986b	Eligible; portions Not Eligible
9CM172	King's Plantation	Yaros 1979	Eligible
9CM173	King's Plantation	Johnson 1978	Destroyed
9CM174	Marianna	Johnson 1989, 1990a; Rock 1996	Eligible
9CM175	Point Peter Road	Eubanks and Adams 1986	Eligible
9CM176	Hercules Club	Eubanks and Adams 1986	Eligible
9CM177	Devil's Walkingstick	Eubanks and Adams 1986	Eligible
9CM178	Araminta Sowerby	Eubanks and Adams 1986	Eligible
9CM179	Killion	Johnson 1989, 1990a; Rock 1996	Eligible
9CM199	Kearns	GNARHGIS	Unknown
9CM206	Shell Midden 1	Eubanks and Adams 1986	Ineligible
9CM208	Kings Bay Cattle Dipping Vat	Johnson 1989, 1990a; Rock 1996	Eligible
9CM214	Rayburn Road Kitchen	GNARHGIS	Ineligible

Note: GNARHGIS = Georgia's Natural, Archaeological, and Historic Resources GIS website

Of the 17 sites listed in **Table 3.1-2**, only two sites, 9CM171 and 9CM172, are located on the west bank of SUBASE Kings Bay within the WRA and are discussed further in this EA. Site 9CM171, the Kings Bay-Etowah Park Extension site, is an elongated site that runs along most of the waterfront on the west bank of the bay, overlooking Kings Bay and Marianna Creek. This site contains a prehistoric shell midden and has Archaic, Woodland, Mississippian, and Historic Indian components. Over the years, this site has been extensively studied and has been found to be significantly disturbed within the Proposed Action area due to previous construction of buildings and security systems (Smith 1978; Rock 1996a). Portions of this site (i.e., 9CM171A, C, D, F, G, I, and J) have been determined to be eligible for listing on the National Register of Historic Places (NRHP), but were not nominated to the Kings Bay Archaeological Multiple Resource Area (Eubanks and Adams 1986).

Site 9CM172, Kings Plantation, is located adjacent to site 9CM171 along the waterfront on the west side of Kings Bay. This is an 18th through 19th century historic domestic site, which was investigated by the University of Florida in the 1970s (Fairbanks and Smith 1980). This site was recommended eligible for listing on the NRHP, but was affected by a construction and dredging project at SUBASE Kings Bay and has been largely disturbed (NAVFAC 1981). This site was determined to be eligible for the NRHP, but was not nominated to the Kings Bay Archaeological Multiple Resource Area (Eubanks and Adams 1986).

In general, the majority of the area in and around the waterfront has been previously disturbed by construction projects, dredging and filling, and the construction of facility security systems. The eligible portions of Site 9CM171 and all of Site 9CM172 were not nominated because effects associated with Navy construction were mitigated in accordance with the term of the 1981 Memorandum of Agreement executed between the State Historic Preservation Officer, Advisory Council on Historic Preservation, and the Navy.

3.4.2 Environmental Consequences

3.4.2.1 Alternative 1

No effects to architectural resources would result from implementation of the Proposed Action.

Sites 9CM171 and 9CM172 are located within the Proposed Action area; however, these sites were mitigated pursuant to the 1981 Memorandum of Agreement executed between the State Historic Preservation Officer, Advisory Council on Historic Preservation, and the Navy. If, however, during construction any archaeological resources are discovered, work would immediately cease and the procedures for inadvertent discovery as outlined in the Integrated Cultural Resources Management Plan would be implemented. The Navy would consult with the Georgia State Historic Preservation Officer in the unlikely event that intact archaeological resources are discovered with the intent to avoid, minimize, or mitigate adverse effects on cultural resources. There would be no apparent significant impacts to archaeological resources from the implementation of Alternative 1. In accordance with Section 106 of the NHPA, the Navy has determined there would be no adverse effect from implementation of the Proposed Action. As part of the Draft EA review process, a copy of the Draft EA was provided to the Georgia State Historic Preservation Officer on January 22, 2016; a response is anticipated to be received during the 30-day public comment period.

3.4.2.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1. Therefore, there would be no apparent significant impacts to archaeological resources from the implementation of Alternative 2. In accordance with Section 106 of the NHPA, the Navy has determined there would be no adverse effect from implementation of the Proposed Action.

3.4.2.3 No Action Alternative

Under the No Action alternative, the Proposed Action would not be implemented; therefore, baseline conditions would remain unchanged.

3.5 COASTAL ZONE MANAGEMENT ACT

3.5.1 Affected Environment

Within the Proposed Action area, coastal resources include salt marsh coves along the western shoreline of SUBASE Kings Bay. The nearest coastal resources outside of the SUBASE Kings Bay boundary include the open water of Cumberland Sound to the south with fringing, shoreline marshes, intertidal sand flats, and the undeveloped forested and scrub-shrub lands located along the estuarine shoreline south of the southern property boundary and the large estuary north of the northernmost existing Port Security Barrier (PSB) which provides the northern boundary of the WRA.

3.5.2 Environmental Consequences

3.5.2.1 Alternative 1

Under Alternative 1, the existing pile-supported structures would be repaired and/or replaced to meet current mission and security upgrade requirements. The TPS Pier would also be constructed in compliance with current DOD and Navy security directives. The Navy completed a consistency review and has determined that Alternative 1 is consistent to the maximum extent practicable with the Georgia Coastal Management Program. Refer to **Table 3.5-1** for a summary of conclusions to Georgia's applicable enforceable policies. As part of the Draft EA review process, a Coastal Consistency Determination (Appendix F) was sent to the GA DNR Coastal Resources Division on January 22, 2016 for concurrence based on an analysis using the concepts and preliminary designs of the Proposed Action. A response is anticipated to be received within 75 calendar days, which ends on April 6, 2016.

Table 3.5-1. Georgia Coastal Management Program Consistency Review

Statute	Scope	Consistency
Georgia Coastal Management Act (O.C.G.A. 12-5-320, *et seq.*) (1997)	• Enables GA DNR to develop and implement plan • Provides authority to GA DNR to accept, spend, and grant funds • Provides authority to GA DNR to hold public hearings • Provides authority to Governor to review and approve coastal management plan and to submit it to federal government for approval	The Proposed Action would not have an effect on the state's coastal management plan.
Coastal Marshlands Protection Act (O.C.G.A. 12-5-280, *et seq.*)	• Protects tidal wetlands • Requires permit for structures, dredging, and filling • Establishes Coastal Marshlands • Regulates how structures will be constructed, operated, and maintained on tidal water bottoms.	The Proposed Action would require a Coastal Marsh Protection Act permit (Letter of Permission) for the placement of structures and/or fill in marsh areas. A Revocable License would also be required. In addition, a permit would be required for shading of salt marsh under Alternative 2 only. The Navy would obtain all permits prior to the commencement of work.
Department of Natural Resources Authority (O.C.G.A. 12-2-1, *et seq.*) (1937)	• Establishes structure, powers and duties of GA DNR, including GA EPD	NA

Table 3.5-1. Georgia Coastal Management Program Consistency Review

Statute	Scope	Consistency
Endangered Wildlife Act (O.C.G.A. 27-3-130, *et seq.*) (1973)	• Purpose is to identify/protect rare, unusual, or other animals in danger of extinction • Provides authority to GA DNR board to issue regulations for protection of protected species	The Proposed Action would have no effect on the striped newt; red-cockaded woodpecker; smalltooth sawfish; North Atlantic right whale; Eastern indigo snake; gopher tortoise; and nesting hawksbill, green, Kemp's ridley, leatherback, and loggerhead sea turtles. The Proposed Action may affect, but is not likely to adversely affect the piping plover; red knot; wood stork; Atlantic sturgeon; shortnose sturgeon; West Indian manage; or at-sea hawksbill, green, Kemp's ridley, leatherback, and loggerhead sea turtles. There would be no effect on the designated critical habitat for the piping plover, West Indian manatee, hawksbill sea turtle, green sea turtle, leatherback sea turtle, and loggerhead sea turtle. A Biological Evaluation has been submitted to NMFS and USFWS for species under their regulatory purview, respectively. In addition, the Navy would require the construction contractors to adhere to the minimization and mitigation measures specified in the EA.
Game and Fish Code (O.C.G.A. 27-1-1, *et seq.*) (1977)	• Designates Wildlife Resources Division to operate Wildlife Management Areas, to register aquaculture activities, and to protect wildlife resources • Establishes hunting, trapping, and fishing laws • Establishes Conservation Rangers	EFH consultation has been initiated and will be concluded prior to the signing of any decision document. With the application of the standard operating procedures, General Construction and Pile removal and Installation BMPs, as well as Acoustic Minimization Measures (soft start) and Timing Restrictions (daylight hours), it is anticipated that construction activities under the Proposed Action would have no more than a minimal impact on habitats designated as EFH or HAPC by the SAFMC or NMFS.
Georgia Administrative Procedures Act (O.C.G.A. 50-13-4, *et seq.*) (1964)	• Establishes requirements for adoption, amendment or repeal of rules and regulations • Requires minimum of 30 days' notice of intended rules change	The Proposed Action would not affect administrative procedures.
Georgia Aquaculture Development Act (O.C.G.A. 27-4-251, *et seq.*) (1992)	• Establishes Commission to study and promote aquaculture development in the State.	The Proposed Action would not have an effect on Aquaculture.
Georgia Air Quality Act (O.C.G.A. 12-9-2, *et seq.*) (1964)	• Establishes ambient air quality standards, emissions limitations, emission control standards, etc.	The Proposed Action would produce minor emissions from construction but would not impact air quality overall in the region.

Table 3.5-1. Georgia Coastal Management Program Consistency Review

Statute	Scope	Consistency
Historic Area Act (O.C.G.A. 12-3-50, *et seq.*) (1951)	• Establishes law for preservation of historic sites in Georgia	The Proposed Action would not affect cultural resources of the state of Georgia as no known sites have been identified within the project footprint. However, should any cultural resources be discovered during construction, the activity would cease and the discovery would be immediately reported to the SUBASE Kings Bay Environmental Director and the Georgia State Historic Preservation Officer.
Georgia Boat Safety Act (O.C.G.A. 52-7-1, *et seq.*) (1994)	• Governs abandoned vessels • Sets enforceable rules for safe boating practices • Establishes 1,000-foot boating safety zones on Jekyll, Tybee, St. Simons, and Sea Islands	The Proposed Action would not have an effect on the recreational or commercial use of boats.
Georgia Administrative Procedures Act (Revocable License Program) (O.C.G.A. 50-16-61, *et seq.*) (1863)	• Grants permission from the State of Georgia to utilize state-owned tidal water bottoms or other tidally influenced areas of the water column.	The Proposed Action would require the use of tidal water bottoms for placement, operation and maintenance of the structures outlined within six projects proposed. A Revocable License would also be required
Georgia Comprehensive Solid Waste Management Act (O.C.G.A. 12-8-20, *et seq.*) (1972)	• Defines rules regarding solid waste disposal, including permit requirements for facilities	The Proposed Action would not require or have an effect on solid waste disposal. Any construction or demolition debris generated from construction of this project would be disposed of in accordance with all applicable regulations.
Georgia Environmental Policy Act (O.C.G.A. 12-16-1, *et seq.*) (1991)	• Requires preparation of an Environmental Effects Report for any governmental action that may significantly adversely affect the quality of the environment	The Proposed Action would not adversely affect the quality of the environment.
Georgia Erosion and Sedimentation Act (O.C.G.A. 12-7-1, *et seq.*) (1975)	• Establishes minimum standards for land-disturbing activities • Requires each local government to establish procedures for land disturbing activities	The Proposed Action would occur within 200 feet of the bank of state waters and would require a Land Disturbing Activity permit, as well as, a sedimentation control plan to be submitted to the Camden County Planning Director. The Navy will obtain this permit prior to the commencement of work.
Georgia Fisheries Law Pertaining to Shellfish (O.C.G.A. 27-1-4, *et seq.*) (1981)	• Protects public health & safety by setting minimum water quality standards for shellfish waters and seafood	The Proposed Action would not adversely affect water quality for shellfish or seafood.

Table 3.5-1. Georgia Coastal Management Program Consistency Review

Statute	Scope	Consistency
Georgia Hazardous Waste Management Act (O.C.G.A. 12-8-60, *et seq.*) (1979)	• Establishes regulations for generation, storage, treatment, and disposal of hazardous wastes	The Proposed Action may result in the generation of minor amounts of hazardous waste. The construction contractors will prepare a project-specific Hazardous Materials Management Plan. Any hazardous waste generated would be small in quantity and would be disposed of in accordance with all applicable regulations.
Georgia Heritage Trust Act of 1975 (O.C.G.A. 12-3-70, *et seq.*) (1975)	• Establishes Heritage Trust Commission • Seeks to preserve certain property in Georgia with unique natural characteristics, special historical value, or particular recreational value.	The Proposed Action would not have an effect on any historic or recreational property or any property with unique natural characteristics.
Georgia Natural Areas Act (O.C.G.A. 12-3-90, *et seq.*) (1966)	• Provides authority to identify and preserve areas of unusual ecological significance in a natural state	The Proposed Action would not have an effect on any areas of unusual ecological significance.
Georgia Oil and Gas and Deep Drilling Act (O.C.G.A. 12-4-40, *et seq.*) (1975)	• Provides protection to underground water supplies and environmentally sensitive areas from the effects of oil and gas drilling activities	The Proposed Action would not involve the oil or gas drilling activities and would not have an effect on underground water.
Georgia Safe Dams Act (O.C.G.A. 12-5-370, *et seq.*) (1978)	• Establishes inspection and permitting requirements for dams	The Proposed Action would not involve the construction of dams.
Georgia Safe Drinking Water Act (O.C.G.A. 12-5-170, *et seq.*) (1977)	• Establishes regulatory requirements for drinking water management programs	The Proposed Action would not have an effect on drinking water.
Georgia Scenic Rivers Act of 1969 (O.C.G.A. 12-5-350, *et seq.*) (1969)	• Defines scenic rivers • Names certain sections of rivers for preservation	The Proposed Action would not have an effect on any scenic rivers.
Georgia Scenic Trails Act (O.C.G.A. 12-3-110, *et seq.*) (1972)	• Provides authority to construct, manage and maintain a system of trails in Georgia	The Proposed Action would not have an effect on any scenic trails
Georgia Surface Mining Act (O.C.G.A. 12-4-70, *et seq.*) (1968)	• Regulates all surface mining in Georgia	The Proposed Action would not involve surface mining operations.
Georgia Underground Storage Tank Act (O.C.G.A. 12-13-1, *et seq.*) (1981)	• Establishes criteria for operating, detecting releases, and utilizing underground storage tanks	The Proposed Action would not require the operation or use underground storage tanks.

Table 3.5-1. Georgia Coastal Management Program Consistency Review

Statute	Scope	Consistency
Georgia Water Quality Control Act (O.C.G.A. 12-9-1, *et seq.*) (1964)	• Establishes regulatory requirements for water quality and quantity, permits for discharges into surface and subsurface waters, etc.	The Proposed Action would require a Section 401 Water Quality Certification from GA EPD for impacts to water quality from pile repair, removal and installation. The construction contractor will be required to prepare an Environmental Protection Plan; a project-specific Spill Prevention, control, and Countermeasure Plan; and a project-specific Stormwater Pollution Prevention Plan.
Groundwater Use Act (O.C.G.A. 12-5-90, *et seq.*) (1972)	• Provides authority to establish regulations and permit requirements for withdrawal, drilling protocols, and water conservation plans	The Proposed Action would not have an effect on ground water.
Licenses to Dig, Mine, and Remove Phosphate Deposits (O.C.G.A. 12-4-100, *et seq.*) (1884)	• Authorizes the Office of the Secretary of State to regulate phosphate mining	The Proposed Action would not conduct phosphate mining.
Mountain and River Corridor Protection Act (O.C.G.A. 12-2-8, *et seq.*) (1981)	• Requires a 100-foot vegetative buffer • Requires consistency with Erosion and Sedimentation Act • Requires local governments to identify river corridors in land-use plans	The Proposed Action would not have an effect on any river vegetative buffers or cause erosion.
Protection of Tidewaters Act (O.C.G.A. 52-1-1, *et seq.*) (1992)	• Requires permit for vessels used for habitation and not transportation within the tidewaters of the State	The Proposed Action would not result in closure of areas within state tidewaters; the Proposed Action would take place in the already restricted area within SUBASE Kings Bay.
Right of Passage Act (O.C.G.A. 52-1-30, *et seq.*) (1981)	• Requires vessel operators to stay to the right (starboard) side of streams and channels for traffic	The Proposed Action would not have an effect on the traffic on streams or rivers or waterways of the state. Access to this portion of SUBASE Kings Bay is restricted to the public.
Title 31 – Health (Septic Tank Law) (O.C.G.A. Title 31 generally) (1981)	• Establishes authority to set statewide standard for septic tanks	The Proposed Action would not have an effect on septic tanks.
Shore Protection Act (O.C.G.A. 12-5-230, *et seq.*) (1979)	• Protects sand dunes, beaches, sandbars, and shoals • Limits construction activity to temporary structures by permit only • Prohibits motorized vehicles on dunes and beaches • Prohibits docks, marinas, boat ramps, storage facilities in dunes · Establishes Shore Protection Committee	The Proposed Action would not have an effect on shore areas, beaches , dunes sand bars, or shoals

Table 3.5-1. Georgia Coastal Management Program Consistency Review

Statute	Scope	Consistency
Water Wells Standards Act (O.C.G.A. 12-5-120, *et seq.*) (1985)	• Provides standards for siting, construction, and operation of wells	The Proposed Action would not construct or operate water wells.
Wildflower Preservation Act (O.C.G.A. 12-6-170, *et seq.*) (1973)	• Provides for designation and preservation of rare, unusual, or endangered plant species	The Proposed Action would not have an effect on rare, unusual, or endangered plant species.

Notes: BMP = best management practice; EA = Environmental Assessment; EFH = Essential Fish Habitat; GA DNR = Georgia Department of Natural Resources; GA EPD = Georgia Environmental Protection Division; HAPC = Habitat Areas of Potential Concern; NA = not applicable; NMFS = National Marine Fisheries Service; O.C.G.A. = Official Code of Georgia Annotated; SAFMC = South Atlantic Fishery Management Council; USFWS = U.S. Fish and Wildlife Service

3.5.2.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1. Therefore, the Navy has determined that Alternative 2 is consistent to the maximum extent practicable with the Georgia Coastal Management Program.

3.5.2.3 No Action Alternative

Under the No Action alternative, the Proposed Action would not be implemented; therefore, baseline conditions would remain unchanged.

3.6 AMBIENT SOUND AND NOISE

Ambient sound and noise are analyzed in this EA because the proposed activities would produce temporary increases in noise levels. Note, that while this section provides a general discussion of the ambient sound in-air and within the underwater environment, only noise impacts to the human environment are analyzed. Please refer to Sections 3.11, 3.12, and 3.13 for a discussion of potential in-air and underwater noise impacts to wildlife.

3.6.1 Affected Environment

SUBASE Kings Bay is an active military base; general sources of noise include motors used to propel boats and ships, repair and maintenance actions, movement of land vehicles and equipment, and cranes used to load materials and supplies onto ships, and the use of loud hailers to warn waterborne craft about entering the WRA (Navy 2005).

In-air noise sources typical of an active seaport have typical noise measurements of 50 decibels, A-weighted (dBA) (for light traffic) to 81 dBA (for a crane) when measured 50 feet from the respective pieces of equipment (USDOT FHA 2006).

Underwater sound levels are not measured in dBA due to the human-specific function of the A-weighting curve. The underwater acoustic environment at SUBASE Kings Bay is dominated by noise from day-to-day port and vessel activities; SUBASE Kings Bay is sheltered from most wave noise. Measurements of

underwater ambient noise levels at SUBASE Kings Bay were taken in February 2015. Ambient underwater sound levels averaged around 135 dB referenced to 1 micro Pascal root mean square (dB re 1µPa rms), with peak levels ranging from 145 to 155 dB (Acentech 2015).

3.6.2 Environmental Consequences

3.6.2.1 Alternative 1

Recreational activities are prohibited within the WRA. Recreational activities that could occur outside the WRA are primarily associated with transitory boating activities within the Intracoastal Waterway and Cumberland Sound. Therefore, impacts to sensitive receptors from underwater noise within the WRA would not occur, and any other impacts to recreational boaters within the Intracoastal Waterway and Cumberland Sound would be negligible under Alternative 1. Refer to Sections 3.12 and 3.13 for a discussion of potential impacts to underwater noise to marine wildlife.

Under Alternative 1, the existing pile-supported structures would be repaired and/or replaced and a new TPS Pier would be constructed. Overall, construction noises are governed primarily by the noisiest pieces of equipment (e.g., dump truck, generator, and pile hammer) with dBA values up to 101 dBA when measured 50 feet from the respective pieces of equipment. Typically, the in-air sound level attenuates, or diminishes, at a rate of 6 dBA for each doubling of the distance (e.g., if the noise level is 85 dBA at 50 feet, it is 79 dBA at 100 feet) from a point source (USEPA 1971). Specific to SUBASE Kings Bay, the noise associated with an impact or vibratory pile driver with a point source noise level of 101 dBA, would attenuate to 59 dBA within 1.21 miles and 53 dBA within 2.42 miles. (Normal speech has a sound level of approximately 60 dBA.)

The nearest sensitive receptor (non-worker), which is military family housing, is located approximately 2 miles west of the WRA. Located farther from military family housing, on SUBASE Kings Bay, are the Youth Center located in Building 0166 and the Kings Bay Community Center on Wren Court, which are approximately 2.5 and 2.6 miles west of the WRA, respectively. Additionally, located approximately 2 miles east of the Proposed Action area is Cumberland Island, which includes the Cumberland Island National Seashore. In the open-air (i.e., not inside a building or car with windows closed), all sensitive receptors would experience less than a 60 dBA noise exposure. In addition, the noise levels would be short in duration, typical of standard construction activities, and would occur one hour post sunrise to one hour prior to sunset Monday through Friday). Furthermore, located between the WRA and military family housing area are extensive forested areas and bermed storage areas that would attenuate construction noise. Therefore, only temporary, minor adverse impacts to the human noise environment would result from implementation of Alternative 1.

3.6.2.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1. Therefore, impacts from construction-related noise to the human noise environment under Alternative 2 would not be measurably different from those described for Alternative 1.

3.6.2.3 No Action Alternative

Under the No Action alternative, the Proposed Action would not be implemented; therefore, baseline conditions would remain unchanged.

3.7 SOCIOECONOMICS

Following implementation of the Proposed Action, there would not be an increase in the number of personnel at SUBASE Kings Bay or change the type or amount of operations at SUBASE Kings Bay; therefore, the EA does not address changes to long-term population, employment, income, or housing characteristics.

3.7.1 Affected Environment

The 2010 population in St. Marys and Camden County were 17,126 and 50,513 people, respectively (**Table 3.7-1**). Between 2000 and 2010, the population of St. Marys and Camden County increased by 3.7 and 1.9 percent, respectively compared to the State of Georgia which grew by 3.1 percent over the same time period (U.S. Census Bureau 2015).

Table 3.7-1. Population and Population Trends

Jurisdiction	2010	2013	2014	Growth Rate 2010-2014 (Percent)
St. Marys	17,121	17,126	17,755	3.7
Camden County	50,513	51,517	52,027	3.0
Georgia	9,688,681	9,994,759	10,097,343	4.2

Source: U.S. Census Bureau 2015.

SUBASE Kings Bay has approximately 5,200 active duty personnel, 2,100 civilian personnel, and 1,700 contract personnel. Estimated annual expenditures include $78.6 million on goods and services, $600 million on payroll, $15 to $16 million on two crews of 165 sailors for each of the submarines, $19.7 million on the Coast Guard Maritime Force Protection Unit, and $8.6 million on the Coast Guard Maritime Safety Security Team (Camden County 2014).

3.7.2 Environmental Consequences

3.7.2.1 Alternative 1

The Proposed Action would occur over a 5-year period with in-water work time ranging in durations of 2 to 80 work days. It is anticipated the total maximum duration of in-water work would be 267 days with no simultaneous work anticipated. Economically, the scale of the proposed construction expenditures, when compared to SUBASE Kings Bay's annual expenditures, would not result in noticeable regional direct or indirect effects. This is especially true since no new long-term jobs would be created in association with this project, no new housing would be required, no new personnel would be hired following completion of these projects, and there would be no additional school-aged children brought to SUBASE Kings Bay. It is not anticipated any of the communities located near SUBASE Kings Bay would be exposed to adverse socioeconomic impacts.

If any required construction-related materials are purchased locally, it could result in a temporary, but minor increase within the local economy. This conclusion is based on the anticipation that the majority of construction materials would be brought to SUBASE Kings Bay by barge. The localized area of

construction activities within the SUBASE Kings Bay waterfront and continued normal operations associated with SUBASE Kings Bay would not impact commercial fishing activities outside the boundaries of the installation.

In conclusion, there would be negligible impacts to socioeconomics under Alternative 1.

3.7.2.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1. Therefore, there would be negligible impacts to socioeconomics under Alternative 2.

3.7.2.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented; therefore, baseline conditions would remain unchanged.

3.8 ENVIRONMENTAL JUSTICE

3.8.1 Affected Environment

On February 11, 1994, President Clinton signed EO 12898, *Federal Actions to Address Environmental Justice in Minority and Low-Income Populations*. The EO requires federal agencies to identify and avoid disproportionate impacts on minority populations, including Native Americans, or low-income communities.

The total minority population is calculated as the percent of the population that is categorized in one of six racial categories and those of Hispanic or Latino origin (without double counting those who report two or more races/origins) (CEQ 1997). The low-income population is calculated using data from the U.S. Census Bureau 2013 population estimates and individuals with incomes below the poverty level. **Table 3.8-2** presents the 2010 census data on the total minority population as well as the 2013 population estimates on low-income population for the study area.

Table 3.8-2. Minority and Low-Income Populations

Jurisdiction	Total Population[1]	Minority Population[1]	Percent Minority[1]	Low-Income Population[2]	Percent Low-Income2
St. Marys	17,121	4,417	25.8	2,655	15.5
Camden County	50,513	12,527	24.8	7,985	15.5
Georgia	9,688,681	3,904,538	40.3	1,819,046	18.2

Sources: *U.S. Census Bureau 2015a, 2015b.*
Notes: [1]*Based on 2010 population estimates.*
[2]Based on 2013 population estimates and includes all individuals for whom poverty status is determined.

In April 1997, President Clinton signed EO 13045, *Protection of Children from Environmental Health Risks and Safety Risks*. This EO requires federal agencies to identify, assess, and address disproportionate environmental health and safety risks to children from federal actions. **Table 3.8-3** presents the population under the age of 18.

Table 3.8-3. Population Under Age 18

Jurisdiction	Total Population for which Age was Determined	Population Under Age 18	Percent of Population Under Age 18
St. Marys	17,390	4,747	27.3
Camden County	50,799	12.344	24.3
Georgia	9,810,417	2,491,846	25.4

Source: *U.S. Census Bureau 2015c.*

3.8.2 Environmental Consequences

3.8.2.1 Alternative 1

Alternative 1 would occur over a 5-year period with in-water work time ranging in durations of 2 to 80 work days. It is anticipated the total maximum duration of in-water work would be 267 days with no simultaneous work anticipated.

The estimated minority, low-income and children populations that would be exposed to any impact from construction and repairs to SUBASE Kings Bay facilities would be nonexistent given that the Base is relatively isolated from civilian population centers. By far, construction noise would have the greatest potential to impact these populations, and exposure to noise greater than normal speech (i.e., 60 dBA) for long durations would be considered an adverse impacts. As discussed in Section 3.6, the noise associated with an impact or vibratory pile driver with a point source noise level of 101 dBA, would attenuate to 59 dBA within 1.21 miles and 53 dBA within 2.42 miles. The nearest sensitive receptor (non-worker), which is military family housing, is located approximately 2 miles west of the WRA; no low-income or minority populations are located adjacent to or in close vicinity to SUBASE Kings Bay's WRA. Therefore, implementation of Alternative 1 would not have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

There are no public schools located on SUBASE Kings Bay. The nearest child occupied facilities include the Crooked River Elementary School, located in St. Marys approximately 3 miles west of the WRA; the on-base Child Development Center, located in Building 0147, approximately 2.5 miles west of the WRA; the on-base Youth Center located in Building 0166, approximately 2.5 miles west of the WRA; the on-base Kings Bay Community Center, located on Wren Court, approximately 2.6 miles west of the WRA; and the SUBASE Kings Bay housing area (nearest neighborhood is approximately 2 miles west of the WRA). The waterfront area requires specific security clearances above those required to access family housing, youth activity areas, schools, and sports venues on the installation. In addition to the security checkpoints which would prevent unauthorized access to the waterfront area by children, the temporary laydown areas for construction would be fenced during active construction phase of work, thereby providing additional measures to protect children during that phase of work. Therefore, implementation of Alternative 1 would have no disproportionate environmental health and safety risks to children.

3.8.2.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier within the WRA. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1. Therefore, implementation of Alternative 2 would not have disproportionately high and adverse human health or environmental effects

on minority populations and low-income populations. Additionally, implementation of Alternative 2 would have no disproportionate environmental health and safety risks to children.

3.8.2.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented; therefore, baseline conditions would remain unchanged.

3.9 HAZARDOUS MATERIALS AND WASTE

3.9.1 Affected Environment

Hazardous wastes, as defined by Resource Conservation and Recovery Act (42 USC 6903[5]), are wastes or combination of wastes that, because of quantity, concentration, or physical, chemical, or infectious characteristics, may either cause, or significantly contribute to, an increase in mortality or an increase in serous irreversible illness, or pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, disposed of, or otherwise managed. To be classified as a hazardous waste, material must first qualify as a solid waste. A solid waste is any material that is disposed, incinerated, treated, or recycled except those exempted under 40 CFR Section 261.4. Hazardous materials are federally regulated by the USEPA in accordance with the Federal Water Pollution Control Act; CWA; Toxic Substance Control Act; Resource Conservation and Recovery Act; Comprehensive Environmental Response, Compensation, and Liability Act; and the CAA.

SUBASE Kings Bay is a permitted large quantity generator (GA4170090001). There are no active solid waste sites at SUBASE Kings Bay as all solid waste is taken to the Camden County landfill. There are two former landfill sites on SUBASE Kings Bay that are approximately 0.25 mile from the southern limits of the Proposed Action area; however, these sites are not located within the actual footprint of where the proposed construction would occur. There are no known areas of contamination in the Proposed Action area and no active corrective action areas in the project vicinity.

3.9.2 Environmental Consequences

3.9.2.1 Alternative 1

During construction activities, fuel may be temporarily stored in the construction staging areas for refueling operations. The contractor would be required to follow all federal and state regulations pertaining to storage and fueling practices. In addition, the construction contractors would prepare an Environmental Protection Plan; project-specific Spill Prevention, Control, and Countermeasure Plan; project-specific Hazardous Materials Management Plan; and a project-specific Stormwater Pollution Prevention Plan.

Specific to the Proposed Action, paints have the potential to be considered hazardous waste depending on the components in the paint mixture but if these materials are consumed in the construction process hazardous waste would not be generated. Furthermore, only those coatings (including paints) approved for marine use would be permitted.

Creosote, used to preserve wooden railroad ties and marine structures, is considered a pesticide and thus is regulated under the Federal Insecticide, Fungicide, and Rodenticide Act. Creosote-treated piles are not generally subject to regulation as a hazardous waste unless testing reveals that it leaches arsenic above a certain threshold (USEPA 2008). Creosote-treated wood waste may be recycled, but its use is limited only to onsite purposes consistent with the Federal Insecticide, Fungicide, and Rodenticide Act-approved use of

creosote-treated wood. The project-specific Hazardous Materials Management Plan would include a Hazardous Waste Management Plan that delineates the measures required to handle and dispose of any hazardous waste or excess hazardous materials. In addition, a non-hazardous solid waste disposal plan would also be prepared by the contractor to identify methods and locations for solid waste disposal and recycling, if applicable.

Additionally, prior to siting and berthing of TSP and Coast Guard vessels, SUBASE Kings Bay would have to update the current Secretarial Certification if a Department of Defense Explosives Safety Board site plan cannot be obtained. This update would be in regards to the explosive quantify safety distance arcs due to the potential change in location of these vessels when berthed. There would be no change in mission or quantities of explosive materials, only a change in location of the berthed ships.

With adherence to federal and state laws, as well as project-specific plans, there would be negligible to minor adverse impacts from hazardous materials and waste with the implementation of Alternative 1.

3.9.2.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier within the WRA. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1. Therefore, impacts from hazardous materials and waste from construction of the new TPS pier under Alternative 2 would not be measurably different as those described for Alternative 1.

3.9.2.3 No Action Alternative

Under the No Action alternative, the Proposed Action would not be implemented; therefore, baseline conditions would remain unchanged.

3.10 VEGETATION

3.10.1 Affected Environment

There are three observed vegetation communities at SUBASE Kings Bay: salt marsh communities, transition zone communities, and inland plant communities. This section also describes rare plant species and invasive plant species that may be present in the Proposed Action area. Threatened and endangered plant species are discussed in Section 3.13.

The Proposed Action area consists of two distinct areas; the mainland portion, which occurs on the west side of the submarine basin, and the Crab Island Access Pier, which is located on the eastern side of the submarine basin. The majority of the mainland area is developed and contains various buildings and associated infrastructure (e.g. roads, parking lots, etc.) and semi-developed grounds. The area where the existing Crab Island Access Pier is located has been previously disturbed due to construction of the access pier.

3.10.1.1 Saltmarsh Communities

Saltmarsh communities form a contiguous border along the edges of estuaries extending into the mouths of creeks and rivers as far as the zone of tidal influence. These habitats are a vital component of the ecosystem since they are significant in storm buffering, pollution filtrations, and habitat. In most areas, perennial

grasses and rushes are the dominant vegetation. Salt marsh communities at SUBASE Kings Bay can be divided into two types; high marsh, and low marsh. High marsh areas are the highest zone along the upper edge of the marsh and are flooded for 1 hour each day by the tide. Black needlerush (*Juncus roemerianus*) is the dominant vegetation in this area. The low marsh areas are at lower elevations and are flooded by tides for a longer period of time than the other types. At high tide, the water in the low marsh may be several feet deep. Smooth cordgrass (*Spartina alterniflora*) forms dense stands in low marsh areas (Navy 2014). In the Proposed Action area, salt marsh communities are found along the southern perimeter of submarine basin on the mainland side.

3.10.1.2 Transition Zone Communities

The transition zone communities are those areas that are adjacent to salt marsh communities (i.e., from uplands to marsh) and are typically at a higher elevation. These transition zone communities are made up of various vegetation types including maritime stand forests, lowland maritime forests, upland maritime forests, bluff forests, and evergreen scrub forests.

Transition zone communities are present in small stands on the mainland side. The largest stand of transition zone area is located at the northern portion of the WRA adjacent to the drydock facilities. This area is dominated by saltcedar and tamarisk (*Tamarix spp.*) with various other plants present.

3.10.1.3 Inland Plant Communities

Inland plant communities are the most common vegetation community on the Installation. This community includes pine flatwoods, cypress-gum wetlands, shrub bogs, bay swamps, and mixed hardwood drain forests.

West of the Proposed Action area, forested areas exist within the developed areas on the mainland. These forested areas are designated as slash pine, live oak, and slash pine/hardwood. Species present in these areas include Virginia live oak (*Quercus virginianus*), laurel oak (*Quercus laurifolia*), and hickory (*Carya* sp.).

3.10.2 Environmental Consequences

3.10.2.1 Alternative 1

The in-water construction would have negligible to minor impacts on the salt marsh community along the shoreline of Site VI with the expansion of the existing trestle to the existing Layberth Pier. No estuarine emergent wetlands (i.e., salt marsh) would be impacted during construction of the TPS Pier (Project 4A), which would be a pile-supported structure, since the access trestle for this pier would be placed where the Layberth North Trestle (Project 6B) is currently located. A permit application to perform construction would be submitted to the GA DNR Coastal Resources Division following completion of this EA in accordance with the Georgia Coastal Marshlands Protection Act. The placement of the pile-supported TPS Pier into waters of the U.S. would require a permit from the U.S. Army Corps of Engineers pursuant with Section 10 of the Rivers and Harbors Act. Since there would be no filling or wetland shading associated with this alternative, no mitigation for wetland impacts would be necessary.

In addition, approximately 0.06 acre of transition zone communities would be permanently impacted from the construction of the new access trestle for the TPS Pier (Project 4), resulting in minor upland habitat loss. Therefore, there would be minor adverse impacts to vegetation as a result of implementing Alternative 1.

3.10.2.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier within the WRA (refer to Figure 2.3-3). Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1. Therefore, impacts to vegetation from construction of the new TPS Pier under Alternative 2 would be similar as those described for Alternative 1 except 0.18 acres of transition zone community would be permanently impacted as a result of the construction of the new access trestle for the TPS Pier (Project 4A), resulting in minor upland habitat loss. Also, there would be approximately 0.19 acres of salt marsh habitat permanently impacted from shading as a result from construction of the new access trestle for the TPS Pier (Project 4A). As part of the permitting process under Georgia's Coastal Marshlands Protection Act, wetland mitigation would be required to ensure no net loss of wetlands. With mitigation, minor impacts to vegetation would occur from the implementation of Alternative 2.

3.10.2.3 No Action Alternative

Under the No Action alternative, the Proposed Action would not be implemented; therefore, baseline conditions would remain unchanged.

3.11 TERRESTRIAL WILDLIFE

3.11.1 Affected Environment

The Proposed Action area is located along the southeastern edge of Georgia and includes a variety of habitats. As such, there are a number of wildlife species that occur or have the potential to occur within the proposed project vicinity. Species protected under the Endangered Species Act (ESA) are addressed in Section 3.13.

3.11.1.1 Mammals

Within SUBASE Kings Bay, the natural communities support numerous mammal species. The only big game species at SUBASE Kings Bay is white-tailed deer (*Odecoileus virginianus*) while other game species include gray squirrel (*Sciurus carolinensis*) and rabbits (*Sylvilagus* spp.). Other non-game species found at SUBASE Kings Bay include the flying squirrel (*Glaucomys volans*), gray fox (*Urocyon cinereoargenteus*), raccoon (*Procyon lotor*), river otter (*Lutra canadensis*), bobcat (*Lynx rufus*), Virginia opossum (*Didelphis marsupialis*), eastern woodrat (*Neotoma floridana*), and eastern harvest mouse (*Reithrodontomys humilis*). These species are typical of those found within other similar areas of eastern Georgia (Navy 2014).

3.11.1.2 Birds

Common wading or shorebirds observed at SUBASE Kings Bay include great blue heron (*Ardea herodias*), white ibis (*Eudocimus albus*), great egret (*Ardea alba*), willet (*Catoptrophorus semipalmatus*), and killdeer (*Charadrius vociferous*). Other waterfowl observed in the Proposed Action area include Canada goose (*Branta canadensis*), wood duck (*Aix sponsa*), clapper rail (*Rallus longirostris*), and common moorhen (*Gallinula chloropus*). On the Installation and in the Proposed Action area, a variety of other bird species occur. Game species include wild turkey (*Meleagris gallopavo*), while other common species include common ground dove (*Columbina passerina*), common nighthawk (*Chordeiles minor*), red-bellied woodpecker (*Melanerpes carolinus*), downy woodpecker, (*Picoides pubescens*), yellow-rumped warbler

(*Dendroica coronata*), cedar waxwing (*Bombycilla cedrorum*), house finch (*Carpodacus mexicanus*), American robin (*Turdus migratorius*), and tree swallow (*Tachycineta bicolor*) (Navy 2014). All migratory birds at SUBASE Kings Bay are protected under the Migratory Bird Treaty Act (MBTA). While not strictly migratory, the wood stork (*Mycteria americana*) is known to occur at SUBASE Kings Bay and is discussed in detail in Section 3.13.

Located approximately 2 miles east of the Proposed Action area is Cumberland Island, which is designated as an Important Bird Area by the Audubon Society, and includes the Cumberland Island National Seashore. This island is a major stopping point for birds along the trans-Atlantic migratory flyway, with over 335 species of birds recorded there. The island contains numerous types of habitat which support this wide variety of species. The southern tip of the island, which is closest to the Proposed Action area, is commonly visited by black skimmers (*Rynchops niger*), oystercatchers (*Haematopus* sp.), pelicans (*Pelecanus* sp.), and least terns (*Sterna antillarum*). Due to the proximity of this Important Bird Area, many of the species that occur there may also occur within or near the Proposed Action area (Navy 2014).

Several raptor species have been observed in the Proposed Action area. Many of the raptors that occur in the vicinity nest in the forested areas of the Installation but they may also utilize man-made structures for nesting sites. Some of the species observed in or near the Proposed Action area include the black vulture (*Coragyps atratus*), turkey vulture (*Cathartes aura*), red-shouldered hawk (*Buteo lineatus*), red-tailed hawk (*Buteo jamaicensis*), sharp-shinned hawk (*Accipiter striatus*), and osprey (*Pandion haliaetus*). The forested areas of the Proposed Action area support a number of owls as well. Common species found include barred owl (*Strix varia*), great horned owl (*Bubo virginianus*), and screech owl (*Asio otus*) (Navy 2014).

While the bald eagle (*Haliaeetus leucocephalus*) is no longer on the threatened and endangered species list, it remains protected under the Bald and Golden Eagle Protection Act and MBTA. Bald eagles may occur during the winter at SUBASE Kings Bay, but there are no known nests within the Proposed Action area (Navy 2014).

3.11.1.3 Amphibians and Reptiles

Amphibians and reptiles known to occur within SUBASE Kings Bay, through general observation, include the spadefoot toad (*Scaphiopus holbrooki*), green tree frog (*Hyla cinerea*), eastern box turtle (*Terrapene carolina*), diamondback terrapin (*Malaclemys terrapin*), broad-headed skink (*Eumeces laticeps*), garter snake (*Thamnophis sirtalis*), cottonmouth (*Agkistrodon piscivorus*), eastern diamondback rattlesnake (*Crotalus adamanteus)* and alligator (*Alligator mississippiensis*) (Navy 2014).

3.11.2 Environmental Consequences

3.11.2.1 Alternative 1

In general, construction activities may result in localized, temporary disturbance of terrestrial wildlife.

<u>Mammals</u>

With regard to mammals, the impacts from implementation of the Proposed Action are anticipated to be temporary and minor based on the limited use of the WRA by mammals. Although the Proposed Action may temporarily disrupt individuals' foraging, resting, or movement between habitats, species are expected to return to normal behaviors soon after construction activities are complete. While mammals may experience minor, short-term intermittent disturbance associated with construction activity and noise, those occurring in the Proposed Action area are likely to have already habituated to anthropogenic activities,

including noise associated with industrial waterfront areas. Therefore, no long-term adverse impacts are anticipated from the implementation of Alternative 1.

Birds

Little is known about the general hearing of birds, but research suggests an in-air maximum auditory sensitivity between 1 and 5 kilohertz for most bird species (NMFS 2003). Larkin et al. (1996) described the results of experiments conducted on nocturnally-migrating songbirds. When exposed to a recorded sound of bird vocalizations, observed reactions included changes in height; when exposed to a recorded sound of thunder, some birds turned away from the source, suggesting the sound exposure elicited a physical response. When the sound stopped, some birds re-corrected their course while some did not re-correct their course (Larkin et al. 1996). In another experiment using intense tone bursts, migrating birds showed few responses to the sound exposure; responses observed included a slight change in height or rate of climb (Larkin et al. 1996). While birds may experience minor, short-term intermittent disturbance associated with construction activity, such potential effect is lessened in context of an active waterfront area where wildlife would generally be tolerant/have acclimated to these noise and activity levels. Therefore, while it is possible that birds could react to noise associated with pile repair and construction activities, any reaction is likely to be slight and temporary. As such, implementation of Alternative 1 would not result in adverse impacts on bird populations.

For the reasons discussed above, migratory birds may also experience minor, short-term intermittent disturbance associated with construction activity. To minimize and monitor impacts to migratory birds at SUBASE Kings Bay, standard protective measures would be incorporated into the project to protect birds, consistent with the installation's INRMP. Therefore, pursuant to the MBTA, Alternative 1 is not expected to result in any harm or harassment of migratory birds.

Specific to bald eagles, while there is no bald eagle nesting activity at SUBASE King Bay, bald eagles may occur during the winter. Federal regulations (50 CFR Part 22) require an eagle permit for activities that are likely to "take" (i.e., pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, destroy, molest, or disturb) a bald or golden eagle. For the purposes of this EA, and in accordance with 50 CFR Part 22, disturb means "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior." Similar to all birds, while bald eagles may experience minor, short-term intermittent disturbance associated with construction activity, such potential effect is lessened in context of an active waterfront area where these species would generally be tolerant/have acclimated to these noise and activity levels. In addition, the standard protective measures for migratory birds would also minimize impacts to bald eagles. Therefore, pursuant to the Bald and Golden Eagle Protection Act, Alternative 1 is not expected to result in any harm or harassment of bald eagles.

Amphibians and Reptiles

Impacts to reptiles and amphibians that inhabit the local terrestrial environment would be very similar to those experienced by mammals and birds. Generally, reptiles and amphibians would experience temporary disturbances from construction and noise generated during pile driving activities. However, given that very little of the construction and repair activities would occur within suitable habitat for many of the reptiles and amphibians known to occur at SUBASE Kings Bay, they are unlikely to cause any population level impacts. If construction occurs during the breeding season for amphibians (late winter/early spring) there

is the potential for localized auditory masking to occur for species that rely on vocalizations to find mates (e.g., frogs and toads) due to elevated noise levels. However, construction would occur only during daylight hours and would be temporary. Reptiles and amphibians are expected to return to normal behaviors soon after construction activities are complete. Therefore, no long-term adverse impacts are anticipated from the implementation of Alternative 1.

3.11.2.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier within the WRA. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1. Therefore, impacts to terrestrial wildlife from construction of the new TPS pier under Alternative 2 would be similar as those described for Alternative 1.

3.11.2.3 No Action Alternative

Under the No Action Alternative, the Proposed Action would not be implemented; therefore, baseline conditions would remain unchanged.

3.12 MARINE WILDLIFE

3.12.1 Affected Environment

The affected environment for aquatic resources includes SUBASE Kings Bay and the Cumberland Sound estuary. The estuary serves as nursery grounds for many larval and juvenile species of fish, shellfish, and invertebrates. It is also foraging, resting, and transiting habitat for marine mammals such as bottlenose dolphins. Threatened and endangered species are addressed in Section 3.13. SUBASE Kings Bay does have security dolphins and pinnipeds but these species are considered assets of the Navy and are not part of the consultation process. They would be protected during any construction to occur under the Proposed Action, including temporarily relocating them if necessary.

3.12.1.1 Fish and Fisheries

Many species and life stages of fish and fisheries occur within the Proposed Action area. The most abundant species of fish include weakfish (*Cynoscion regalis*), Atlantic croaker (*Micropogonias undulatus*) spot drum (*Leiostomus xanthurus)*, star drum (*Stellifer lanceolatus*), bay anchovy (*Anchoa mitchilli*), hogchoker (*Trinectes maculatus*), and southern hake (*Urophycis foridana*) (SAIC 2005). Species such as killifish (*Fundulus majalis*) and grass shrimp (*Hippolyte sp*) are permanent residents in the nearby tidal creeks and silver perch (*Bairdiella chrysoura*) and spot inhabit these areas during juvenile or larval stages (Alber et al. 2005). Juvenile forms of some shark species such as Atlantic sharpnose (*Rhizoprionodun terraenovae*) and bonnethead shark (*Sphyrna tiburo*) may be present during warmer times of the year. Red drum (*Sciaenops ocellata*) and spotted seatrout (*Cynoscion nebulosus*) occur year-round and are popular recreational fisheries in the South Atlantic. Penaid shrimp and oyster species that serve as viable commercial fisheries are likely present in post-larval and juvenile life stages in the estuary. Crustaceans such as blue crab (*Callinectes sapidus*), stone crab (*Menippe mercenaria*), and fiddler crab (*Uca sp*.) are found in the Proposed Action area and serve as prey for avian, mammalian, and juvenile fish species.

3.12.1.2 Essential Fish Habitat

The types of designated Essential Fish Habitat (EFH) with the potential to be affected by the Proposed Action include estuarine emergent wetlands (e.g., salt marsh), subtidal and intertidal flats (mud and sand), oyster reefs and shell banks, soft-bottom subtidal, and estuarine water column (i.e., sum of intertidal and subtidal habitats). **Table 3.12-1** lists those species/fishery management units and specific EFH and Habitat Areas of Potential Concern (HAPC) for species potentially occurring in the Proposed Action area. Full EFH descriptions can be found in the South Atlantic Fishery Management Council (1998), National Marine Fisheries Service (2009), and Atlantic States Marine Fisheries Commission (2015). An EFH Assessment (Appendix D) was provided to NMFS on January 6, 2016; a response from NMFS is anticipated to be received by May 24, 2016.

3.12.1.3 Bottlenose Dolphins

Bottlenose dolphins are protected under the MMPA (16 U.S.C. parts 1361-1407). The application for a Letter of Authorization for incidental takes under the MMPA is included in Appendix B.

Bottlenose dolphins occurring in the waters of SUBASE Kings Bay may be individuals belonging to any of the following stocks: the Southern Georgia Estuarine System Stock; the Western North Atlantic South Carolina-Georgia Coastal Stock; the Western North Atlantic Southern Migratory Coastal Stock; the Western North Atlantic Northern Florida Coastal stock; and extralimitally, the Western North Atlantic Offshore Stock and the Jacksonville Estuarine System stock. Based on incidental sightings in the Proposed Action area, as well as results from surveys conducted in July to September 2006 and January to June 2007 in a survey area that ranged from Cumberland Sound to the Satilla River, bottlenose dolphins are expected to be frequent visitors to the Proposed Action area (Navy 2009). The estimated year-round average density using the 2006 and 2007 survey data is 1.12 dolphins per square kilometer (Navy 2009).

Table 3.12-1. Federally-Managed Species in the Proposed Action Area

Common Name	Scientific Name	Habitat Associations	Nursery/ Spawning Habitats	Sensitive Life Stage Use of Estuary	Primary Prey	Life Stage in Project Area	Heilprin and Combs 2008	GADNR 2003–2008 (Stations 921 & 922)
Coastal Migratory Pelagic Species								
Cobia	Rachycentron canadum	Pelagic – water column, manmade structures, over reefs, mangroves; migratory	Nursery: Inshore Spawn: Offshore	Transient	Opportunistic feeders on small fish, crabs, shrimp and squid	Larvae, Post-larvae, Juveniles, and Adults	Not Observed	Present
Spanish Mackerel	Scomberomorous maculatus	Pelagic – water column, over rock or seagrass; migratory	Nursery: Inshore Spawn: Offshore	Nursery (spring-fall)	Pelagic schooling fish such as anchovies	Juveniles	Present	Present
Penaeid Shrimp Species								
Brown Shrimp	*Farfantepenaeus aztecus*	Marsh grass-water interface, mud-sandy substrate; migratory	Nursery: Estuary Spawn: Offshore	Nursery (spring-summer; may overwinter)	Invertebrates, decaying plant matter, organic debris	Post-larvae, Juveniles, and Sub-adults	Not Observed	Reported
White Shrimp	*Litopenaeus setiferus*	Marsh grass-water interface, mud-sandy substrate; migratory	Nursery: Estuary Spawn: Offshore	Nursery (spring-summer; may overwinter)	Invertebrates, decaying plant matter, organic debris	Post-larvae, Juveniles, and Sub-adults	Not Observed	Reported
Snapper-Grouper Complex Species								
Atlantic Spadefish	*Chaetodipterus faber*	Manmade structures, oyster reefs, mangroves; migratory	Nursery: Estuary, Inshore Spawn: Inshore, Offshore	Nursery (spring-summer, may overwinter)	Benthic invertebrates including crustaceans, mollusks, annelids, sponges, and cnidarians; plankton	Post-larvae, Juveniles, and Sub-adults	Not Observed	Common

Table 3.12-1. Federally-Managed Species in the Proposed Action Area (cont.)

Common Name	Scientific Name	Habitat Associations	Nursery/ Spawning Habitats	Sensitive Life Stage Use of Estuary	Primary Prey	Life Stage in Project Area	Heilprin and Combs 2008	GADNR 2003–2008 (Stations 921 & 922)
Bank Sea Bass	*Centropristis striata*	Hard bottom	Nursery: Inshore Spawn: Offshore	Unknown	Benthic invertebrates (e.g., crustaceans), squid, and small fish.	Post-larvae, Juveniles, and Sub-adults	Not Observed	Present
Black Sea Bass	*Centropristis striata*	Manmade structures, oyster reefs, marsh edges, submerged vegetation; migratory	Nursery: Estuary, Inshore Spawn: Offshore	Nursery (spring-summer)	Benthic invertebrates (crustaceans, mollusks, and worms) and fish	Post-larvae, Juveniles, and Sub-adults	Not Observed	Present
Crevalle Jack	*Caranx hippos*	Pelagic – water column, juveniles may occur on seagrass beds; migratory	Nursery: Estuary, Inshore Spawn: Offshore	Nursery (spring-summer)	Opportunistic feeders on fish, shrimp and invertebrates	Post-larvae, Juveniles, and Sub-adults	Present	Present
Dog Snapper	*Lutjanus jocu*	Rocky or coral reefs; offshore movement with age	Nursery: Estuary Spawn: Offshore	Nursery (spring-summer)	Opportunistic feeders on fish and benthic invertebrates, including shrimps, crabs, gastropods and cephalopods	Post-larvae, Juveniles, and Sub-adults	Not Observed	Present
Gray snapper	*Lutjanus griseus*	Rocky areas, seagrass beds, mangrove areas, reefs, unconsolidated sediment; offshore movement with age	Nursery: Estuary, lower reaches of rivers Spawn: Offshore	Nursery (summer-fall)	Opportunistic feeders on small fish, shrimps, crabs, gastropods, and cephalopods	Post-larvae, Juveniles, and Adults	Present	Not Observed

Table 3.12-1. Federally-Managed Species in the Proposed Action Area (cont.)

Common Name	Scientific Name	Habitat Associations	Nursery/ Spawning Habitats	Sensitive Life Stage Use of Estuary	Primary Prey	Life Stage in Project Area	Heilprin and Combs 2008	GADNR 2003–2008 (Stations 921 & 922)
Lane Snapper	*Lutjanus synagris*	Mangrove and vegetated flats, reefs, over mud bottom; offshore movement with age	Nursery: Mangrove and sea grass beds, bays Spawn: Offshore	Nursery (spring-summer)	Opportunistic feeders on small fish, shrimps, crabs, gastropods, and cephalopods	Post-larvae, Juveniles, and Sub-adults	Not Observed	Present
Rock Sea Bass	*Centropristis philadelphica*	Hard bottom, rocks, jetties, unconsolidated sediment; offshore movement with age	Nursery: Inshore Spawning: Offshore	Nursery (summer-fall)	Opportunistic feeders on small fish, crustaceans, and shellfish	Post-larvae, Juveniles, and Sub-adults	Not Observed	Common
Sheepshead	*Archosargus probatocephalus*	Rocky areas, reefs, pilings, seagrass beds; limited seasonal movements	Nursery: Estuary, Inshore Spawn: Offshore	Nursery (spring-summer)	Benthic invertebrates, including crabs, crustaceans, and mollusks	Post-larvae, Juveniles, and Sub-adults	Abundant	Not Observed
Highly Migratory Species								
Atlantic Sharpnose Shark	*Rhizoprionodon terraenovae*	Pelagic – water column; migratory	Nursery: Estuary, Inshore	Nursery (spring-fall)	Opportunistic feeders on fish (e.g., menhaden, eels, silversides, wrasses, jacks), shrimp, crabs, and mollusks.	Juveniles and Sub-adults	Not Observed	Present

Table 3.12-1. Federally-Managed Species in the Proposed Action Area (cont.)

Common Name	Scientific Name	Habitat Associations	Nursery/ Spawning Habitats	Sensitive Life Stage Use of Estuary	Primary Prey	Life Stage in Project Area	Heilprin and Combs 2008	GADNR 2003–2008 (Stations 921 & 922)
Bonnethead Shark	*Sphyrna tiburo*	Pelagic – water column; migratory	Nursery: Estuary, Inshore	Nursery (warm months)	Opportunistic feeders on crustaceans (e.g., shrimp), mollusks, and fish.	Juveniles and Adults	Not Observed	Present
Lemon Shark	*Negaprion brevirostris*	Reefs, mangroves, bays, sounds, river mouths	Nursery: Mangrove areas, estuary, inshore	Nursery (warm months)	Fish, crustaceans, mollusks	Juveniles and Adults	Not Observed	Present

Source: SAIC 2008.

Notes: [1]A = Adult; J = Juvenile; N = Neonate; ND = Not Determined; P = Post larval; S = Sub-adult.

[2]The SAFMC also recognizes several species covered under Federal Fishery Management Plans of the Mid-Atlantic Fishery Management Council because EFH for those species extends as far south as the Florida Keys in the South Atlantic Area.

[3]The Atlantic States Marine Fisheries Commission coordinates management of interstate fisheries of Atlantic states (including Georgia), co-managing several species covered by SAFMC and the Mid-Atlantic Fishery Management Council Federal Fishery Management Plans and managing separate Federal Fishery Management Plans for several other species.

3.12.2 Environmental Consequences

3.12.2.1 Alternative 1

Projects 1, 2, 3, 5, and 6 would all occur on existing structures located in developed areas of the WRA. Shorelines in the developed waterfront areas have manmade embankments comprised of artificially filled land and riprap. In most locations, muddy and/or sandy intertidal and shallow subtidal habitats occur as a narrow zone (e.g., less than 50 feet wide) between the riprap embankments and the deepwater channel. Salt marsh habitat may also be present as a narrow fringe above the intertidal flats along some of the developed shorelines (e.g., Site VI shoreline, western shoreline of Crab Island).

Fish and Fisheries

Implementation of Alternative 1 may result in impacts to marine fish and fisheries from construction activities. Primary impacts would occur from elevated noise levels and localized increases in turbidity.

Elevated underwater noise levels may result in avoidance behavior for fish and mobile invertebrates that are in the vicinity. However, given the small and temporary extent of the ensonified area relative to the available waters of Cumberland Sound and adjacent waterways, and that any avoidance behavior would likely occur for no more than a few net hours on a given day, any disturbance of individuals would be considered insignificant (NMFS 2012 and 2014). Use of soft starts during impact pile driving may allow fish an opportunity to move away from the immediate area before full pile driving power is reached. It is unlikely these minor changes in behavior would preclude a fish from completing any normal behaviors or expending a measurable amount of additional energy.

Temporary resuspension of bottom sediments would affect water quality during vessel operations, removal of old piles, and installation of new piles. However, the environment where the Proposed Action would occur is dynamic, with sediment particles that are constantly being redistributed by localized currents and tides. The impact of temporarily resuspended sediments would be comparable to fluctuations already occurring, and as such, only minor impacts to fish and marine invertebrates are anticipated under Alternative 1.

Essential Fish Habitat

Impacts to EFH may result from construction activities, pier repair, and pile removal and replacement. Appendix D provides a detailed analysis of potential impacts to EFH. A brief summary is provided in **Table 3.12-2**. The proposed action may result in small-scale conversion or temporary disturbance of habitat, primarily from removal and replacement of piles. Bivalves and other burrowing invertebrates may be displaced or buried, but the affected area would be highly localized. Animals are expected to return from surrounding habitats after the repairs and maintenance activities are completed. Further, the duration and scope of activities are limited to a few days or weeks in any given year. Given implementation of BMPs and protective measures (Appendix D), a measurable reduction in the quantity or quality of habitat is not anticipated and no long-term adverse effects on EFH would result.

Table 3.12-2. Potential Effect to EFH and HPAC from Implementation of Alternative 1

Habitat Type	Designation	Dependent Species or Management Unit	Effect Conclusion
Emergent Wetlands	EFH	Penaeid Shrimp, Snapper-Grouper Complex	No effect
Oyster and Shell Habitat	HAPC	Snapper-Grouper Complex	Minimal, short-term habitat loss due to pile replacement in most locations
			Minimal, permanent loss of hard structure (piles) for oyster colonization at Site VI (more piles removed than installed)
Subtidal and Intertidal Flats, Unconsolidated Bottoms	EFH	Penaeid Shrimp, Snapper-Grouper Complex	Minimal temporary adverse effects during construction activities
			Overall permanent increase in EFH quantity
Water Column	EFH	Coastal Migratory Pelagics, Sharks	Minimal, temporary adverse effects during construction activities

Bottlenose Dolphins

Of the marine mammal species in Georgia's coastal waters, only bottlenose dolphins may occur in the Proposed Action area in densities high enough where any incidental harassment (as defined under the MMPA) could take place. Over a 5-year period, up to 845 Level B exposures for bottlenose dolphins were modeled for the Proposed Action (**Table 3.12-3**). Studies of marine mammal responses to pile driving (both impact and vibratory methods) are limited. Marine mammal monitoring at the Port of Anchorage marine terminal redevelopment project in Anchorage, Alaska, found no response by marine mammals swimming within the threshold distances to noise impacts from construction activities including pile driving (both impact hammer and vibratory driving) (Integrated Concepts and Research Corporation 2009). Small numbers of cetaceans (beluga whales, harbor porpoise) and pinnipeds (harbor seals, Steller sea lions) were observed. This study also noted that the background noise levels at this port are typically relatively high (approximately 125 dB rms). This background noise is due to both strong tidal currents and marine traffic from shipping vessels at the Port of Anchorage. Such high background noise levels could help habituate marine mammals to non-impulsive sounds from vibratory pile driving in their environment. Responses to impact pile driving are expected to be more acute than response to vibratory driving. Controlled experiments with captive marine mammals showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway et al. 1997; Finneran et al. 2003). Observed responses of wild marine mammals to loud impulsive sound sources (typically seismic guns or acoustic harassment devices) have been varied, but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds 2002; also see reviews in Gordon et al. 2003 and Nowacek et al. 2007).

Bottlenose dolphins exposed to pile driving noise over the course of Proposed Action would likely avoid affected areas if they experience noise-related discomfort, but individual responses are expected to be variable. Some individuals may occupy waters that are within the range to effects during pile driving without apparent responses discomfort while others may be displaced with undetermined long-term effects. Noise-related avoidance may also inhibit some dolphins from entering the vicinity of the Proposed Action

in the first place. Based on the time required to install and remove each pile, behavioral disturbances are expected to be intermittent and brief.

In conjunction with this EA, an application for a Letter of Authorization for incidental Level B (harassment) takes of bottlenose dolphins was submitted to NMFS Headquarters on January 19, 2016 in accordance with the MMPA (refer to Appendix B). Included in the request for a Letter of Authorization are BMPs and protective measures the Navy would employ to minimize impacts to bottlenose dolphins (refer to Chapter 4). The Letter of Authorization is not anticipated to be issued until July 5, 2017.

Table 3.12-3. Estimated Marine Mammal Exposures by Year and Pile Driving Method

Fiscal Year	Density	Vibratory		Impact		Exposure Totals
		Level A	Level B	Level A	Level B	
2017	1.12 / km^2	0	174	0	2	176
2018		0	8	0	2	10
2019		0	0	0	0	0
2020		0	96	0	8	104
2021		0	29	0	4	33
2022		0	518	0	4	522
Estimated Total Exposures by Pile Driving Method		0	825	0	20	
					Total Level A Exposures	**0**
					Total Level B Exposures	**845**
					Total Exposures (entire Proposed Action)	**845**

Pursuant to the MMPA, Alternative 1 would result in no Level A incidental takes for marine mammals and may result in up to 845 Level B incidental takes for bottlenose dolphins.

3.12.2.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier within the WRA. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1. Therefore, impacts to fish and fisheries, EFH, and bottlenose dolphins under Alternative 2 would be similar to those described under Alternative 1.

3.12.2.3 No Action Alternative

Under the No Action alternative, the Proposed Action would not be implemented; therefore, baseline conditions would remain unchanged.

3.13 FEDERALLY-LISTED THREATENED AND ENDANGERED SPECIES

3.13.1 Affected Environment

Based on a review of site conditions, existing records, and the USFWS' Information for Planning and Conservation system, ESA-listed and candidate species in **Table 3.13-1** could occur in the vicinity of SUBASE Kings Bay. Those with reasonable potential to occur in the Proposed Action area were carried forward for further analysis and consultation with USFWS and NMFS (refer to Appendices C and E).

Table 3.13-1. Threatened and Endangered Species Potentially Occurring within the Proposed Action Area

Species		Status[1]	Critical Habitat	Jurisdiction	DPS / ESU / Stock	Occurrence[2]	Navy Conclusion[3]	
Common Name	Scientific Name						Species	Critical Habitat
Striped Newt	*Notophthalmus perstratus*	C	Not designated	USFWS		No documented occurrences or suitable habitat, not expected	No Effect	N/A
Piping Plover	*Charadrius melodus*	T	Designated – none in Proposed Action area	USFWS		Rare	NLAA	No Effect
Red Knot	*Calidris canutus rufa*	T	Not designated	USFWS		Rare	NLAA	N/A
Red-cockaded Woodpecker	*Picoides borealis*	E	Not designated	USFWS		No documented occurrences or suitable habitat; not expected	No effect	N/A
Wood Stork	*Mycteria americana*	T	Not designated	USFWS		Rare; minimal suitable habitat; low potential for occurrence	NLAA	N/A
Atlantic Sturgeon	*Acipenser oxyrinchus oxyrinchus*	E	Not designated	NMFS	South Atlantic DPS	Rare	NLAA	N/A
Shortnose Sturgeon	*Acipenser brevirostrum*	E	Not designated	NMFS		Rare	NLAA	N/A
Smalltooth Sawfish	*Pristis pectinate*	E	Designated – none in Proposed Action area	NMFS	U.S. portion of range	Not expected[4]	No Effect	No effect
North Atlantic Right Whale	*Eubalaena glacialis*	E	Designated – none in Proposed Action area	NMFS		No documented occurrences; not expected	No Effect	No Effect
West Indian Manatee	*Trichechus manatus*	E	Designated – none in Proposed Action area	USFWS		Rare to seasonally common	NLAA	No Effect
Eastern Indigo Snake	*Drymarchon corais couperi*	T	Not designated	USFWS		No documented occurrences; not expected	No Effect	N/A
Gopher Tortoise	*Gopherus polyphemus*	C[5]	N/A	USFWS	eastern population	Not expected	No Effect	N/A

Table 3.13-1. Threatened and Endangered Species Potentially Occurring within the Proposed Action Area

Species		Status[1]	Critical Habitat	Jurisdiction	DPS / ESU / Stock	Occurrence[2]	Navy Conclusion[3]	
Common Name	Scientific Name						Species	Critical Habitat
Hawksbill Sea Turtle	*Eretmochelys imbricata*	E	Designated – none in Proposed Action area	USFWS[6] / NMFS		Rare; no documented nesting	NLAA (NMFS); No Effect (USFWS)	No Effect
Green Sea Turtle	*Chelonia mydas*	T	Designated – none in Proposed Action area	USFWS[6] / NMFS		Rare; no documented nesting	NLAA (NMFS); No Effect (USFWS)	No Effect
Kemp's Ridley Sea Turtle	*Lepidochelys kempi*	E	Not designated	USFWS[6] / NMFS		Rare; no documented nesting	NLAA (NMFS); No Effect (USFWS)	N/A
Leatherback Sea Turtle	*Dermochelys coriacea*	E	Designated – none in Proposed Action area	USFWS[6] / NMFS		Rare; no documented nesting	NLAA (NMFS); No Effect (USFWS)	No Effect
Loggerhead Sea Turtle	*Caretta caretta*	T	Designated – none in Proposed Action area	USFWS[6] / NMFS	Northwest Atlantic Ocean DPS	Rare; no documented nesting	NLAA (NMFS); No Effect (USFWS)	No Effect

Notes: [1]C = candidate; E = endangered; T = threatened
[2]common = confirmed, regular sightings of the species inside the study area; rare = there have been few confirmed sightings/strandings in the vicinity, or the distribution of the species is near enough to the study area that the species could occur there; however, occurrences would be infrequent and/or in very small numbers; not expected = species is not expected to occur inside the study area based on unsuitability of habitat or conditions; unprecedented.
[3]N/A = not applicable; NLAA = may affect, not likely to adversely affect; NMFS = National Marine Fisheries Service; USFWS = U.S. Fish and Wildlife Service
[4] NMFS concurrence letter dated October 3, 2012 regarding the Installation of a Continuous Physical Barrier around the Naval Submarine Base at Kings Bay, Georgia.
[5]The western population of gopher tortoises is listed as threatened under the ESA; eastern population is candidate for listing.
[6]No sea turtle nest have been documented at SUBASE Kings Bay, therefore they are included in the NMFS consultation only.

3.13.2 Environmental Consequences

3.13.2.1 Alternative 1

Based on exceptionally low or no anticipated occurrence in the Proposed Action area, the Navy has concluded that the Proposed Action would have no effect on striped newts, red-cockaded woodpeckers, smalltooth sawfish, North Atlantic right whales, Eastern indigo snakes, nesting sea turtles, or gopher tortoises.

ESA-listed Birds

Suitable habitat for piping plovers, red knots, and wood storks is not found in the Proposed Action area. Therefore, potential effects to these species would be limited to individuals migrating through the region or occurring incidentally. Temporary avoidance of the area as a result of elevated noise levels may occur during active repair and maintenance activities, but no measureable disruption to foraging, sheltering, or breeding is expected

ESA-listed Fish

Atlantic and shortnose sturgeon have been documented in small numbers in tributaries near Kings Bay and Cumberland Sound, but the quality of foraging habitat in the Proposed Action area is relatively low. Kings Bay is regularly dredged, resulting in a high level of disturbance combined with ongoing anthropogenic activities. Like birds, fish are expected to exhibit avoidance behavior when exposed to elevated noise levels like those that would result from wharf repair and maintenance activities. The Navy applied proxy source levels to model the range to which pile driving noise would reach several standard thresholds for injury or behavioral disturbance (refer to Appendix C). While the behavioral ranges may extend out into Cumberland Sound, the ranges for injury are limited to the area immediately surrounding the structure being repaired. Additionally, vessels used for construction will observe very low speeds and use propeller guards, minimizing potential for strikes. Given the various BMPs and protective measures (refer to Chapter 4) that will be implemented during construction activities, it is reasonable to assume that impacts to Atlantic and shortnose sturgeon would not differ appreciably from those experienced under normal circumstances and stressors (e.g., predation or severe weather events). Disruption to foraging, sheltering, and breeding is not anticipated.

ESA-listed Marine Mammals

West Indian manatees are known to occur seasonally in small numbers in the waters of Kings Bay, Cumberland Sound, and the nearshore environment off the barrier islands. The waters of Kings Bay are turbid and do not contain high quality habitat for this species. Like birds and fish, manatees are expected to avoid the Proposed Action area during in-water construction due to the increased anthropogenic activities and noise levels. A number of BMPs and protective measures will be implemented to minimize the likelihood of injury and disturbance (refer to Appendix E and Chapter 4). Disruption to foraging, sheltering, and breeding is not anticipated.

ESA-listed Sea Turtles

Hawksbill, green, Kemp's ridley, leatherback, and loggerhead sea turtles have been documented in the waters of Cumberland Sound and the St. Mary's River. Loggerhead sea turtles, and leatherback and greens in very small numbers, nest at Cumberland Island. However, no nesting has been documented aboard SUBASE Kings Bay. As described for other species, the overall quality of habitat in the Proposed Action

area is of relatively low quality based on recurring dredging and high levels of anthropogenic activity. Sea turtles in the vicinity are expected to avoid the immediate construction area. The Navy applied proxy source levels to model the range to which pile driving noise would reach an established threshold for injury or behavioral disturbance (refer to Appendix C). The model indicated that noise levels may only reach the 190 dB threshold during impact driving of steel piles for the Warping Wharf (Map ID 3F) project in FY 2021. On the four planned in-water work days, the maximum range from the pile being driven that noise levels may reach this threshold is approximately 50 feet. Because a small number of piles would be driving, and installation would occur intermittently throughout the day, the potential for a sea turtle to be affected is minimal. Additionally, vessels used for construction will observe very low speeds and use propeller guards, minimizing potential for strikes. Given the various BMPs and protective measures (refer to Chapter 4) that will be implemented during construction activities, it is reasonable to assume that impacts to sea turtles would not differ appreciably from those experienced under normal circumstances and stressors (e.g., predation or severe weather events). Disruption to foraging, sheltering, and breeding is not anticipated.

Conclusions

Pursuant to the Endangered Species Act, the Proposed Action under Alternative 1:

- may affect but is not likely to adversely affect piping plovers, and would have no effect on their critical habitat;
- may affect but is not likely to adversely affect red knots;
- may affect but is not likely to adversely affect wood storks;
- may affect but is not likely to adversely affect Atlantic sturgeon;
- may affect but is not likely to adversely affect shortnose sturgeon;
- may affect but is not likely to adversely affect West Indian manatees;
- may affect but is not likely to adversely affect hawksbill sea turtles, and would have no effect on their critical habitat;
- may affect but is not likely to adversely affect green sea turtles, and would have no effect on their critical habitat;
- may affect but is not likely to adversely affect Kemp's ridley sea turtles;
- may affect but is not likely to adversely affect leatherback sea turtles, and would have no effect on their critical habitat; and
- may affect but is not likely to adversely affect loggerhead sea turtles, and would have no effect on their critical habitat.

A Biological Evaluation was submitted to NMFS in a letter dated November 19, 2015 (Appendix C) and to USFWS in a letter dated November 25, 2015 (Appendix E). USFWS responded with a concurrence letter concluding informal consultation on December 16, 2015 (Appendix E). USFWS concurred with the Navy's determination that the proposed project "may affect, but is not likely to affect" the wood stork, red knot, piping plover, or the West Indian manatee. Concurrence from NMFS is expected by May 30, 2016.

3.13.2.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier within the WRA. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1. Therefore, impacts to threatened and endangered species under Alternative 2 would be similar to those described under Alternative 1.

Pursuant to the Endangered Species Act, the Proposed Action under Alternative 2:

- may affect but is not likely to adversely affect piping plovers, and would have no effect on their critical habitat;
- may affect but is not likely to adversely affect red knots;
- may affect but is not likely to adversely affect wood storks;
- may affect but is not likely to adversely affect Atlantic sturgeon;
- may affect but is not likely to adversely affect shortnose sturgeon;
- may affect but is not likely to adversely affect hawksbill sea turtles, and would have no effect on their critical habitat;
- may affect but is not likely to adversely affect green sea turtles, and would have no effect on their critical habitat;
- may affect but is not likely to adversely affect Kemp's ridley sea turtles;
- may affect but is not likely to adversely affect leatherback sea turtles, and would have no effect on their critical habitat; and
- may affect but is not likely to adversely affect loggerhead sea turtles, and would have no effect on their critical habitat.

3.13.2.3 No Action Alternative

Under the No Action alternative, the Proposed Action would not be implemented; therefore, baseline conditions would remain unchanged.

3.14 CUMULATIVE EFFECTS

CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from "the incremental impacts 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 Section 1508.7).

3.14.1 Past, Present, and Reasonably Foreseeable Actions

In accordance with CEQ's guidance, past actions are relevant and useful in analyzing whether or not the reasonably foreseeable effects of the Proposed Action may have a continuing, additive, and significant relationship to those effects. Present actions include those that are in detailed planning phases, under construction, or which have been recently initiated. Reasonable foreseeable actions include those actions that are likely to occur or are probable. For the purpose of this cumulative impacts analysis, reasonably foreseeable actions do not include actions that are speculative. A list of past, present, and reasonably foreseeable actions, along with the status of the NEPA analysis (if applicable) is provided in **Table 3.14-1**.

Table 3.14-1. Past, Present, and Reasonably Foreseeable Future Actions

Action	Level of Analysis Completed	Decision Document	Lead Agency
Past Actions			
Transit Protection System Facilities	EA/OEA	FONSI/FONSH	Navy
Various Minor Construction Projects-Waterfront Area	CATEX	RCE	Navy
Aerial Application of Pesticides for Mosquito Control at SUBASE Kings Bay	EA	FONSI	Navy
Floating Dock Repair and Replacement at Cumberland Island National Seashore	Unknown	Unknown	National Park Service
SUBASE Kings Bay Maintenance Dredging	EA	FONSI	USACE
Present and Reasonably Foreseeable Actions			
Enclave Fence System in the Waterfront Restricted Area	EA	FONSI	Navy

Notes: *CATEX = Categorical Exclusion; EA = Environmental Assessment; FONSI = Finding of No Significant Impact; OEA = Overseas Environmental Assessment; RCE = Record of Categorical Exclusion.*

Transit Protection System Facilities. An EA/Overseas EA (OEA) was completed in May 2011 for the establishment of a transit protection system to reduce potential terrorist threats against submarines while in transit between facilities at Kings Bay and the open ocean. The preferred alternative consisted of using up to 16 armed escort vessels, adding an approximate 507-foot pier segment by installing up to 250 new pilings, installing fuel lines to the pier and berthing area, and constructing a new office building near the existing U.S. Coast Guard office to accommodate an additional 150 personnel. As documented in the EA/OEA, there would be no significant impacts/harm to soil resources air resources, water resources, biological resources, and socioeconomic resources. A Biological Assessment was submitted to USFWS, and USFWS concurred that the Proposed Action may affect, but not likely to adversely affect the Florida manatee, and would have no effect on the piping plover, wood stork, eastern indigo snake, and shortnose sturgeon. Mitigation measures from the approved June 2009 Biological Opinion for the Navy's Tactical Training Theater Assessment and Planning program were implemented to minimize impacts to sea turtles and marine mammals (Navy 2011). A combined Finding of No Significant Impact (FONSI)/Finding of No Significant Harm was signed on November 30, 2011.

Various Minor Construction Projects-WRA. Various construction projects were completed in the WRA, including a small ordnance magazine, waterfront security improvements, and armored fighting vehicle support facility. Since these projects are similar to existing land use and the use or operation would comply with existing regulatory requirements, a Categorical Exclusion was applied and further environmental analysis was not warranted.

Aerial Application of Pesticides for Mosquito Control at SUBASE Kings Bay. An EA was completed in June 2012 and a FONSI signed in August 2012 for the aerial application of biological agents and insecticides to control adult and larval mosquitoes and biting midges at SUBASE Kings Bay. All biological agents or insecticides used would be USEPA approved and labeled for aerial application, and the number of aerial spray events would occur no more than six times per year. The USFWS also provided concurrence with the Navy's determination that the proposed action "may effect, but is not likely to adversely affect" any of the federally listed species that may occur within the area to be sprayed. The Navy also determined that there would be no impacts to EFH or protected marine species from the proposed action (Navy 2012a).

Floating Dock Repair and Replacement at Cumberland Island National Seashore. The National Parks Service completed repair and rehabilitation of the four primary docks within the Cumberland National Seashore. The floating docks that needed repair were the St. Marys, Dungeness, Sea Camp, and Plum Orchard docks. The island is only accessible by boat or plane, with the majority of visitors arriving via park concessioner ferry. The modification and repairs were necessary to make the ferries fully accessible for the mobility impaired under any tide conditions. The new configurations also improved safety for those entering and exiting the ferries. The projects included the removal of old piles, fenders, dolphins, and docks and in-kind replacement of these with modern structural components. The new docks would still be floating docks. The projects were completed in two phases, with the docks at St. Marys and Dungeness being completed in 2012 and the docks at Sea Camp and Plum Orchard completed in 2013 (Personal communication, Fry, J. F. 2015).

Maintenance Dredging Projects at SUBASE Kings Bay. Routine maintenance dredging is required to continue with safe operations at SUBASE Kings Bay. Maintenance dredging it undertaken annually within the Kings Bay Inner Channel, and periodically within the King Bay Entrance Channel, also called the St. Marys Entrance Channel. Depending on needs and conditions, dredging is done with a cutter suction dredge or a hopper dredge. The U.S. Army Corps of Engineers developed an EA and Memorandum for Record and concluded that using standard dredging BMPs and mitigation measures, there would be no significant impacts from dredging operations at Kings Bay. Dredging activities would occur in accordance with U.S. Army Corps of Engineers issued Permit SAJ-1992-01854, and all conditions required within that permit. In addition, the Florida Department of Environmental Protection has also issued Permit 0196204-016-JC for dredging operations for the portions of these channels that extend into Florida. Annually, dredging of the Kings Bay Inner Channel typically is contracted for 800,000 cubic yards per year. SUBASE Kings Bay is currently dredging with dredging scheduled for completion by 15 September (Personal communication, More, J. 2015). All dredging activities occur with adherence to all applicable permit conditions, as well as to the Statewide Programmatic Biological Opinion provided by USFWS.

Enclave Fence System – WRA. An EA was completed in May 2013 for the waterfront security system project which included installing in-water barriers consisting of four Land/Water Interfaces (LWIs,), moving existing PSBs, installing new PSBs, and constructing an Enclave Fence System (EFS) on Crab Island.

Construction of the LWI bulkheads is currently underway and involves installation of up to 696 steel sheet piles, steel king (I-beam) piles, and square concrete piles. The entire length of each of the LWIs will be equipped with double fences, a patrol road, camera towers with lighting, and sensor posts.

In addition to installations of the LWIs, two new PSBs will be installed and the two existing PSBs will be moved interior to the new PSBs. Each PSB section will be moored in place by a system of underwater dead weight anchors. Up to 10 underwater dead weight anchors will be installed for each new and relocated PSB. As part of moving the two existing PSBs, up to eight underwater dead weight anchors on the existing southern PSB and up to eight underwater dead weight anchors on the existing northern PSB will be removed. Additionally, a new EFS system will be constructed on the eastern side of Crab Island and connect to the LWIs.

The EA determined there would be no impacts to cultural resources; negligible to minor impacts to utilities and infrastructure and hazardous materials and waste; and minor impacts to air quality, noise, natural resources. To offset wetland impacts, a wetland restoration and creation ration of 2:1 was required. There

would be no effect on the eastern indigo snake, gopher tortoise, and wood stork. In addition, the project may affect, but is not likely to adversely affect manatees; loggerhead, green, leatherback, hawksbill, and Kemp's ridley sea turtles; smalltooth sawfish; shortnose sturgeon, or Atlantic sturgeon (Navy 2012b).

3.14.2 Cumulative Impact Analysis

Cumulative impacts analysis characterize the resource areas carried forward for further analysis in terms of their responses to change and capacity to withstand stresses affecting these resources, ecosystems, and human communities and their relation to regulatory thresholds. Specifically, only the resources that could potentially result in impacts other than no, negligible, or minor direct/indirect adverse impacts unless the analyst determines the respective resources would not recover within a short period of time prior to another effect are carried forward in the cumulative impacts analysis. For the purposes of this EA, impacts to air quality, water quality, noise, marine wildlife, and threatened and endangered species are carried forward for cumulative impact analysis.

3.14.2.1 Air Quality and Climate Change

Relevant Past, Present, and Future Actions

The projects listed in **Table 3.14-1** are relevant in that they would produce emissions that would be additive to those produced by implementation of the Proposed Action. In addition to the construction projects, the Transit Protection System Facility has an ongoing operational component that involves 16 escort vehicles operating between Kings Bay and the open ocean, and the addition of 150 personnel working onsite.

Cumulative Impacts Analysis

In terms of short-term cumulative impacts, the Proposed Action and other projects could produce short-term additive amounts of emissions if they are concurrent. However, air emissions were evaluated and considered insignificant for the region. The addition of the small, temporary increases in construction emissions associated with this Proposed Action would not be sufficient to elevate the total cumulative air emissions during the period of the Proposed Action activities to a significant impact. Once the construction associated with the Proposed Action has been completed, no further air quality impacts would be anticipated (i.e., no long-term impacts).

Greenhouse gases (GHGs) are gases in the Earth's atmosphere that prevent heat from escaping into space, resulting in climate change as the Earth's surface temperature increases. Anthropogenic GHGs result primarily from the combustion of fossil fuels, and include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Emission sources evaluated in this EA are exclusively associated with construction and demolition mobile source activities associated with the Proposed Action. The primary GHG emission associated with these activities is CO_2, and to a lesser extent, CH_4 and N_2O. Emissions of these GHGs were considered in the cumulative impacts analysis. **Table 3.14-2** presents the summary of anticipated GHG emission for the Proposed Action.

Table 3.14-2. Anticipated GHG Emissions for Proposed Action

Year of Construction	CO2e Emissions in metric tons/year
2017	836
2018	95
2020	1,014
2021	328
2022	1,344
Total Additional Tons	**3,617**

Note: CO_2e = carbon dioxide equivalent.

Over the life of the Proposed Action, an estimated total of 3,617 tons of GHGs would be emitted from mobile sources and equipment operating during construction and demolition activities. Additional details can be found in Appendix G.

The small increase in emissions of GHGs from the Proposed Action alone would not cause appreciable global warming that would lead to climate change. However, these emissions would increase the atmosphere's concentration of GHGs, and, in combination with past and future emissions from all other sources, contribute incrementally to the global warming that produces the adverse effects of climate change.

3.14.2.2 Biological Resources

Relevant Past, Present, and Future Actions

The projects listed in **Table 3.14-1** are relevant since those projects have the potential to impact surface waters, coastal resources, and/or produce in-air or underwater noise. The potential for cumulative impacts would be most likely if the Proposed Action and any of the projects listed in **Table 3.14-1** occur in a similar location or during a similar time period. As discussed above, all but one project have been completed, and it is assumed construction of the Enclave Fence System would be completed prior to the implementation of the Proposed Action. However, all projects occur within the Waterfront Restricted Area.

Cumulative Impacts Analysis

Impacts to surface waters, coastal resources, and wildlife would likely result from implementation of the projects listed in **Table 3.14-1**. In general, impacts to surface waters and coastal resources are localized and temporary in nature. Therefore, in order for a cumulative impact to occur, a project and the Proposed Action would have to occur within a similar timeframe. However, as noted above, all but one project have been completed, and it is assumed construction of the Enclave Fence System would be completed prior to the implementation of the Proposed Action. Therefore, there is no potential for cumulative impacts to surface waters and coastal resources as a result of implementation of the Proposed Action. This conclusion is further demonstrated since the use of BMPs coupled with the tidal currents would minimize environmental impacts and allow the environment to recover prior to being potentially affected again by the Proposed Action.

Even though cumulative impacts to surface waters and coastal resources would not result from implementation of the Proposed Action, incremental impacts to marine and terrestrial wildlife are possible as a result of in-air and underwater noise. With regards to terrestrial wildlife and in-air noise, SUBASE Kings Bay is an active waterfront area where typical noise measurements of 50 dBA (for light traffic) to 81 dBA (for a crane) when measured 50 feet from the respective pieces of equipment may occur. Since background noise and human activity levels are already high, any wildlife present in the vicinity would generally be tolerant or have acclimated to construction noise and activity levels. Therefore, cumulative impacts to terrestrial wildlife from implementation of Alternative 1 appear to be less than significant.

In regards to incremental impacts to marine wildlife as a result of in-water noise, Navy BMPs, and mitigation and protective measures (refer to Chapter 4) will be implemented to minimize the likelihood of injury and disturbance. For example, use of soft starts allow marine wildlife, including threatened and endangered species, an opportunity to move away from the immediate area before full pile driving power is reached. In addition, visual monitoring and shutdown procedures allow a physical buffer zone between marine wildlife and construction equipment. As a result of the implementation of these measures, the most likely effects would be behavioral avoidance of the noise source. Marine wildlife reacting in this manner would be expected to move relatively short distances while remaining in similar habitats, incurring minor (if any) energetic costs (e.g., increased swimming or reduced feeding). Such localized, temporary behavioral effects would not be expected to contribute to cumulative effects on marine wildlife populations. Furthermore, the ESA and MMPA consultation process requires protective measures to minimize risks to protected species, which in general would benefit all marine wildlife. Therefore, cumulative impacts to marine wildlife from implementation of Alternative 1 appear to be less than significant. In conclusion, no cumulative impacts are anticipated to biological resources from the implementation of the Proposed Action. Further, combined cumulative effects to local populations of special status species are not anticipated.

4.0 PERMITS AND MITIGATION MEASURES

4.1 PERMITS

All applicable federal and state permits would be obtained prior to implementation of the Proposed Action. These permits include the following:

- Section 10 of the Rivers and Harbors Act for placement of structures into waters of the U.S.
- Section 404 of the CWA for the placement of fill.
- Section 401 Water Quality Certification from GA EPD for impacts to water quality from pile repair, removal, and installation.
- Coastal Marshlands Protection Act permit for the shading of wetlands (Alternative 2 only).
- Coastal Marshlands Protection Act for placement of structures and/or fill in coastal Georgia areas.
- State of Georgia Revocable License to use publicly owned lands lying below the ordinary high water mark.
- Camden County Land Disturbing Activity for planned disturbances within 200 feet of the bank of state waters.

In addition, all applicable consultations, coordination, and authorizations such as concurrence on the Coastal Zone Management Act Coastal Consistency Determination from GA DNR, application for a Letter of Authorization from NMFS, ESA section 7 concurrences from USFWS and NMFS, and Magnuson-Stevens Fishery Conservation and Management Act consultation documentation from NMFS must be received before a FONSI can be signed and the Proposed Action can be implemented.

4.2 GENERAL ENVIRONMENTAL REQUIREMENTS

General environmental requirements include the following:

- The construction contractors will prepare an Environmental Protection Plan. The Environmental Protection Plan will contain, but is not limited to, names and qualifications of individuals who will be responsible for hazardous waste disposal and biological monitoring (if required), authorized work areas, environmental compliance training program, drawings showing material storage areas and construction material containment, and methods to control water runoff.
- The construction contractors will develop a project-specific Spill Prevention, Control, and Countermeasure Plan that will provide the clean-up, containment, and restoration procedures, instructions and reports to be used in the event of an unforeseen spill of a substance regulated by federal, state and local laws and regulations. The plan will list the name of the individual(s) who will report spills or hazardous substance releases, will oversee the clean-up activities, will follow-up with complete documentation and report to the Contracting Officer in addition to the legally required federal, state, and local reporting channels.
- The construction contractors will develop a project-specific Hazardous Materials Management Plan that identifies the hazardous substances to be used on the job site, the actions to prevent introduction of such materials into air, water, or ground, and detail provisions for compliance with federal, state, and local laws and regulations for storage and handling of these materials. A Hazardous Waste Management Plan will be included in the Hazardous Materials Management Plan to delineate measures required to handle and dispose of any hazardous waste or excess hazardous materials.

- The construction contractor will prepare a project-specific Stormwater Pollution Prevention Plan which identifies the type and location of the erosion and sedimentation controls that will be used.
- The construction contractor will complete a non-hazardous solid waste disposal plan that will identify methods and locations for solid waste disposal and recycling.
- The contractor will adhere to recordkeeping requirements, including maintaining usage logs, for generators and other temporary air emitting sources.

4.3 BEST MANAGEMENT PRACTICES

- Vehicular traffic will be confined to existing roads and access routes.
- No petroleum products, lime, chemicals, or other toxic or harmful materials will be allowed to enter surface waters.
- Washwater resulting from the washdown of equipment or work areas will be contained for proper disposal, and will not be discharged unless authorized.
- Equipment that enters surface waters will be maintained to prevent any visible sheen from petroleum products.
- No oil, fuels, or chemicals shall be discharged to surface waters, or onto land where there is a potential for re-entry into surface waters shall occur. Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. shall be checked regularly for leaks, and be maintained and stored properly to prevent spills.
- No cleaning solvents or chemicals used for tools or equipment cleaning shall be discharged to ground or surface waters.
- Construction materials shall not be stored where high tides, wave action, or upland runoff could cause materials to enter surface waters.
- Barge operations shall be restricted to tidal elevations adequate to prevent grounding of a barge.
- Use of chemicals, fuels, lubricants, or biocides will be in compliance with all local, state, and federal regulations. All uses of such compounds will observe label and other restrictions mandated by the USEPA and other state and federal legislation.
- The project site will be maintained trash-free, and food refuse will be contained in secure bins and removed daily during construction.
- No vehicles or equipment will be refueled within 100 feet of wetlands or aquatic habitats unless a bermed and lined refueling area is constructed. Any vehicles driven and/or operated within or adjacent to wetlands or aquatic habitats will be checked and maintained daily to prevent leaks of materials.
- To minimize the impacts from temporary elevated turbidity, control floating debris, and to ensure that floating creosote-related contamination is constrained to the construction site (where applicable), floating booms and turbidity curtains, as appropriate, would be in place during the duration of pile removal, repair, and installation activities.
- Soft starts are performed at the beginning of impact pile driving. During a soft start, an initial set of strikes from the impact hammer at reduced energy are performed before it is able to be operated at full power and speed. The energy reduction of an individual hammer cannot be quantified because they vary by individual drivers. Also, the number of strikes will vary at reduced energy because raising the hammer at less than full power and then releasing it results in the hammer “bouncing” as it strikes the pile resulting in multiple “strikes.” Initiating impact pile driving at a lower power may allow fish, marine mammals, and other wildlife an opportunity to

move away from the immediate vicinity of the activity, thereby reducing the likelihood of exposure to sound levels that could cause further behavioral disturbance or injury.

- A containment boom surrounding the work area shall be used during creosote-treated pile removal to contain and collect any floating debris and sheen. The boom may be lined with oil-absorbing material to absorb released creosote.
- Oil-absorbent materials shall be used in the event of a spill if any oil product is observed in the water.
- All creosote-treated material and associated sediments shall be disposed of in a landfill that meets Georgia environmental standards.
- Removed piles and associated sediments (if any) shall be contained on a barge. If a barge is not utilized, piles and sediments may be stored in a containment area near the construction site.
- Pilings that break or are already broken below the waterline may be removed by wrapping the piles with a cable or chain and pulling them directly from the sediment with a crane. If this is not possible, they shall be removed with a clamshell bucket. To minimize disturbance to bottom sediments and splintering of piling, the contractor shall use the minimum size bucket required to pull out piling based on pile depth and substrate. The clam shell bucket shall be emptied of piling and debris on a contained barge before it is lowered into the water. If the bucket contains only sediment, the bucket shall remain closed and be lowered to the mud line and opened to redeposit the sediment. In some cases (depending on access, location, etc.), piles may be cut below the mud line and the resulting hole backfilled with clean sediment.
- Any floating debris generated during installation shall be retrieved. Any debris in a containment boom shall be removed by the end of the work day or when the boom is removed, whichever occurs first. Retrieved debris shall be disposed of at an upland disposal site.
- Whenever activities that generate sawdust, drill tailings, or wood chips from treated timbers are conducted, tarps or other containment material shall be used to prevent debris from entering the water.
- If excavation around piles to be replaced is necessary, hand tools or a siphon dredge shall be used to excavate around piles to be replaced.
- All in-water construction activities shall occur during daylight hours (one hour post sunrise to one hour prior to sunset). Sunrise and sunset are to be determined based on the National Oceanic and Atmospheric Administration data.

4.4 MITIGATION AND PROTECTIVE MEASURES

Concurrent with the NEPA process, the Navy is consulting NMFS and USFWS as required by section 7 of the ESA, NMFS as required by the Magnuson-Stevens Fishery Conservation and Management Act, and NMFS as required by the MMPA. The below listed consultation-specific minimization and/or mitigation measures will be finalized during the consultation process and will be documented in the Final EA.

4.4.1 Standard Conditions and Measures

The contractors shall adhere to all of the following standard measures:

- *Kings Bay Manatee Protection Measures*
- *Sea Turtle and Smalltooth Sawfish Construction Conditions*
- *Southeast Regional Marine Mammal and Sea Turtle Viewing Guidelines*

4.4.2 Briefings

Construction crews and barge operators will complete applicable portions of the Navy's *Marine Species Awareness Training*, and a general environmental awareness briefing that addresses terrestrial ESA-listed and candidate species and birds prior to the start of repair and maintenance activities. This training is designed to improve the effectiveness of visual observations for protected species and provides information on sighting cues, visual observation tools and techniques, and sighting notification procedures.

4.4.3 Marine Mammal Monitoring During Pile Driving

Refer to Section 4.4.6 for measures specific to West Indian manatees. Marine species observers ("observers") designated by the contractor will be placed at a vantage point (e.g., from a small boat, construction barges, on shore, elevated perch, or any other suitable location) suitable for monitoring the farthest extent of the species-specific shutdown zones (**Table 4.4-1**). The observers shall have no other construction related tasks while conducting monitoring.

Table 4.4-1. Vibratory and Impact Shutdown Zones for All Projects

Project	FAC #	Fiscal Year	Vibratory Shutdown Zone [feet]	Impact Shutdown Zone [feet]
1A	5926	2017	50	50
1B	5888	2017	50	N/A
2	5976	2017	N/A	50
3A	5109	2017 and 2022	50	150
3B	5995	2021	50	50
3C	5909	2018	50	150
3D	5910	2017	50	150
3E	5916	2018	50	150
3F	5877	2021	50	240
3G	5926	2022	50	50
4A	P617	2020	50	50
4B	5936	2020	50	150
5	5980	2017	50	N/A
6A	5934	2022	50	N/A
6B	5977	2022	50	N/A

It shall be the contractor's responsibility to ensure that appropriate safety measures are implemented to protect observers. If a boat is used for monitoring, the boat will maintain minimum distances from all species (should they occur) as described in the *Viewing Guidelines*.

During all observation periods, observers shall use binoculars and the naked eye to search continuously for MMPA- and ESA-listed species. If the shutdown zone is obscured by fog or poor lighting conditions, pile driving shall not be initiated until the entire shutdown zone is visible.

The shutdown zone shall be monitored for 15 minutes prior to in-water construction/demolition activities. If a protected species is observed in the shutdown zone, in-water activities shall be delayed until the animal(s) leaves the shutdown zone. Activity shall resume only after the observer has determined, through re-sighting or by waiting approximately 15 minutes that the animal(s) has moved outside the shutdown

zone. The observer(s) shall notify the monitoring coordinator/construction foreman/point of contact when construction activities can commence.

Monitoring of the shutdown zone will continue for 30 minutes following the completion of pile driving.

4.4.4 Data Collection

The following information will be collected on sighting forms used by observers:

- Date and time that pile driving or removal begins or ends
- Construction activities occurring during each observation period
- Weather parameters identified in the acoustic monitoring (e.g., wind, temperature, percent cloud cover, and visibility)
- Tide and sea state

If a protected species approaches or enters the shutdown zone, the following information will be recorded once shutdown procedures have been implemented:

- Species, numbers, and if possible sex and age class of the species
- Behavior patterns observed, including bearing and direction of travel
- Location of the observer and distance from the animal(s) to the observer

If possible, photographs of the animal(s) will be taken and forwarded to the NAVFAC Southeast Environmental point of contact.

Data collection forms shall be furnished to the Environmental point of contact within a mutually agreeable timeframe.

4.4.5 Reporting

A draft report of any incidents of marine mammals entering the shutdown zone will be forwarded to NMFS/USFWS annually. A final report would be prepared and submitted to NMFS within 30 days following receipt of comments on the draft report from NMFS.

4.4.6 Specific Protective Measures for West Indian Manatees

As specified by the conditions in Section 4.4.1, any in-water construction shall cease if a West Indian manatee is observed within 100 feet of the activity. These activities would occur at wharves and piers that are pile supported, without vertical walls. However, boats and barges used during these activities that are over 100 feet in length shall deploy fenders or other equipment to maintain a minimum of three feet of space at maximum compression between the hull and the wharf in order to minimize or eliminate potential for injuries to West Indian manatees. Barges that are temporarily fixed in place by spuds are not required to observe this measure because mobility that causes the risk to manatees is eliminated. Navy ships and submarines, and those that support them (e.g., tug boats, security escorts) are also excluded from this requirement.

4.4.7 Specific Protective Measures for Sea Turtles

As specified by the conditions in Section 4.4.1, any in-water construction shall cease if a sea turtle is observed within 50 feet of the activity. Noise from the Proposed Action may reach the 190 dB noise threshold for sea turtles only during impact driving of steel piles for the Warping Wharf (Map ID 3F) project in FY21. On the four planned in-water work days, the maximum range from the pile being driven that noise

levels may reach this threshold is approximately 50 feet. Therefore, observance of the 50-foot shutdown zone will minimize potential for injury from both mechanical and acoustic sources.

4.4.8 Interagency Notifications

If the contractors encounter an ESA-listed species that is injured, sick, or dead, the installation natural resources manager shall be notified immediately. The Navy will in turn notify the appropriate regulatory agencies.

The Navy will provide the regulatory agencies with the species or description of the animal(s), the condition of the animal (including carcass condition if the animal is dead), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

In preservation of biological materials from a dead animal, the observer has the first responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed. Observers shall not handle dead animals.

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6.0 LIST OF PREPARERS

This EA was prepared for the Navy under contract with NAVFAC Southeast. A list of primary organizations and individuals who contributed to the preparation and review of this document are listed in **Table 6.1-1**.

Table 6.1-1. List of Preparers

Name	Responsibility	Education	Years of Experience
NAVFAC Southeast			
Allen, Nancy	NEPA Program Manager	B.S., Forestry M.S., Environmental Engineering Sciences	33
Cardno			
Allen, Kevin	GIS/Figure Development	B.S., Communications M.S., Geography (in progress)	11
Antolik, Frances	Production	B.S. and M.A., Psychology	7
Everson, Chrystal	Project Manager, Author	B.S. and M.S., Environmental and Occupational Health	15
Ferguson, Emily	Author	B.A., Public and Urban Affairs	8
Hamilton, Lesley	Author	B.A., Chemistry	28
Harrison, Mike	Deputy Project Manager, Author	B.S., Biology M.S., Environmental Science	12
Lowenthal, John	Author	B.S., Biology M.S., Plant Ecology	30
Paulson, Amy	Author	B.S., Ecology M.S., Conservation Ecology and Sustainable Development	18
Riek, Kathleen	Quality Control/Quality Assurance	B.S., Biology	25
Simpson, Sharon	Technical Editor/Production	A.S., Science	18
Wardwell, Robert	Quality Control/Quality Assurance	B. A., Economics M.S., Environmental Science M.B.A., Transportation/Logics	37
Wirth, Carol	Project Director	B.S., Ecology and Evolutionary Biology	21

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7.0 PERSONS AND AGENCIES CONTACTED

The following individuals were consulted in the development of this Environmental Assessment.

Elected Officials

The Honorable Nathan Deal
Governor of Georgia
203 State Capitol
Atlanta, GA 30334

The Honorable David A. Perdue, Jr.
United States Senator
191 Peachtree Street Northeast, Suite 3250
Atlanta, GA 30303

The Honorable Johnny Isakson
United States Senator
3625 Cumberland Boulevard, Suite 970
Atlanta, GA 30339

The Honorable Earl L. "Buddy" Carter
Member, United States House of Representatives
1510 Newcastle Street, Suite 200
Brunswick, GA 361520

Federal Agencies

Mr. Stan Austin
Regional Director
National Park Service, Southeast Region
100 Alabama Street, Southwest
1924 Building
Atlanta, GA 30303

Roy E. Crabtree, Ph.D.
Regional Administrator
National Oceanic and Atmospheric Administration
National Marine Fisheries Service, Protected Resources Division
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505

Mr. David Bernhart
Fishery Management Officer, Protected Resources Division
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505

Mr. Ben Laws
Permits and Conservation Division
National Marine Fisheries Service, Office of Protected Resources
1315 East-West Highway, F/PR1 Room 13805
Silver Spring, MD 20910

Ms. Virginia Fay
Fishery Administrator
National Marine Fisheries Service, Habitat Conservation Division
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505

COL Marvin L. Griffin
Commander
U.S. Army Corps of Engineers, Savannah District
100 West Oglethorpe Avenue
Savannah, GA 31401

RADM Scott A. Buschman
Commander
U.S. Coast Guard Seventh District
Brickell Plaza Federal Building
909 Southeast 1st Avenue
Miami, FL 33131-3050

Mr. Heinz Mueller
Chief, NEPA Program Office
U.S. Environmental Protection Agencies, Region 4
Sam Nunn Atlanta Federal Center
61 Forsyth Street, SW
Mail Code 9T25
Atlanta, GA 30303-8960

Ms. Cynthia Dohner
Regional Director
U.S. Fish and Wildlife Service, Region 4
1875 Century Boulevard, Suite 400
Atlanta, GA 30345

Mr. Don Imm
Field Supervisor
Georgia Ecological Services Field Office
U.S. Fish and Wildlife Services
4980 Wildlife Drive Northeast
Townsend, GA 31331

State Agencies

Mr. Mark Williams
Commissioner

Georgia Department of Natural Resources
2 Martin Luther King, Jr. Drive Southeast, Suite 1252
Atlanta, GA 30334

Mr. Bruce Foisy
District Manager, Coastal District
Georgia Department of Natural Resources
Environmental Protection Division
400 Commerce Center Drive
Brunswick, GA 31523

Mr. Karl Burgess
Manager, Marsh and Shore Management Program
Georgia Department of Natural Resources
Coastal Resources Division
One Conservation Way, Suite 300
Brunswick, GA 31520-8687

David Crass, Ph.D.
Director and Deputy State Historic Preservation Officer
2610 Georgia Highway 155, Southwest
Stockbridge, GA 30281

Local Government

The Honorable William T. DeLoughy
Mayor of St. Marys
418 Osborne Street
St. Marys, GA 31558

Mr. James Starline
Chairman, Camden County Board of Commissioners
200 East 4th Street
Woodbine, GA 31569

Native American Tribes

Mr. Chadwick Smith
Principal Chief
Cherokee Nation of Oklahoma
P.O. Box 948
Tahlequah, OK 74465

Mr. Michell Hicks
Principal Chief
Eastern Band of the Cherokee Nation
P.O. Box 455
Cherokee, NC 28719

Mr. George Wickliffe
Chief, United Keetoowah Band of Cherokee Indians in Oklahoma

P.O. Box 746
Tahlequah, OK 74465

Mr. Bill Anoatubby
Governor, Chickasaw Nation
P.O. Box 1548
Ada, OK 74821

Mr. Gregory E. Pyle
Chief, Choctaw Nation of Oklahoma
P.O. Box 1210
Durant, OK 74702-1210

Mr. Colley Billie
Chairman, Miccosukee Tribe of Indians of Florida
P.O. Box 440021
Miami, FL 33144

Mr. A.D. Ellis
Principal Chief, Muscogee (Creek) Nation of Oklahoma
P.O. Box 580
Okmulgee, OK 74447

Mr. Leonard M. Harjo
Principal Chief, Seminole Nation of Oklahoma
P.O. Box 1498
Wewoka, OK 74884

Mr. Mitchell Cypress
Chairman, Seminole Tribe of Florida
6300 Stirling Road
Hollywood, FL 33024

Mr. George Scott
Mekko, Thlopthlocco Tribal Town
P.O. Box 188
Okemah, OK 74859-0188

Mr. Oscola Clayton M. Sylestine
Principal Chief, Alabama-Coushatta Tribe of Texas
571 State Park Road
Livingston, TX 77351

Mr. Kevin Sickey
Chairman, Coushatta Tribe of Louisiana
P.O. Box 818
Elton, LA 70532

Mr. Beasley Denson
Miko, Mississippi Band of Choctaw Indians

P.O. Box 6010
Choctaw, MS 39350

Organizations

Ms. Genie Strickland
Georgia Chapter Sierra Club
1401 Peachtree Street, Suite 345
Atlanta, GA 30309

Mr. Braye Boardman
Board Chair
Georgia Chapter, The Nature Conservancy
1330 West Peachtree Street, Suite 410
Atlanta, GA 30309-2904

Mr. Mike Worley
President and CEO
Georgia Wildlife Federation
11600 Hazelbrand Road
Covington, GA 30014

Mr. Harry Lowe
State Chairman
Coastal Conservation Association – Georgia Chapter
2807-A Roger Lacey Avenue
Savannah, GA 31404

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APPENDIX A
PUBLIC INVOLVEMENT AND AGENCY CORRESPONDENCE

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/164
May 20, 2015

Dr. David Crass
Division Director/Deputy SHPO
DNR Historic Preservation Division
Jewett Center for Historic Preservation
2610 GA Hwy 155, SW
Stockbridge, GA 30281

Dear Mr. Crass:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

The EA will assess the potential effects of the Alternative 1, Alternative 2 and the No Action Alternative. Enclosure 1 provides a description of the project and includes maps showing the location of the project area. Based on the information presented, the DON respectfully requests that your agency identify any specific information, issues, or concerns that should be included in the EA and would facilitate the decision making process. We would appreciate receiving your comments within 30 days of the date of this letter.

The DON will be consulting with your office under separate cover in regard to the potential effects of the proposed action on significant cultural resources pursuant to Section 106 of the National Historic Preservation Act.

If you have any questions about this project, please contact Ms. Nancy Allen, Project Manager at (904) 542-6302 or e-mail at nancy.p.allen@navy.mil. Written comments may be sent to:

5090
Ser EV21/164
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

GEORGIA
DEPARTMENT OF NATURAL RESOURCES
HISTORIC PRESERVATION DIVISION

MARK WILLIAMS
COMMISSIONER

DR. DAVID CRASS
DIVISION DIRECTOR

June 17, 2015

C.R. Destafney, PE
Environmental Business Line Coordinator
Naval Facilities Engineering Command Southeast (EV21)
Post Office Box 30A, Building 903
Jacksonville, Florida 32212-0030
Attn: Nancy Allen, Project Manager

RE: Kings Bay Submarine Base: In-water Structure Repair, Facility Construction, and Pier Extension
Camden County, Georgia
HP-150529-003

Dear Ms. Destafney,

The Historic Preservation Division (HPD) has received initial information concerning the above referenced project requesting comments pursuant to the National Environmental Policy Act of 1969. Our comments are offered to assist the Department of the Navy and Kings Bay Submarine Base in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended.

Thank you for notifying us of this federal undertaking. We look forward to receiving Section 106 compliance documentation as appropriate.

Please refer to project number **HP 150529-003** in future correspondence regarding this project. If we may be of further assistance, please feel free to contact me at Jennifer.dixon@dnr.ga.gov or (770) 389-7851.

Sincerely,

Jennifer Dixon, MHP, LEED Green Associate
Program Manager
Environmental Review & Preservation Planning

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/165
May 20, 2015

Mr. David Bernhart
Assistant Regional Administrator
Protected Resources Division
NOAA Fisheries Service, Southeast
263 13th Avenue South
St. Petersburg, FL 33701

Dear Mr. Bernhart:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, Georgia. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

An important aspect of the SUBASE Kings Bay EA will be the analysis of the acoustic effects to marine species protected under the Marine Mammal Protection Act and the Endangered Species Act. To complete the analysis required by the permitting and consultation processes, the Navy and the National Marine Fisheries Service (NMFS) will need to work together. Therefore, in accordance with the Council on Environmental Quality's (CEQ's) NEPA guidelines (specifically 40 C.F.R. Part 1501.6) and CEQ's 2002 guidance on cooperating agencies, Navy is sending a letter under separate cover requesting that NMFS serve as a cooperating agency for the development of the Naval Submarine Base Kings Bay EA.

The EA will assess the potential effects of the Alternative 1, Alternative 2 and the No Action Alternative. Enclosure 1 provides a description of the project and maps showing the location of the project area. Based on the information presented, the DON respectfully requests that your agency identify any specific information, issues, or concerns that should be

included in the EA and would facilitate the decision making process. We would appreciate receiving your comments within 30 days of the date of this letter.

If you have any questions about this project, please contact Ms. Nancy Allen, Project Manager at (904) 542-6302 or e-mail at nancy.p.allen@navy.mil. Written comments may be sent to:

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/166
May 20, 2015

Mr. Miles M. Croom
Assistant Regional Administrator
NOAA Fisheries Service, Habitat Conservation Division
263 13th Avenue South
St. Petersburg, FL 33701

Dear Mr. Croom:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, Georgia. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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Ser EV21/166
May 20, 2015

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If you have any questions about this project, please contact Ms. Nancy Allen, Project Manager at (904) 542-6302 or e-mail at nancy.p.allen@navy.mil. Written comments may be sent to:

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV22/345
19 Nov 15

Mr. David Bernhart
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701-5511

SUBJECT: INFORMAL SECTION 7 CONSULTATION REGARDING WATERFRONT PILE REPAIR, REPLACEMENT, AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Navy proposes to repair several waterfront structures at Naval Submarine Base (SUBASE) Kings Bay and construct a new pier to support Transit Protection System (TPS) functions. These repairs, upgrades, and new construction would (1) address critical damage and mission and safety requirements, (2) where damage is less advanced, limit further deterioration and increase the useful life of the structures, and/or (3) upgrade infrastructure to meet the requirements of new submarine technology. The Proposed Action would occur in fiscal years (FY) 2017 through 2022.

The Navy has prepared a consultation package in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) to assess the potential effects on threatened and endangered species and their critical habitats from activities associated with the proposed repair and modification activities at SUBASE Kings Bay.

The Navy identified all federally-listed species and designated critical habitats that may occur in the Action Area and, through NEPA analysis, determined that the Proposed Action may affect Atlantic sturgeon, shortnose sturgeon, green sea turtles, hawksbill sea turtles, Kemp's ridley sea turtles, leatherback sea turtles, and loggerhead sea turtles. No critical habitat for these species is located within the Action Area.

The analysis of the potential effects of the Proposed Action contained in the enclosed biological evaluation (BE) is based on a review of the proposed activities, current and historical distribution and occurrence data for each species, best management practices, and protective measures. The BE is being provided to the National Marine Fisheries Service to initiate informal section 7 consultation on potential effects and seek concurrence on "may affect, but not likely to adversely affect" conclusions for the species under its jurisdiction.

A separate BE has been prepared and submitted to the U.S. Fish and Wildlife Service to address the potential effects of the Proposed Action on species under that agency's jurisdiction, including avian species and the West Indian manatee. Additionally, an application for a letter of

Based on the information provided, we concur with the determination that the proposed project "is not likely to adversely affect" the wood stork, red knot, piping plover, or the West Indian manatee. The requirements of section 7 of the ESA have been satisfied and no further consultation is required. However, obligations under section 7 of the ESA must be reconsidered if: (1) new information reveals impacts of this identified action may affect listed species or critical habitat in a manner not previously considered; (2) this action is subsequently modified in a manner which was not considered in this assessment; or (3) a new species is listed or critical habitat determined that may be affected by the identified action.

We appreciate the opportunity to comment on your project. If you have any additional questions, please write or call our Coastal Georgia Sub Office staff biologist, Christopher Coppola, at 912-832-8739 extension 6.

Sincerely,

Strant Colwell

Strant Colwell
Coastal Georgia Supervisor

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/167
May 20, 2015

Mr. Chadwick Smith
Principal Chief
Cherokee Nation of Oklahoma
P.O. Box 948
Tahlequah, OK 74465

Dear Mr. Smith:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

The EA will assess the potential effects of the Alternative 1, Alternative 2 and the No Action Alternative. Enclosure 1 provides a description of the project and includes maps showing the location of the project area. Based on the information presented, the DON respectfully requests that your agency identify any specific information, issues, or concerns that should be included in the EA and would facilitate the decision making process. We would appreciate receiving your comments within 30 days of the date of this letter.

The DON will be consulting with your tribe under separate cover in regard to the potential effects of the proposed action on significant cultural resources pursuant to Section 106 of the National Historic Preservation Act.

If you have any questions about this project, please contact Ms. Nancy Allen, Project Manager at (904) 542-6302 or e-mail at nancy.p.allen@navy.mil. Written comments may be sent to:

5090
Ser EV21/167
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/168
May 20, 2015

Mr. Michell Hicks
Principal Chief
Eastern Band of the Cherokee Nation
P.O. Box 455
Cherokee, NC 28719

Dear Mr. Hicks:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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If you have any questions about this project, please contact Ms. Nancy Allen, Project Manager at (904) 542-6302 or e-mail at nancy.p.allen@navy.mil. Written comments may be sent to:

5090
Ser EV21/168
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/169
May 20, 2015

Mr. George Wickliffe
Chief, United Keetoowah Band
of Cherokee Indians in Oklahoma
P.O. Box 746
Tahlequah OK 74465

Dear Mr. Wickliffe:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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5090
Ser EV21/169
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/170
May 20, 2015

Mr. Bill Anoatubby
Governor, Chickasaw Nation
P.O. Box 1548
Ada, OK 74821

Dear Mr. Anoatubby:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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5090
Ser EV21/170
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line
Coordinator
By direction of the Commanding
Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/171
May 20, 2015

Mr. Gregory E. Pyle
Chief, Choctaw Nation of Oklahoma
P.O. Box 1210
Durant, OK 74702-1210

Dear Mr. Pyle:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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5090
Ser EV21/171
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/172
May 20, 2015

Mr. Colley Billie
Chairman, Miccosukee Tribe of Indians of Florida
P.O. Box 440021
Miami, FL 33144

Dear Mr. Billie:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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5090
Ser EV21/172
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/173
May 20, 2015

Mr. A.D. Ellis
Principal Chief, Muscogee (Creek)
Nation of Oklahoma
P.O. Box 580
Okmulgee, OK 74447

Dear Mr. Ellis:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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5090
Ser EV21/173
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

MUSCOGEE (CREEK) NATION

Cultural Preservation Johnnie Jacobs – Manager

August 10, 2015

Mr. C.R. Destafney, PE
Environmental Business Line Coordinator
Department of the Navy
New Facilities Engineering Command Southeast
Jacksonville, FL 32212-0030

RE: Proposed EA for Waterfront Pile Repair; Replacement and Facilities Maintenance
Naval Submarine Base
Kings Bay, GA.

Dear Mr. Destafney:

Thank you for contacting the Muscogee (Creek) Nation Cultural Preservation Office in reference to your request for comments regarding the above project.

We have no comments at this time, but look forward to reviewing the Environmental Assessment once it is completed. Please keep us informed about the project should additional information be attained.

Should further information or comment be required please do not hesitate to contact me at (918) 732-7732 or by email at davidp@mcn-nsn.gov. Thank you.

Sincerely,

David J. Proctor
Muscogee (Creek) Nation
Cultural Preservation Dept.

P.O. Box 580 • Okmulgee, OK 74447 • Phone 918-732-7732 • Fax (918) 758-0649

From: David Proctor
Sent: Wednesday, September 02, 2015 11:21 AM
To: Allen, Nancy P CIV NAVFAC SE
Cc: Johnnie Jacobs
Subject: Department of the Navy EA for Waterfront Pile Repair; Replacement and Facilities Maintenance at Naval Submarine Base Kings Bay, GA

Ms. Allen:

After further review of the proposed project, we would like to request additional information for our NHPA 106 review. The additional information requested include:

A copy of the cultural resources survey associated with the project and any any SHPO comments that may have been submitted.

Thank you for your cooperation.

David J. Proctor, Cultural Advisor
Cultural Preservation Office
Muscogee (Creek) Nation
PO Box 580
Okmulgee, Ok 74447
davidp@mcn-nsn.gov
(918) 732-7732

From: Winter, Len E CIV NAVFAC SE, JAXS
Sent: Wednesday, September 02, 2015 2:21 PM
To: Davidp@MCN-NSN.gov
Cc: Allen, Nancy P CIV NAVFAC SE
Subject: Department of the Navy EA/Waterfront Pile Repair/Naval Submarine Base Kings Bay, GA - CULTURAL RESOURCES CONSIDERATIONS

David,

We are in receipt of your letter of 10 August in which you express interest in reviewing the EA as well as your e-mail today requesting additional information for Section 106 consideration.

Version 2 of the EA has been compiled. The final draft EA will be circulated to your tribe upon completion. In the interim, I have attached two pages from the EA/Version 2 regarding the project and its potential effects on cultural resources.

As indicated in the enclosure, the pile-repair action will be occurring on the heavily-utilized west bank of the channel that has been significantly disturbed over the past four decades. Although sites "9CM171 and 9CM172 are located within the Proposed Action area; however, these sites were mitigated pursuant to the 1981 Memorandum of Agreement executed between the State Historic Preservation Officer, Advisory Council on Historic Preservation, and the Navy."

Alternative 2/Project 4 is the only current proposed action that will affect the land surface through the construction of a narrow pier. This same Area of Potential Effects (APE) was subject to consultation back in 2011 when NSB proposed to implement a transit protection system to guide submarines. In 2012, the same APE was subject to consultation over the construction of a proposed security system and fence. In both instances, the SHPO concurred that the action would not affect historic properties.

The Navy is confident that the current proposed action --- which is almost exclusively waterborne --- will not affect any intact archaeological resources. As an added safeguard, the construction contract will carry inadvertent discovery provisions pursuant to 36 CFR 800.13 in the event that intact archaeological resources and/or NAGPRA "cultural items" are identified.

I hope this demonstrates our commitment to ensure that cultural resources are taken into account. Once the draft EA is circulated, we will consult openly with the Muscogee Creek in re the requirements of Section 106 compliance.

Please contact me if you require any additional information.

Thanks,

Len

Len Winter
Historic Preservation Officer
NAVFAC SE/CNRSE
Box 30A/BLDG 903
NAS Jacksonville
Jacksonville, FL 32212
COMM: 904-542-6861

3.4.1 Affected Environment

3.4.1.1 Architectural Resources

There are no historic properties, structures, or districts that are eligible for or listed in the National Register of Historic Places in the Area of Potential Effects.

3.4.1.2 Archaeological Resources

A search of the Georgia's Natural, Archaeological, and Historic Resources GIS website identified 17 previously identified archaeological sites within 1 mile of the Proposed Action area (**Table 3.4-2**). Eleven of these sites have prehistoric Indian components, including mounds, shell middens, artifact scatters, and villages. Five are historic sites with components dating from the 18th through the 20th centuries. One site has historic and prehistoric components.

Table 3.4-2. Archaeological Sites within 1 mile of the Proposed Action Area

Site No.	Site Name	Source	Status
9CM1	Fairview	GNARHGIS	Unknown
9CM166	Mill Creek Shell Midden	Johnson 1989, 1990a; Rock 1996	Eligible
9CM167	Mill Creek MI	Johnson 1990b	Ineligible; Destroyed
9CM170	Rabbit Run	Johnson 1989, 1990a; Rock 1985, 1996	Eligible
9CM171	Kings Bay-Etowah Park Extension	Johnson 1989, 1990a, 1990b; Rock 1996a; Yaros 1979; Smith 1986a, Smith 1986b	Eligible; portions Not Eligible
9CM172	King's Plantation	Yaros 1979	Eligible
9CM173	King's Plantation	Johnson 1978	Destroyed
9CM174	Marianna	Johnson 1989, 1990a; Rock 1996	Eligible
9CM175	Point Peter Road	Eubanks and Adams 1986	Eligible
9CM176	Hercules Club	Eubanks and Adams 1986	Eligible
9CM177	Devil's Walkingstick	Eubanks and Adams 1986	Eligible
9CM178	Araminta Sowerby	Eubanks and Adams 1986	Eligible
9CM179	Killion	Johnson 1989, 1990a; Rock 1996	Eligible
9CM199	Kearns	GNARHGIS	Unknown
9CM206	Shell Midden 1	Eubanks and Adams 1986	Ineligible
9CM208	Kings Bay Cattle Dipping Vat	Johnson 1989, 1990a; Rock 1996	Eligible
9CM214	Rayburn Road Kitchen	GNARHGIS	Ineligible

Note: GNARHGIS = Georgia's Natural, Archaeological, and Historic Resources GIS website

Of the 17 sites listed in **Table 3.1-2**, only two sites, 9CM171 and 9CM172, are located on the west bank of SUBASE Kings Bay within the WRA and are discussed further in this EA. Site 9CM171, the Kings Bay-Etowah Park Extension site, is an elongated site that runs along most of the waterfront on the west bank of the bay, overlooking Kings Bay and Marianna Creek. This site contains a prehistoric shell midden and has Archaic, Woodland, Mississippian, and Historic Indian components. Over the years, this site has been extensively studied and has been found to be significantly disturbed within the project area due to previous construction of buildings and security systems (Smith 1978; Rock 1996a). Portions of this site (i.e., 9CM171A, C, D, F, G, I, and J) have been determined to be eligible for listing on the National Register of Historic Places (NRHP), but were not nominated to the Kings Bay Archaeological Multiple Resource Area (Eubanks and Adams 1986).

Site 9CM172, Kings Plantation, is located adjacent to site 9CM171 along the waterfront on the west side of Kings Bay. This is an 18th through 19th century historic domestic site, which was investigated by the University of Florida in the 1970s (Fairbanks and Smith 1980). This site was recommended eligible for listing on the NRHP, but was affected by a construction and dredging project at SUBASE Kings Bay and has been largely disturbed (NAVFAC 1981). This site was determined to be eligible for the NRHP, but was not nominated to the Kings Bay Archaeological Multiple Resource Area (Eubanks and Adams 1986).

In general, the majority of the area in and around the waterfront has been previously disturbed by construction projects, dredging and filling, and the construction of facility security systems. The eligible portions of Site 9CM171 and all of Site 9CM172 were not nominated because effects associated with Navy construction were mitigated in accordance with the term of the 1981 Memorandum of Agreement executed between the State Historic Preservation Officer, Advisory Council on Historic Preservation, and the Navy.

3.4.2 Environmental Consequences

3.4.2.1 Alternative 1

No effects to architectural resources would result from implementation of the Proposed Action.

Sites 9CM171 and 9CM172 are located within the Proposed Action area; however, these sites were mitigated pursuant to the 1981 Memorandum of Agreement executed between the State Historic Preservation Officer, Advisory Council on Historic Preservation, and the Navy. If, however, during construction any archaeological resources are discovered, work would immediately cease and the procedures for inadvertent discovery as outlined in the Integrated Cultural Resources Management Plan would be implemented. The Navy would consult with the Georgia State Historic Preservation Officer in the unlikely event that intact archaeological resources are discovered with the intent to avoid, minimize, or mitigate adverse effects on cultural resources. There would be no significant impacts to archaeological resources from the implementation of Alternative 1. In accordance with Section 106 of the NHPA, the Navy has determined there would be no adverse effect from implementation of the Proposed Action. As part of the Draft EA review process, a copy of the EA was provided to the State Historic Preservation Office.

3.4.2.2 Alternative 2

Under Alternative 2, Projects 1, 2, 3, 5, and 6 would be implemented as described under Alternative 1. However, under Alternative 2, Project 4 would be located at the south end of the existing Layberth Pier. Aside from the location, it is anticipated Project 4 under Alternative 2 would be constructed using the same methodology as described under Alternative 1. Therefore, there would be no significant impacts to archaeological resources from the implementation of Alternative 2. In accordance with Section 106 of the NHPA, the Navy has determined there would be no adverse effect from implementation of the Proposed Action.

3.4.2.3 No Action Alternative

Under the No Action alternative, the Proposed Action would not be implemented; therefore, baseline conditions would remain unchanged.

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/013
January 14, 2016

Mr. David J. Proctor
Muscogee (Creek) Nation
Cultural Preservation Department
P.O. Box 580
Okmulgee, OK 74447

SUBJECT: NATIONAL ENVIRONMENTAL PROTECTION ACT PUBLIC REVIEW AND COORDINATION WITH THE DEPARTMENT OF THE NAVY FOR THE DRAFT ENVIRONMENTAL ASSESSMENT FOR ENVIRONMENTAL ASSESSMENT FOR PROPOSED WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE (SUBASE), KINGS BAY, GEORGIA

The Department of the Navy (DON) has prepared the enclosed draft Environmental Assessment (EA) to evaluate the environmental effects of the proposed repair of in-water structures and construction of a new pier associated with Transit Protection System functions at Naval Submarine Base (SUBASE) Kings Bay, Georgia. This EA was prepared in accordance with the National Environmental Policy Act (NEPA) of 1969, the President's Council on Environmental Quality regulations implementing NEPA in 40 Code of Federal Regulations (CFR) Parts 1500-1508, Department of the Navy regulations implementing NEPA (32 CFR 775), and Chief of Naval Operations Instruction (OPNAVINST) 5090.1D.

The DON is sending you this draft EA in response to your letter dated August 10, 2015 in which you requested to review the document. Information that you provide will be considered and addressed as appropriate in the Final EA, which we will make available upon request.

The draft EA evaluates the potential impacts on humans and the natural environment associated with the proposed action and alternatives (including a no action alternative). Under the proposed action, the DON would repair (including direct repairs and repairs by replacement)in-water structures at SUBASE Kings Bay and construct a new pier to support Transit Protection System functions at Site VI. These repairs, upgrades and new construction would (1) address critical damage and mission and safety requirements, (2) where damage is less advanced, limit further deterioration and increase the useful life of the structures, and/or (3) upgrade infrastructure to meet the requirements of new submarine technology. The Proposed Action would occur in fiscal years 2017 through 2022.

A public review and comment period has been advertised in the local paper(s) and comments are being accepted from January 21, 2016 through February 22, 2016. Copies of the draft EA are also available on the NAVFAC SE public website as follows:

http://www.navfac.navy.mil/navfac_worldwide/atlantic/fecs/southeast/about_us/environmental_planning.html

5090
Ser EV21/013
January 14, 2016

We welcome your participation in this NEPA public review and comment process. If you have any questions regarding this project, please contact Ms. Nancy Allen at commercial: (904) 542-6302 or email: nancy.p.allen@navy.mil. Written correspondence should be addressed as follows:

Commanding Officer
NAVFAC Southeast (EV21)
Attn: Ms. Nancy Allen
P.O. Box 30A Bldg 903/Yorktown
Jacksonville, FL 32212-0030

Thank you for your time, assistance and cooperation regarding this matter.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the
Commanding Officer

Enclosure: Draft EA

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/174
May 20, 2015

Mr. Leonard M. Harjo
Principal Chief, Seminole Nation of Oklahoma
P.O. Box 1498
Wewoka, OK 74884

Dear Mr. Harjo:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

The EA will assess the potential effects of the Alternative 1, Alternative 2 and the No Action Alternative. Enclosure 1 provides a description of the project and includes maps showing the location of the project area. Based on the information presented, the DON respectfully requests that your agency identify any specific information, issues, or concerns that should be included in the EA and would facilitate the decision making process. We would appreciate receiving your comments within 30 days of the date of this letter.

The DON will be consulting with your tribe under separate cover in regard to the potential effects of the proposed action on significant cultural resources pursuant to Section 106 of the National Historic Preservation Act.

If you have any questions about this project, please contact Ms. Nancy Allen, Project Manager at (904) 542-6302 or e-mail at nancy.p.allen@navy.mil. Written comments may be sent to:

5090
Ser EV21/174
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/175
May 20, 2015

Mr. Mitchell Cypress
Chairman, Seminole Tribe of Florida
6300 Stirling Road
Hollywood, FL 33024

Dear Mr. Cypress:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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If you have any questions about this project, please contact Ms. Nancy Allen, Project Manager at (904) 542-6302 or e-mail at nancy.p.allen@navy.mil. Written comments may be sent to:

5090
Ser EV21/175
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/176
May 20, 2015

Mr. George Scott
Mekko, Thlopthlocco Tribal Town
P.O. Box 188
Okemah, OK 74859-0188

Dear Mr. Scott:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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If you have any questions about this project, please contact Ms. Nancy Allen, Project Manager at (904) 542-6302 or e-mail at nancy.p.allen@navy.mil. Written comments may be sent to:

5090
Ser EV21/176
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/177
May 20, 2015

Mr. Oscola Clayton M. Sylestine
Principal Chief, Alabama-Coushatta Tribe of Texas
571 State Park Road
Livingston, TX 77351

Dear Mr. Sylestine:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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5090
Ser EV21/177
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/178
May 20, 2015

Mr. Kevin Sickey
Chairman, Coushatta Tribe of Louisiana
P.O. Box 818
Elton, LA 70532

Dear Mr. Sickey:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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5090
Ser EV21/178
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/179
May 20, 2015

Mr. Beasley Denson
Miko, Mississippi Band of Choctaw Indians
P.O. Box 6010
Choctaw, MS 39350

Dear Mr. Denson:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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5090
Ser EV21/179
May 20, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/180
May 20, 2015

Mr. David L. Rainer
Chairman, Camden County Board of Commissioners
P.O. Box 435
Kingsland, GA 31548

Dear Mr. Rainer:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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If you have any questions about this project, please contact Ms. Nancy Allen, Project Manager at (904) 542-6302 or e-mail at nancy.p.allen@navy.mil. Written comments may be sent to:

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

5090
Ser EV21/180
May 20, 2015

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/181
May 20, 2015

The Honorable William T. DeLoughy
Mayor of St. Marys
418 Osborne Street
St. Marys, GA 31558

Dear Mayor DeLoughy:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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If you have any questions about this project, please contact Ms. Nancy Allen, Project Manager at (904) 542-6302 or e-mail at nancy.p.allen@navy.mil. Written comments may be sent to:

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

5090
Ser EV21/181
May 20, 2015

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/182
May 20, 2015

The Honorable Nathan Deal
Governor of Georgia
203 State Capitol
Atlanta, GA 30334

Dear Governor Deal:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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If you have any questions about this project, please contact Ms. Nancy Allen, Project Manager at (904) 542-6302 or e-mail at nancy.p.allen@navy.mil. Written comments may be sent to:

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

5090
Ser EV21/182
May 20, 2015

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line
Coordinator
By direction of the Commanding
Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/184
May 20, 2015

The Honorable David A. Perdue, Jr.
United States Senator
One Overton Park, Suite 970
3625 Cumberland Boulevard
Atlanta, GA 30339

Dear Senator Perdue:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

5090
Ser EV21/184
May 20, 2015

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/186
May 20, 2015

The Honorable Johnny Isakson
United States Senator
One Overton Park
3625 Cumberland Blvd, Suite 970
Atlanta, GA 30339

Dear Senator Isakson:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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If you have any questions about this project, please contact Ms. Nancy Allen, Project Manager at (904) 542-6302 or e-mail at nancy.p.allen@navy.mil. Written comments may be sent to:

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

5090
Ser EV21/186
May 20, 2015

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/187
May 20, 2015

The Honorable Buddy Carter
Member, United States House of Representatives
6602 Abercorn Street, Suite 105B
Savannah, GA 31405

Dear Mr. Carter:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/188
May 20, 2015

Ms. Cynthia Dohner
Regional Director
U.S. Fish & Wildlife Service, Region 4
1875 Century Blvd, Suite 400
Atlanta, GA 30345

Dear Ms. Dohner:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/189
May 20, 2015

Ms. Sandra S. Tucker
U.S. Fish & Wildlife Service
Georgia Ecological Services Field Office
105 Westpark Drive, Westpark Center Suite D
Athens, GA 30606-3175

Dear Ms. Tucker:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

-----Original Message-----
From: Coppola, Christopher [mailto:christopher_coppola@fws.gov]
Sent: Thursday, June 25, 2015 3:55 PM
To: Allen, Nancy P CIV NAVFAC SE
Subject: Kings Bay Sub Base Waterfront Pile Repair and Facilities Maintenance

Nancy,

Thank you for the opportunity to provide early comments on the proposed maintenance activities on the Kings Bay Submarine Base in Camden County Georgia. Your letter was routed to our Coastal office by way of the Athens Ecological Services Office on June 3. In order to expedite future coordination concerning the Kings Bay Sub Base, please sent correspondence to: Georgia Ecological Services Coastal Office at 4980 Wildlife Drive, Townsend, Georgia, 31331.

Regarding the project to repair and replace waterfront piles and perform facilities maintenance, you can visit the Service's Information, Planning and Conservation System (IPAC) website at http://ecos.fws.gov/ipac/ <http://ecos.fws.gov/ipac/> . for a list of species that may occur in the project area. Based on the descriptions of the proposed actions and alternatives, I anticipate that the project would encounter habitats utilized by wood storks (Mycteria americana) and West Indian manatees (Trichechus manatus). Shallow freshwater and saltwater areas may be used as foraging habitats for the wood stork. In the event of a wood stork flying in and utilizing the wetlands during the construction activities, those activities within 100 yards of the bird should be suspended until the stork leaves. The stork should not be harassed or harmed.

Somewhat deeper waters may be occupied by manatees from April through October. For previous projects on the Base that may have effects on the manatee the Service and Navy developed special conditions to be implemented to minimize risk of harm to the species. These are attached to this email and should be included in the project documents. Any observations and incidents involving any protected species should be noted and transmitted to me.

Thank you again for the opportunity to provide assistance.

Chris

--

Christopher Coppola
Fish and Wildlife Biologist

Georgia Ecological Services
Townsend, Georgia 31331

912-832-8739 extension 6

Special Provisions for Manatee

The following conditions are intended as a minimum to protect this species and its habitat during any activities that are in close proximity to the known locations of this species on this project.

1. The permittee agrees that all personnel associated with the project will be advised that there are civil and criminal penalties for harming, harassing or killing manatees, which are protected under the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972. The permittee and contractor will be held responsible for any manatee harmed, harassed, or killed as a result of construction activities.

2. All on-site project personnel are responsible for observing water-related activities for the presence of manatees. All construction and activities in open water will cease upon sighting of manatees within 100 feet of the project area. Construction activities will not resume until the manatees have left the project area for at least thirty minutes.

3. A trained spotter provided by the Contractor, shall be onsite for sightings of manatees during the construction of the project. Personnel designated by the Contractor shall receive training by the Georgia Department of Natural Resources, Coastal Resources Division, Brunswick, Georgia. The contact person for the Georgia Department of Natural Resources is Clay George at 912-262-3336.

4. Siltation barriers will be made of material in which manatees cannot become entangled, are properly secured, and are regularly monitored to avoid manatee entrapment. Barriers must not block manatee entry to or exit from essential habitat.

5. All vessels associated with the project will operate at “no wake/idle” speeds at all times while in the construction area. All vessels will follow routes of deep water whenever possible.

6. Propellers on all boats 21 feet or less in length shall be equipped with propeller guard systems, approved by the Project Manager, designed to prevent harm to manatees.

7. Extreme care will be taken in lowering equipment or materials, including, but not limited to piles, sheet piles, casings for drilled shaft construction, spuds, pile templates, anchors, etc., below the water surface and into the stream bed; taking any precaution not to harm any manatee(s) that may have entered the construction area undetected. All such equipment or materials will be lowered at the lowest possible speed.

8. Prior to initiation of construction, the permittee shall install at least two (2) temporary manatee awareness construction signs in locations clearly visible from the navigation channel (Attachment A). The signs shall be displayed and maintained throughout construction and shall be removed by the permittee upon completion of construction. Placement of all signs shall be as approved by the Georgia Department of Natural

Resources, Coastal Resources Division, Brunswick, Georgia. The contact person for the Georgia Department of Natural Resources is Clay George at 912-262-3336.

9. All temporary construction materials will be removed upon completion of the work, and salt marsh areas will be restored. No construction debris or trash will be discarded in the water.

10. Any dead manatee(s) found in the project area must be secured to a stable object to prevent the carcass from being moved by the current. The Contractor shall immediately notify the Government Project Manager who in turn will notify the Environmental Office at 912 563-4678. The Environmental Office will notify:

a. the U. S. Fish and Wildlife Service, Coastal Sub-Office at 912-832-8739 and,
b. the GDNR, Nongame Conservation Section at 912-262-3336.

11. The Contractor shall immediately report to the Government Project Manager any incident (e.g. collisions, injuries and mortalities) which occurs that causes harm or could be detrimental to the continued existence of the manatee along the project corridor. The Government Project Manager will in turn notify the Environmental Office at 912 573-4678. The Environmental Office will notify:

a. the U. S. Fish and Wildlife Service, Coastal Sub-Office at 912-832-8739 and,
b. the GDNR, Nongame Conservation Section at 912-262-3336 or,
800-2-SAVE-ME.

12. In the event of injury or mortality of a manatee, all aquatic activity in the project area must cease pending section 7 consultation under the Endangered Species Act with the U. S. Fish and Wildlife Service and the lead Federal agency.

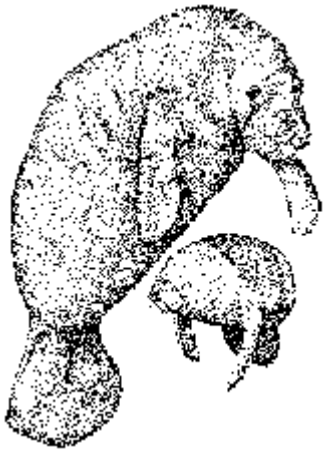
13. The Contractor shall keep a log detailing sightings, collisions, or injury to manatees, which have occurred during the contract period. Following project completion, the log and a report summarizing the any incidents and / or sightings of manatees will be submitted to the Government Project Manager and Environmental Office.

14. The Environmental office will submit above mentioned log to:

a. the U. S. Fish and Wildlife Service, 4980 Wildlife Drive, NE, Townsend, Georgia 31331 and,
b. the GDNR, Nongame Conservation Section, One Conservation Way, Brunswick, Georgia 31520

Attachment A

MARINE FACILITY
MANATEE SIGNS
PLACEMENT PROCEDURES



The West Indian manatee (*Trichechus manatus*) is an endangered species throughout its range. Manatees are protected at the Federal level by the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972, as amended. Protection measures such as these signs are necessary to increase boater awareness. The increased level of Georgia coastal development and associated marinas and boat traffic will increase the probability of negative impacts to the seasonal manatee population. Manatees inhabit Georgia waters from March through November. The main threat to manatee populations is human related boat/barge collisions. Raising boater awareness and educating the public is necessary for manatee conservation in Georgia waters and has been proven effective.

The informational/educational display sign, "Manatee Habitat", is intended to increase boater awareness of manatees that are present in Georgia waters. This sign informs boaters of the potential threat boats pose to the animals and how to help decrease negative impacts caused by those vessels. Although the placement of these signs is mandatory and required by permit, they are informative and non-regulatory in nature.

<u>Procedure for Approval of Sign Installation</u>:

1. The applicant should forward a project site plan, including the proposed location for the permanent signs to: Manatee Sign Approval, Nongame Conservation Section, Department of Natural Resources, One Conservation Way, Brunswick, Georgia 31520. The applicant should also include a chart indicating the location of the facility in relation to waterways, location within a

given county (specify county name), Contact person with phone number, and the Permit and/or Lease number associated with the project

2. The Nongame Conservation Section of the Georgia Department of Natural Resources (GDNR) will review the proposed sign placement site plan and will respond to the applicant within 30 days. If the proposed location is unacceptable, guidance on an alternate site will be provided. The contact person should notify the Nongame Conservation Section when sign placement has been completed (912-264-7218). A photograph(s) of the posted manatee signage at your facility must be submitted with the required permit compliance form to the Marsh and Shore Regulatory Program of the Coastal Resources Division/Georgia Department of Natural Resources.

3. If during a site visit, approved signs, and their locations are found not to be in compliance with the instructions given in this document, relocation or addition of signs will be required. Annual site visits will be conducted to document sign placement and condition. All signs locations will be recorded in the GDNR manatee database.

Approved Sign Suppliers:

The signs are available through the companies listed below and may also be available from other local suppliers throughout the state. Permit/lease holders, marinas, and boat docking/launching facilities should contact sign companies directly to obtain pricing information and arrange for shipping and billing.

Approved Suppliers of Manatee Signs:

Grafix, Inc.
455 Montgomery Street
Post Office Box 1028
Savannah, Georgia 31402
Voice: 912-691-1117
Fax: 912-232-3845

Image Sign Company
785 King George Blvd., Bldg. 3
Savannah, Georgia 31419
Voice: 912-961-1444
Fax: 912-961-1499

Doug Bean Signs, Inc.
160 Dean Forest Rd
Savannah, Georgia 31408
Voice: 912-964-1900
Fax: 912-964-2900

Fendig Signs
411 Arnold Rd
Saint Simons Island, Georgia 31522

Good & Associates
Saint Simons Island, Georgia
(912) 638-7664

Temporary Construction Signs

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/190
May 20, 2015

Colonel Jeffrey M. Hall
Commander, U.S. Army Corps of Engineers
Savannah District
P.O. Box 889
Savannah, GA 31402-0889

Dear Colonel Hall:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

5090
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May 20, 2015

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Environmental Business Line Coordinator
By direction of the Commanding Officer

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PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/191
May 20, 2015

Mr. David Vela
Regional Director
National Park Service, Southeast Region
100 Alabama St, SW
Atlanta, GA 30303

Dear Mr. Vela:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
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5090
Ser EV21/192
May 20, 2015

Mr. Heinz Mueller
Region 4 NEPA Coordinator
USEPA Region 4, NEPA Program Office
61 Forsyth Street, SW
Atlanta, GA 30303

Dear Mr. Mueller:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/193
May 20, 2015

Rear Admiral William D. Baumgartner
Commander, U.S. Coast Guard Seventh District
Brickell Plaza Federal Building
909 SE 1st Avenue
Miami, FL 33131-3050

Dear Admiral Baumgartner:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/194
May 20, 2015

Mr. Chris Clark
Commissioner, GA Department of Natural Resources
2 Martin Luther King, Jr. Drive, SE, Suite 1252
East Tower
Atlanta, GA 30334

Dear Mr. Clark:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

From: Potter, Amy [mailto:Amy.Potter@dnr.ga.gov]
Sent: Thursday, July 02, 2015 11:29 AM
To: Allen, Nancy P CIV NAVFAC SE
Subject: Scoping for Environmental Assessment for Waterfront Pile Repair Replacement and Facilities Maintenance; Naval Submarine Base Kings Bay

Ms. Allen:

Thank you for the opportunity to provide preliminary comments on the Environmental Assessment (EA) for the above referenced project at Naval Submarine Base in Kings Bay. While we have no preliminary comments, we look forward to reviewing and commenting on the EA.

Amy M. Potter, Unit Coordinator
Department of Defense Facilities Unit
Hazardous Waste Management Program
Land Protection Branch
Georgia Environmental Protection Division
404-657-8604

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/195
May 20, 2015

Mr. Karl Burgess
Georgia Department of Natural Resources
Coastal Resource Division
One Conservation Way, Suite 300
Brunswick GA 31520

Dear Mr. Burgess:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/196
May 20, 2015

Mr. Dale Caldwell
Georgia Department of Natural Resources
Environmental Protection Division
400 Commerce Center Dr.
Brunswick, GA 31523-8251

Dear Mr. Caldwell:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

The EA will assess the potential effects of Alternative 1, Alternative 2 and the No Action Alternative. Enclosure 1 provides a description of the project and maps showing the location of the project area. Based on the information presented, the DON respectfully requests that your agency identify any specific information, issues, or concerns that should be included in the EA and would facilitate the decision making process. We would appreciate receiving your comments within 30 days of the date of this letter.

If you have any questions about this project, please contact Ms. Nancy Allen, Project Manager at (904) 542-6302 or e-mail at nancy.p.allen@navy.mil. Written comments may be sent to:

Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

5090
Ser EV21/196
May 20, 2015

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/197
May 20, 2015

Ms. Genie Strickland
Georgia Chapter Sierra Club
1401 Peachtree Street, Suite 345
Atlanta GA 30309

Dear Ms. Strickland:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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May 20, 2015

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/198
May 20, 2015

Mr. Braye Boardman
Board Chair
Georgia Chapter, The Nature Conservancy
1330 West Peachtree Street, Suite 410
Atlanta, GA 30309-2904

Dear Mr. Boardman

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

5090
Ser EV21/198
May 20, 2015

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

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NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/199
May 20, 2015

Mr. Jerry L. McCollum
President and CEO
Georgia Wildlife Federation
11600 Hazelbrand Road
Covington, GA 30014

Dear Mr. McCollum:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

5090
Ser EV21/199
May 20, 2015

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

GEORGIA WILDLIFE FEDERATION

June 18, 2015

Commanding Officer
Naval Facilities Engineering Command Southeast
ATTN: Ms. Nancy Allen, Project Manager
PO Box 30A, BLDG 903
Jacksonville, FL 32212-0030

Dear Ms. Allen:

Thank you for the opportunity to comment on the Department of the Navy's Environmental Assessment for waterfront pile repair, replacement, and facilities maintenance at Naval Submarine Base Kings Bay, GA. We have read through the project description including all diagrams and tables. At this time the Georgia Wildlife Federation will not be submitting comments on this project. Please keep us on your list and include us in future public correspondence. All correspondence should be addressed to me, Mike Worley, President and CEO of the Georgia Wildlife Federation.

Thank you,

Mike Worley
President & CEO
Georgia Wildlife Federation
11600 Hazelbrand Rd
Covington, GA 30014
770-787-7887
mworley@gwf.org

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/200
May 20, 2015

Mr. Harry Lowe
State Chairman
Coastal Conservation Association-Georgia Chapter
2807-A Roger Lacey Ave
Savannah, GA 31404

Dear Mr. Lowe:

SUBJECT: ENVIRONMENTAL ASSESSMENT FOR WATERFRONT PILE REPAIR; REPLACEMENT AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (DON) is preparing an Environmental Assessment (EA) for waterfront pile repair; replacement, and facilities maintenance at Naval Submarine Base (SUBASE) Kings Bay, GA. The purpose of this letter is to seek scoping comments that will assist the DON in project planning and analysis in accordance with the National Environmental Policy Act (NEPA) of 1969.

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Commanding Officer
Naval Facilities Engineering Command Southeast (EV21)
ATTN: Ms. Nancy Allen, Project Manager
P.O. Box 30A, BLDG 903
Jacksonville, FL 32212-0030

5090
Ser EV21/200
May 20, 2015

Your assistance in this project scoping effort is greatly appreciated.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the Commanding Officer

Enclosure: Project Description

Copy to:
NAVFAC SE (EV21)
PWD Kings Bay (PRB4)

APPENDIX B
APPLICATION FOR A LETTER OF AUTHORIZATION

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV22/016
January 14, 2016

Ms. Donna Wieting
Director, Office of Protected Resources
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
1315 East-West Highway, SSMC3, Room 13821
Silver Spring, MD 20910-3282

SUBJECT: REQUEST FOR MARINE MAMMAL PROTECTION ACT INCIDENTAL TAKE AUTHORIZATION AND REGULATIONS FOR WATERFRONT PILE REPAIR, REPLACEMENT, AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

In accordance with the Marine Mammal Protection Act, as amended, and 50 C.F.R. Part 216, the U.S. Navy requests a five-year incidental take authorization and regulation for the incidental taking of marine mammals associated with waterfront pile repair, replacement, and facilities maintenance activities at Naval Submarine Base (SUBASE) Kings Bay, Georgia.

The proposed action may incidentally expose marine mammals that occur within the SUBASE study area to elevated noise levels and other environmental stressors. The enclosed request further describes the repair and maintenance activities and study area, and provides specific details required by the National Marine Fisheries Service (NMFS) for consideration of an incidental take request.

The U.S. Navy requests the above regulations authorize, and NMFS issue, a five-year Letter of Authorization, effective 12 July 2017, to:

Commanding Officer
1063 USS Tennessee Avenue
Naval Submarine Base
Kings Bay, GA 31547

We appreciate your continued support in helping the U.S. Navy to meet its environmental responsibilities. Please direct any questions to Ms. Taura Huxley-Nelson, Natural Resources Specialist, at (904) 542-6307 or email: taura.a.huxley1@navy.mil.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction
of the Commanding Officer

Enclosures: 1. Request for Regulation and Letter of Authorization for the Incidental Taking of Marine Mammals Resulting from Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, Georgia and Marine Mammal Monitoring Plan

2. Draft Environmental Assessment for Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, Georgia – January 2016

REQUEST FOR REGULATION AND LETTER OF AUTHORIZATION FOR THE INCIDENTAL TAKNG OF MARINE MAMMALS RESULTING FROM PILE DRIVING ACTIVITIES AT NAVAL SUBMARINE BASE KINGS BAY, KINGS BAY, GEORGIA

Submitted to:

Office of Protected Resources,
National Marine Fisheries Service,
National Oceanographic and Atmospheric Administration

Prepared for:

Naval Submarine Base Kings Bay

Prepared by:

Naval Facilities Engineering Command Southeast
and
Naval Facilities Engineering Command Atlantic

January 2016

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Naval Submarine Base Kings Bay Point of Contact:
Mr. Jim More
Naval Submarine Base Kings Bay
1063 USS Tennessee Avenue
Kings Bay, GA 31547
Phone: 912-573-4759
Email address: jim.more@navy.mil

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Appendices

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ACRONYMS AND ABBREVIATIONS

AT/FP	Anti-terrorism/Force Protection
B	logarithmic loss
BMP	best management practice
C	linear (scattering and absorption) loss
CFR	Code of Federal Regulations
CGC	Coast Guard Cutters
CV	coefficient of variation
dB	decibel
dBA	decibel (A-weighted)
DOD	Department of Defense
ESA	Endangered Species Act
FAC	Facility
ft.	feet
FR	Federal Register
FY	Fiscal Year
h	height
HDPE	high-density polyethylene
Hz	Hertz
IDP	Installation Development Plan
in.	inch
km	kilometer
kHz	kiloHertz
µPa	microPascal
m	meter
MHW	mean high water
MLLW	mean lower low water
MMPA	Marine Mammal Protection Act
MSDD	Marine Species Density Database
MSF	Magnetic Silencing Facility
NAVFAC	Naval Facilities Engineering Command
NAVFAC SE	Naval Facilities Engineering Command, Southeast
n.d.	no date
NMFS	National Marine Fisheries Service
OSV	Off-shore Supply Vessel
POC	point of contact
PTS	permanent threshold shift
R_1	range from source in meters
R_2	range from driven pile to original measurement location
rms	root-mean-square
SOD	Ship Overboard Drainage
SPL	sound pressure level
SSBN	ballistic missile submarine
SSGN	guided missile submarine
SSP	steel sheet pile
SUBASE	(Naval) Submarine Base

SV	Screening Vessels
TL	transmission loss
TPS	Transit Protection System
UMC	Unspecified Minor Construction
U.S.	United States
USFWS	United States Fish and Wildlife Service
W	width
WRA	Waterfront Restricted Area

1 INTRODUCTION AND DESCRIPTION OF ACTIVITIES

A detailed description of the specific activity or class of activities that can be expected to result in incidental taking of marine mammals.

1.1 INTRODUCTION AND PROPOSED ACTION

Naval Submarine Base (SUBASE) Kings Bay is the United States (U.S.) Department of the Navy's (Navy's) east coast home port for ballistic missile nuclear submarines supporting the Trident II (D-5) missile. SUBASE Kings Bay manages, maintains, and operates Trident ballistic missile (SSBN) and guided missile (SSGN) submarines, Trident II D-5 and Tomahawk Land Attack Missiles and systems, and infrastructure and quality of life facilities and programs.

A study of SUBASE Kings Bay water-based support facilities found that conditions varied widely from good to seriously deteriorated (NAVFAC 2010). Continuous monitoring of these conditions by SUBASE Kings Bay logistical support staff has confirmed the advanced deterioration and critical nature of some issues that pose operational and safety risks. Additionally, other areas of initial deterioration were identified which require remedy in order to maintain the useful life of existing structures. Damage observed (Figure 1-1) includes deteriorated concrete piles, pile caps, and deck components (cracked, spalled, delaminated, exposed/corroded internal reinforcing steel structures); marine pest (wood borer) damage on wooden piles; broken or unmaintained moorings fittings; and corrosion on steel piles and pile caps.

Figure 1-1. Example damage observed at SUBASE Kings Bay waterfront facilities

In some cases, it is more cost effective to demolish older structures that are deteriorated and not well configured to fit existing and upcoming assets with new structures that are specifically designed to meet new mission requirements.

The purpose of the Proposed Action is to maintain the structural integrity of the in-water pile-supported structures across the installation's waterfront. This action would be accomplished by repairing damaged and aged piles and installing new piles, and ensuring compliance with the current revisions to Department of Defense (DOD) and Navy security directives. The Proposed Action is needed because the in-water pile-supported structures and associated infrastructure are deteriorating and do not provide adequate and stable mooring facilities for ships and submarines, and do not comply with current DOD and Navy security directives.

1.2 DESCRIPTION OF ACTIVITIES

The requested effective date of the Letter of Authorization is 12 July 2017.

To ensure the Navy can continue its mission of supporting the Fleet Ballistic Missile System and Trident Submarine Program, the Navy proposes to repair (including direct repairs and repairs by component replacement) in-water structures at SUBASE Kings Bay, construct a new Transit Protection System (TPS) Operational Support Facility, and extend the existing Layberth Pier in Site VI. These repairs, upgrades, and new construction would 1) address critical damage and mission and safety requirements, 2) limit further deterioration and increase the useful life of the structures, and/or 3) upgrade infrastructure to meet requirements of new submarine technology.

The Proposed Action (henceforth, "Project") is comprised of six distinct projects. Of those six projects, Projects 1, 3, 4, and 6 are comprised of multiple smaller projects. A summary of the six proposed projects is provided in Table 1-1, and Table 1-2 details pile removal and installation requirements associated with each.Table 1-3 provides summary information on the number and types of piles to be installed and removed per fiscal year. Figure 1-2 illustrates the general locations of the proposed projects. Detailed individual project information is provided immediately following Figure 1-2.

For all Proposed Action projects involving replacement of piles, the replacement piles would be brought to SUBASE Kings Bay via barge and staged on the delivering barge. If necessary, the piles would be placed onshore adjacent to the construction site on previously disturbed areas for temporary staging. Pile-driving equipment would be barged-mounted and placed immediately adjacent to the piles being removed or installed.

A vibratory hammer would be used for all pile removal work. If the use of vibratory hammer is not feasible for pile installation (i.e., with steel piles), a Delmag Pile Hammer D62-22 or equivalent impact hammer would be used. Estimates of the numbers of pile driven per day are given in the text descriptions for each project. These estimates are based on previous construction projects at given locations within SUBASE Kings Bay. The per-pile drive time for each pile type and method will vary based on the project location and the environmental conditions (including substrate) where each pile is driven. In general, it should take no more than one hour to drive each pile.

The most effective and efficient method of pile installation available will be implemented for each project. The method fitting these criteria may vary based on specific project requirements and local conditions. In some areas of Kings Bay a limestone layer can be found relatively close to the substrate / water interface. This type of layer requires impact driving because vibratory installation will not drive the piles to a sufficient depth. Impact driving, while generally producing higher source levels also minimizes the net amount of active driving time, reducing the amount of time during which marine mammals may be exposed to noise.

Table 1-1. Summary of Proposed Waterfront Repairs and Security-Related Upgrades

Project ID	Project Description	Facility Number (FAC #)	Project Summary
Project 1: Port Operations Waterfront Facilities Repair			
1A	Tug Pier	5926	Repair concrete structural piles, pile caps, utility cover grates, headwall, mooring support and hardware, and deck undersides; replace wooden fender piles with concrete piles; and modify the fender system on the south side of access pier.
1B	General Access Pier Crab Island	5888	Install new guide piles, and repair brow and handrails.
Project 2: Unspecified Minor Construction Layberth Fender Pile Modification			
2	Unspecified Minor Construction (UMC) Layberth Fender Pile Modification P661 Project	5976	Install additional fender piles to shorten the distance between existing piles and provide the required support for hydro-pneumatic fenders.
Project 3: Waterfront Repair and Replacement Maintenance Program			
3A	Explosive Handling Wharf #2 Pier W/Capstans (7)	5109	Repair high-density polyethylene (HDPE) fender pile wraps, sacrificial anodes attached to the steel fender piles, steel safety ladders and treated timber bracing; repair or replace various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings and two steel guide pipe piles on the diver's float.
3B	(Dry Dock) Interface Wharf	5995	Replace timber fender bearing strips and wales, repair concrete deck, bullrail, edge beams, and mooring foundations; and repair, paint and recoat cathodic protection on the steel H-pile fender system and sheet pile.
3C	Refit Wharf #1	5909	Replace various pile caps, piles, and the outboard edge beam; and repair, clean, and paint several mooring fittings.
3D	Refit Wharf #2	5910	Replace or repair various pile caps, piles, outboard edge beams, and mooring foundations; and reattach underdeck lighting conduit and clean and repaint various mooring fittings.
3E	Refit Wharf #3	5916	Replace or repair various pile caps, piles, the outboard edge beams, and mooring foundations; and clean and repaint various mooring fittings.
3F	Warping Wharf W/Capstan (4)	5877	Repair HDPE fender pile wraps; replace or repair various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings.
3G	Tug Pier	5926	Replace timber fender piles with guide piles and small boat access floats; paint mooring fittings; and repair concrete pile caps, concrete piles, concrete underdeck, and storm drain.

Table 1-1. Summary of Proposed Waterfront Repairs and Security-Related Upgrades (*continued*)

Project 4: Transit Protection System Pier and Off-Shore Supply Vessel Berthing Modification Project			
4A	New TPS Pier	P617	Construct a new pier with full hotel service capability including power; potable water; fire protection; sewage connections; Ship Overboard Drainage (SOD) collection; fuel; and telephone, cable, and Local Area Network (LAN) services.
4B	Small Craft Berth Site VI	5936	Once the new TPS pier is constructed, floating berthing slips would be constructed and provided with full hotel service capability. The berthing pier would consist of a pile supported reinforced concrete structure with floating sections. This project includes the installation of two 5,000-gallon above ground storage tanks and provides two associated truck off-loading connections and fuel dispensing units.
Project 5: Trident Refit Facility Waterfront Facilities Repair, Magnetic Silencing Facility with Crane			
5	Magnetic Silent Facility with Cranes (RM14-1710 Trident Refit Facility Waterfront Facilities Repair)	5980	Replace timber fender piles, restraining chains, aluminum utility tray, and concrete pile utility guide bracket; and repair wooden hand rails and the cracked concrete deck underside.
Project 6: Demolition of the Transit Protection System Pier and Layberth North Trestle			
6A	Demolition of TPS Pier	5934	Remove the tip of the existing TPS Pier.
6B	Demolition of Layberth North Trestle	5977	Demolish the North Layberth Trestle.

Table 1-2. Summary of Proposed Pile Removal and Installation Requirements

ID	FAC #	Project Description	Project Start (FY)	Water Depth at Pile Driving Location (feet)	Pile Size (in)	Pile Material	Pile Type	Total # of Piles		Installation Method	Removal Method	Estimated # of Strikes per Pile (Impact Driving only)	Total Maximum Number of In-Water Work Days
								Installed	Removed				
1A	5926	Tug Pier	2017	24	18	Concrete	Square	148	0	Impact	N/A	60	30
					24	Concrete	Square	18	0	Impact	N/A	70	4
					16	Timber	Round	0	159	N/A	Vibratory	N/A	31
1B	5888	General Access Pier Crab Island	2017	15	16	Composite	Round	2	0	Vibratory	N/A	N/A	1
					16	Timber	Round	0	2	N/A	Vibratory	N/A	1
2	5976	UMC Layberth Fender Pile Modification P661 Project	2017	46	14	Steel	H	55	0	Impact	N/A	80	7
3A	5109	Explosive Handling Wharf #2 Pier W/Capstans	2017	46	24	Steel	Round	2	2	Impact	Vibratory	70	2
			2022	46	24	Concrete	Square	3	3	Impact	Vibratory	75	2
				46	24	Steel	Round	10	10	Impact	Vibratory	70	7
3B	5995	(Dry Dock) Interface Wharf	2021	46	14	Steel	H	99	99	Impact	Vibratory	60	15

Table 1-2. Summary of Proposed Pile Removal and Installation Requirements (*continued*)

ID	FAC #	Project Description	Project Start (FY)	Water Depth (feet)	Pile Size (in)	Pile Material	Pile Type	Total # of Piles		Installation Method	Removal Method	Strikes per Pile (Impact Driving only)	Max. In-Water Work Days
								Installed	Removed				
3C	5909	Refit Wharf #1	2018	46	24	Steel	Round	6	0	Impact	N/A	70	1
					30	Steel	Round	0	6	N/A	Vibratory	N/A	1
3D	5910	Refit Wharf #2	2017	46	24	Steel	Round	6	0	Impact	NA	70	1
					30	Steel	Round	0	6	N/A	Vibratory	N/A	1
3E	5916	Refit Wharf #3	2018	46	24	Steel	Round	6	0	Impact	N/A	70	1
					30	Steel	Round	0	6	N/A	Vibratory	N/A	1
3F	5877	Warping Wharf W/Capstan (4)	2021	46	30	Steel	Round	8	8	Impact	Vibratory	70	4
3G	5926	Tug Pier	2022	30	14	Steel	H	77	77	Impact	Vibratory	60	16
4A	P617	New Facility	2020	35	24	Concrete	Square	165	0	Impact	N/A	200	55
					18	Concrete	Square	50	0	Impact	N/A	80	17
					24	Concrete	Square	0	121	N/A	Vibratory	N/A	8
4B	P617	Small Craft Berth Site VI	2020	35	24	Steel	Round	30	30	Impact	Vibratory	100	8
5	5980	Magnetic Silent Facility (RM14-1710 TRIREFFAC Waterfront Facilities Repair)	2017	46	18	Composite	Round	18	0	Vibratory	N/A	N/A	3
					16	Timber	Round	0	18	N/A	Vibratory	N/A	3
6A	5934	TPS Pier Demolition	2022	46	24	Concrete	Square	0	649	N/A	Vibratory	N/A	41
6B	5977	North Trestle Demolition	2022	46	24	Concrete	Square	0	121	N/A	Vibratory	N/A	6

Table 1-3. Total Piles Installed by Type and Fiscal Year

Pile Material	Pile Shape	Pile Size (in)	FY2017		FY2018		FY2020		FY2021		FY2022		TOTAL	
			Install	Remove	Install	Remove	Install	Remove	Install	Remove	Install	Remove	Install	Remove
Composite	Round	16	2	0	0	0	0	0	0	0	0	0	2	0
Composite	Round	18	18	0	0	0	0	0	0	0	0	0	18	0
Concrete	Square	18	148	0	0	0	50	0	0	0	0	0	198	0
Concrete	Square	24	18	0	0	0	165	121	0	0	3	773	186	894
Steel	H	14	55	0	0	0	0	0	99	99	77	77	231	176
Steel	Round	24	8	2	12	0	24	30	0	0	10	10	54	42
Steel	Round	30	0	6	0	12	0	0	8	8	0	0	8	26
Timber	Round	16	0	179	0	0	0	0	0	0	0	0	0	179
Total piles per fiscal year			**249**	**187**	**12**	**12**	**239**	**151**	**107**	**107**	**90**	**860**	**697**	**1317**
			436		**24**		**390**		**214**		**950**		**2014**	

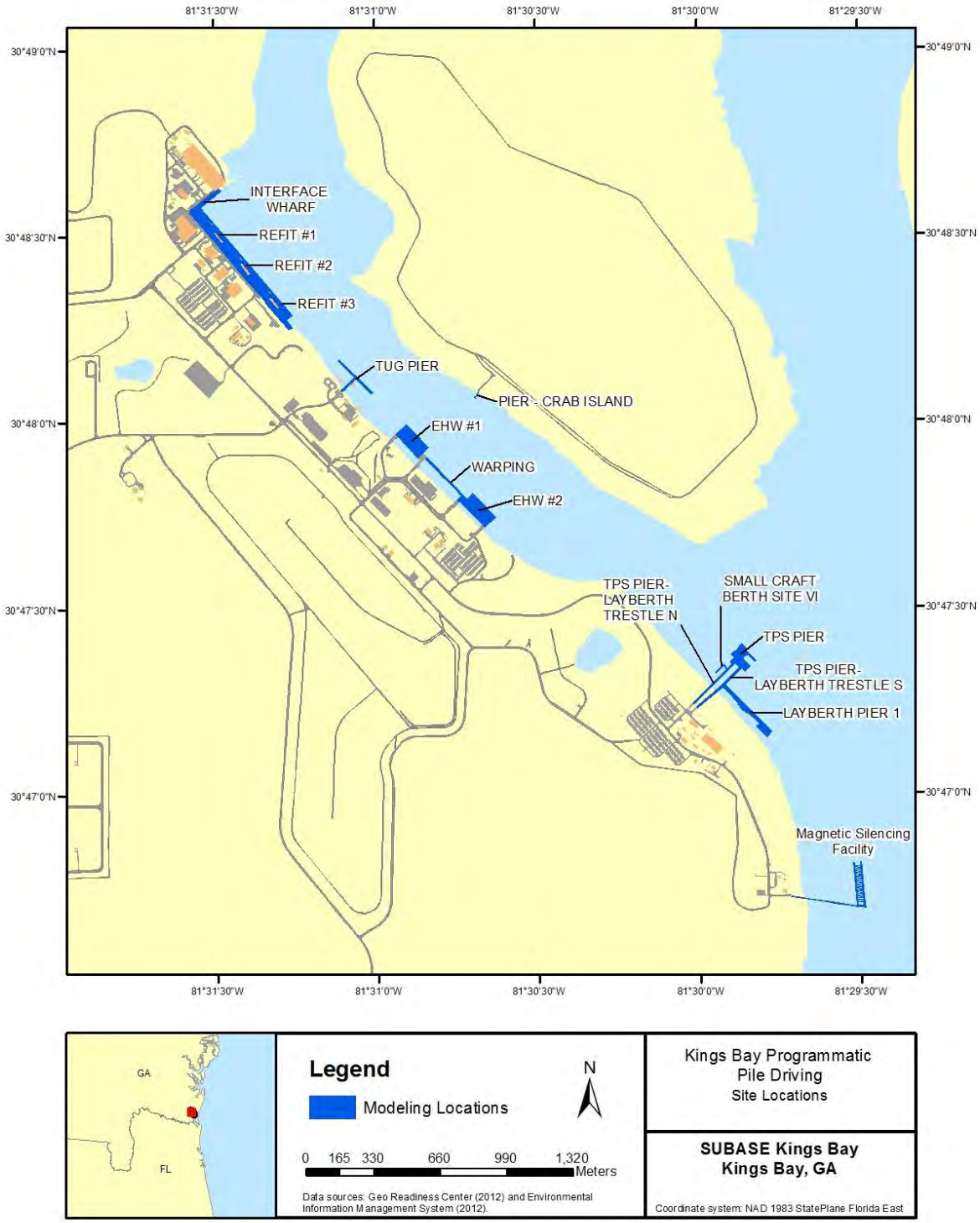


Figure 1-2. Locations of the Proposed Projects

1.2.1 Project 1: Port Operations Waterfront Facilities Repair

In order to maintain the waterfront infrastructure and security required to carry out homeport and refit services to SSBN and SSGN submarines, repairs to the Port Operations Waterfront Facilities are required. Under the Project, structural concrete and steel repairs and corrosion protection is needed on the following waterfront facilities:

- Tug Pier Facility [FAC] #5926 (Project 1A)
- General Access Pier Crab Island FAC #5888 (Project 1B)

1.2.1.1 1A: Tug Pier

The existing Tug Pier is currently operating in a generally dilapidated and unsafe condition. Although several timber piles appear to have recently been replaced, extensive marine borer damage has caused significant loss of pile integrity near the low tide level on 53 older timber fender piles along the inboard (center) side of the pier head and the pier approach. Deterioration and cracking, such as spalling, delamination, and corrosion of internal reinforcing steel are occurring on six concrete piles, 23 concrete pile caps, and 20 square feet of concrete deck underside. Forty-four mooring fittings show areas of coating loss and surface corrosion.

Under the Project, the Tug Pier concrete structural piles, pile caps, headwall, and deck undersides would be repaired. Concrete would be removed to expose the corroded steel reinforcing bars in areas where the concrete has already cracked and spalled, the steel would be repaired or replaced, and the overlying concrete restored. Wooden fender piles would be replaced with concrete piles. The steel reinforcing bars and utility cover grates would be replaced as needed. The fender system on the south side of the access pier would be modified with floats on guide piles to allow mooring of smaller vessels. The concrete base support structures on mooring hardware would be repaired and the mooring hardware would be repainted. All broken and cracked wooden fenders piles and wooden fender piles with wooden guide piles would be replaced with concrete piles

Repairing the Tug Pier would require the installation of 148 new 18-inch square concrete piles, the installation of 18, 24-inch square concrete piles, and the removal of 159 existing 16-inch wood fender piles. The piles would be removed with a vibratory hammer. The concrete piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that five to 16 piles would be removed or installed per day or up to 65 days of in-water work. In-water work is scheduled to begin in Fiscal Year (FY) 17.

1.2.1.2 1B: General Access Pier Crab Island

The Access Pier at Crab Island was impacted by tropical storms in 2012 and the wooden guide piles are damaged. New fiberglass re-enforced plastic composite guide piles with HDPE jackets would be installed at the Access Pier, and the gangplank and handrails would be repaired. Repairing the Access Pier at Crab Island would require the installation of two, 16-inch round composite piles and the vibratory removal of two wooden guide piles. Extraction and installation would both be performed using a vibratory hammer. It is anticipated that an average of two piles would be installed or removed per day for approximately two days of in-water work. In-water work is scheduled to begin in FY17.

1.2.2 Project 2: Unspecified Minor Construction Layberth Fender Pile Modification P661

The Layberth Pier serves the critical functions of weapons loading and unloading, resupply, and maintenance activities for allied vessels visiting SUBASE Kings Bay. The Pier is currently designated as a site for loading Tomahawk missiles in the event weapons loading operations are underway in one of the Explosive Handling Wharves. The loss of the use of this pier would significantly impact SUBASE Kings Bay's ability to berth SSBNs, SSGNs, and foreign vessels. The existing Layberth fenders are currently installed on 5-foot centers (i.e. center of pile to center of pile), and the gaps between the fender piles are too wide to adequately support the necessary fender system.

The Unspecified Minor Construction (UMC) Layberth Fender Pile Modification P661 would provide berthing for the Submarine Group 10 SSGN homeported at SUBASE Kings Bay, berthing for visiting vessels, and overflow berthing for Tridents homeported at SUBASE Kings Bay. By reducing the distance between existing piles by installing additional piles, the pier would provide necessary structural support required for the installation and operation of an upgraded Yokahama pneumatic fender, which is necessary to safely moor submarines.

Upgrading the Layberth pier would require the installation of 55 new 14-inch steel H-piles. No existing piles would need to be removed. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of eight piles would be installed per day for approximately seven days of in-water work. In-water work is scheduled to begin in FY17.

1.2.3 Project 3: Waterfront Repair and Replacement Maintenance Program

The Waterfront Pile Repair and Replacement Maintenance Program consist of repairing and/or replacing structurally unsound piles along the WRA. This project includes multiple individual projects as follows:

- Explosives Handling Wharf #2, Pier with Capstans (7), FAC #5109 (Project 3A)
- (Dry Dock) Interface Wharf, FAC #5995 (Project 3B)
- Refit Wharf #1, FAC #5909 (Project 3C)
- Refit Wharf #2, FAC #5910 (Project 3D)
- Refit Wharf #3, FAC #5916 (Project 3E)
- Warping Wharf with Capstan (4), FAC #5877 (Project 3F)
- Tug Pier, FAC #5926 (Project 3G)

1.2.3.1 3A: Explosives Handling Wharf #2 Pier with Capstans (7)

The Explosive Handling Wharves at SUBASE Kings Bay serve as covered deep water facilities for the loading and off-loading of munitions and other heavy objects onto submarines. Without this facility in operational condition, the secondary loading location would be the only place for such actions to take place. In the event of a mechanical failure or any other event causing the secondary location to be disabled, munitions or heavy supplies could not be loaded or unloaded from the submarines.

Explosives Handling Wharf #2 displays significant deterioration of a non-rated cleat mooring fitting on the diver's float, various HDPE fender pile wraps, sacrificial anodes attached to the

steel fender piles, steel safety ladders and treated timber bracing; damaged reinforced concrete on various pile caps, piles, and mooring foundations. Likewise, mooring fittings and two steel guide pipe piles on the diver's float require cleaning and repainting.

Upgrading Explosives Handling Wharf #2 would require the installation of two new 24-inches round steel piles and the removal of two guide piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated two piles would be installed or removed per day for approximately two days of in-water work.

Additional future repair projects at this location may include the installation of three, 24-inch square concrete and ten, 24-inch round steel piles and the removal of three dolphin piles and ten fender piles. The piles would be removed and installed as described in the above paragraph. For the second phase, it is anticipated that three to eight piles would be removed or installed per day or up to nine days of in-water work. The in-water work is scheduled to begin in FY22.

1.2.3.2 3B: (Dry Dock) Interface Wharf

The Interface Wharf serves as a loading and unloading for the submarine fleet as well as a service and storage wharf for non-dry-dock repairs and maintenance. Without this facility in operational condition, other refit wharves or the dry dock would have to be used to complete such tasks.

The existing Interface Wharf is increasingly deteriorating. Marine borer damage and subsequent peeling and rot are documented on 96 timber fender piles at and below mean high water (MHW). Fifteen linear feet of timber wale at the curb elevation has impact and rot damage. Spalled concrete occurs at one location on the bullrail corner, on one mooring foundation, on one location on the deck at the handrail attachment, and on two linear feet of the beam seat on the east side of the dry dock gate. All steel fender piles show areas of surface corrosion within and immediately above the tidal zone. (Visual examination and ultrasonic thickness testing indicates the steel piles have up to 0.25-inch of rust scale; the actual loss of steel is less than 0.125-inch loss of actual steel thickness.)

Under the Project, the timber fender bearing strips and wales would be replaced, and the concrete deck, bullrail, edge beams, and mooring foundations would be repaired. Additionally, the steel H Pile fender system would be repaired and painted. Cathodic protection would be recoated on the steel H Pile fender system and sheet pile.

Repairing the Interface Wharf would require the installation of 99 new 14-inch steel H-piles and removal of 99 existing 14-inch steel H-piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of 14 piles would be removed or installed per day for approximately 15 days of in-water work. The in-water work is scheduled to begin in FY21.

1.2.3.3 3C: Refit Wharf 1

Refit Wharfs 1, 2, and 3 provide storage and maintenance services to Trident Submarines and others as requested, including incremental overhaul, modernization, and repair support. All three Refit Wharfs are in disrepair and present a safety risk to the personnel and heavy equipment utilizing the pier; in certain areas, it is recommended that vehicles, mobile cranes, storage and any other heavy loads be prohibited from within the areas supported by deteriorated pile cap locations to limit the possibility of further damage or structural failures. Without the wharves in

operational condition, submarines would need to be docked at other locations for repairs, reducing the operational efficiency of Kings Bay maintenance mission, extending the length of vessel docking times, and creating congestion with other vessels already in port.

Refit Wharf 1 displays damaged steel beams supporting the outboard access walkway; damaged reinforced concrete on various pile caps, piles, and the outboard edge beam. Likewise, several mooring fittings require repair, cleaning, and painting.

Repairing Refit Wharf 1 would require the installation of six, 24-inch round steel guide piles and the removal of six existing 30-inch fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of six piles would be removed or installed per day for approximately two days of in-water work. The in-water work is scheduled to begin in FY18.

1.2.3.4 3D: Refit Wharf 2

Refit Wharf 2 displays broken steel beams supporting the outboard access walkway and damaged reinforced concrete on various pile caps, piles, outboard edge beams, and mooring foundations. Additionally, some of the underdeck lighting conduit is detached and various mooring fittings require cleaning and repainting.

Repairing Refit Wharf 2 would require the installation of six, 24-inch round steel guide piles and the removal of six existing 30-inch fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of six piles would be removed or installed per day for approximately two days of in-water work. The in-water work is scheduled to begin in FY17.

1.2.3.5 3E: Refit Wharf 3

Refit Wharf 3 displays broken steel beams supporting the outboard access walkway and damaged reinforced concrete on various pile caps, piles, the outboard edge beams, and mooring foundations. Likewise, the mooring fittings require cleaning and painting.

Repairing Refit Wharf 3 would require the installation of six, 24-inch round steel guide piles and the removal of six, 30-inch fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of six piles would be removed or installed per day for approximately two days of in-water work. The in-water work is scheduled to begin in FY18.

1.2.3.6 3F: Warping Wharf with Capstan (4)

The Warping Wharf serves as a non-covered extension of the inboard leg of the Explosives Handling Wharfs used for aligning submarines prior to berthing in the covered facilities. This facility provides for quick transfer from one Explosives Handling Wharf to the other, as well as protection for the submarines as there is a continuous barrier beside the submarine and attached capstans during docking. The Warping Wharf also functions as a berthing facility for Fleet Ballistic Cargo Ships.

Deterioration at the Warping Wharf includes various degraded HDPE fender pile wraps and damaged reinforced concrete on various pile caps, piles, and mooring foundations. Likewise, the mooring fittings require cleaning and painting.

Repairing the Warping Wharf would require the installation of eight, 30-inch round steel piles and the removal of eight existing fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of five piles would be removed or installed per day for approximately four days of in-water work. The in-water start work is scheduled to begin in FY21.

1.2.3.7 3G: Tug Pier

Although this location is also discussed in Project 1A, additional future repair projects at this location may include the installation of 77 new 14-inch steel H-piles and removal of 77 existing steel fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of 10 piles would be removed or installed per day for approximately 16 days of in-water work. The in-water work is scheduled to begin in FY22.

1.2.4 Project 4: Transit Protection System Off-Shore Supply Vessel Berthing Modification Project

This project includes the construction of a new pier associated with TPS functions, and the modification of the existing berthing pier on the north trestle at Site VI to comply with current DOD and Navy security directives.

- New Facility, P617 (Project 4A)
- Small Craft Berth Site VI, P617, FAC #5936 (Project 4B)

1.2.4.1 4A: New Facility P617

The new TPS pier would be provided with full hotel service capability including power, potable water, fire protection, wastewater, Ship Overboard Drainage (SOD) collection, fuel, and telecommunications (i.e., telephone, cable, and Local Area Network [LAN] services). The construction of the new pier would require the installation of 165 new 24-inch square concrete piles and 50 new 18-inch square concrete piles. Approximately 121 piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated 16 to 22 piles would be removed and three to 12 piles would be installed per day for approximately 80 days of in-water work. The in-water work is scheduled to begin in FY20.

1.2.4.2 4B: Small Craft Berth Site VI P617

The existing berthing pier on the north trestle at Site VI would be relocated to align with the new pier associated with the proposed TPS Operational Facility and modified to accommodate two OSVs, two 87-foot Coast Guard Cutters (CGC), six 33-foot long Screening Vessels (SVs), and six 72-foot long SVs in accordance with current DOD and Navy security directives. The berthing pier would consist of a pile-supported, reinforced concrete structure including floating sections to berth the smaller craft. Two, 5,000 gallon horizontal, protected above-ground storage tanks and two associated truck off-loading connections (one for each tank) and fuel dispensing units for refueling the U.S. Coast Guard escort vessels would be installed.

As with the new trestle described in Project 4A, the floating berthing slips would be provided with full hotel services. Drainage water from the piers would be collected, run through oil-water separators, and then disposed through existing sewage connections. The modification of the

small craft berthing site associated with the TPS Pier would require the installation of 30 new 24-inch round steel piles and the removal of 30 existing piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of eight piles would be installed or removed per day for approximately eight days of in-water work. The in-water work is scheduled to begin in FY20.

1.2.5 Project 5: RM14-1710 TRIREFFAC Waterfront Facilities Repair, Magnetic Silencing Facility with Cranes

The Magnetic Silencing Facility (MSF) serves as a degaussing (process of decreasing or eliminating a remnant magnetic field) station for Trident Submarines. During normal oceanic operations ships and submarines naturally build up a magnetic signature, which can be visible and exploitable by enemy craft as well as damaging to sensitive equipment aboard the ship. The earth's magnetic fields between the North and South Poles are being crossed routinely at sea, and while either traversing these natural fields or lying dormant for extended periods of time during scheduled maintenance, a vessel's magnetic signature changes. To minimize the level of permanent magnetism, the MSF treatment slip is the first structure vessels encounter on their way into or out of SUBASE Kings Bay facilities.

The MSF at Kings Bay is in a deteriorated condition. Deterioration includes a broken 5-linear foot aluminum utility tray, one fender system restraining chain, and one utility guide bracket. Marine borer damage is occurring on one timber fender pile at and below MLW. The concrete underdeck has a 6-linear foot crack (0.125-inch wide).

The Project would replace the MSF and MSF trestle timber fender piles, restraining chains, aluminum utility tray, and concrete pile utility guide bracket. Wooden hand rails and the cracked concrete deck underside would be repaired. Repairing the MSF and MSF trestle would require the vibratory removal of 18 existing timber piles, and the installation of 18 new 18-inch round composite piles. The fiberglass re-enforced plastic composite piles would be driven by a vibratory hammer. It is anticipated that an average of six piles would be installed per day for approximately three days of in-water work. The in-water work is scheduled to begin in FY17.

1.2.6 Project 6: Demolition Project using Restoration Modernization Funds: TPS Pier and North Trestle

As part of this project, the existing TPS Pier and the North Trestle would be demolished. The North Trestle and TPS Pier were designed to meet the short-term need to moor a floating dry dock and med-moor (moor using a bow anchor and stern lines to attach to the dock) a submarine tender for Poseidon Class submarines. Demolition work described below includes removal of pier decks, pile caps, and piles. This work will be accomplished using barge mounted cranes. There is no dredging associated with the proposed action, and no other in-water work will occur during demolition.

- Demolition of the TPS Pier, FAC #5934 (Project 6A)
- Demolition of the North Trestle, FAC #5977 (Project 6B)

1.2.6.1 6A: Demolition of the TPS Pier

Demolition of the TPS pier would require the vibratory removal of 649 existing 24-inch square concrete piles. It is anticipated that an average of 16 piles would be removed per day for approximately 41 days of in-water work. The in-water work is scheduled to begin in FY22.

1.2.6.2 6B: Demolition of the North Trestle

The trestle was intended as an interim fix during the transition to the newer Ohio Class submarines as the Poseidon Class submarines were decommissioned. The facility is obsolete, in poor condition, and cannot meet any current or future mission needs cost effectively. Demolition of the Layberth North trestle would require the removal of 121 existing 24-inch square concrete piles. The piles would be removed with a vibratory hammer. It is anticipated that an average of 20 piles would be removed per day for approximately six days of in-water work.

2 DURATION AND LOCATION OF ACTIVITIES

The dates and duration of such activity and the specific geographical region where it will occur.

SUBASE Kings Bay is located in the southeastern corner of Georgia, eight miles north of the Georgia-Florida border, approximately four miles inland (straight line distance) from the Atlantic Ocean, and approximately two miles north of St. Mary's, Georgia, along the western shore of Cumberland Sound (Figure 2-1). The approximate 16,000-acre installation provides berthing and support services to naval submarines and other assets. The entirety of SUBASE Kings Bay, including the land areas and adjacent water areas along Kings Bay and Cumberland Sound between Marianna Creek to the north and Mill Creek to the south, is restricted from general public access.

SUBASE Kings Bay is an estuarine environment, receiving salt water input from ocean waters through tidal exchange, and fresh waters input from rivers, tributaries, and stormwater outfalls. Water temperature ranges from 54°F in winter to a high of 85 °F in summer (NOAA 2015). The large tidal range and strong currents result in tidally mixed waters that are refreshed on a daily basis.

The Kings Bay submarine channel is regularly maintenance-dredged and has fairly uniform depths of -45 feet mean lower low water. The submarine channel is depositional with fine-grained sediment, accumulation of organic matter, and reduced DO (Pinckard and Morris 2005, 2006). Benthic invertebrate communities within the channel are characterized as moderately to highly degraded due to the presence of low DO or methane bubbles indicative of anoxic conditions and presence of only opportunistic early succession organisms (e.g., species capable of quickly colonizing disturbed sites).

Channel maintenance results in a relatively narrow intertidal zone along most of the shoreline. The north end of Kings Bay is not dredged beyond the turning basin and abruptly transitions to shallow subtidal and intertidal habitat, with fine sands predominant in the channel and finer-grained silts and clays in marsh creeks. Shallow subtidal and intertidal habitat areas also occur along the northwestern and southwestern shoreline of Crab Island, and along the southern shoreline of the base between the south end of the developed waterfront area and the Magnetic Silencing Facility. These areas have a predominance of fine sands in more exposed locations (i.e., close to open channel) and silts and clays in more protected locations.

The Project would begin in fiscal year (FY) 2017, with construction continuing through FY 2022. Projects would occur at specific facilities on the installation, shown in Figure 1-2. Construction could occur year-round. While impact and vibratory driving / extraction may occur interchangeably thoughout a given day of construction, no simultaneous (i.e., two drivers operating at the same time) would take place.

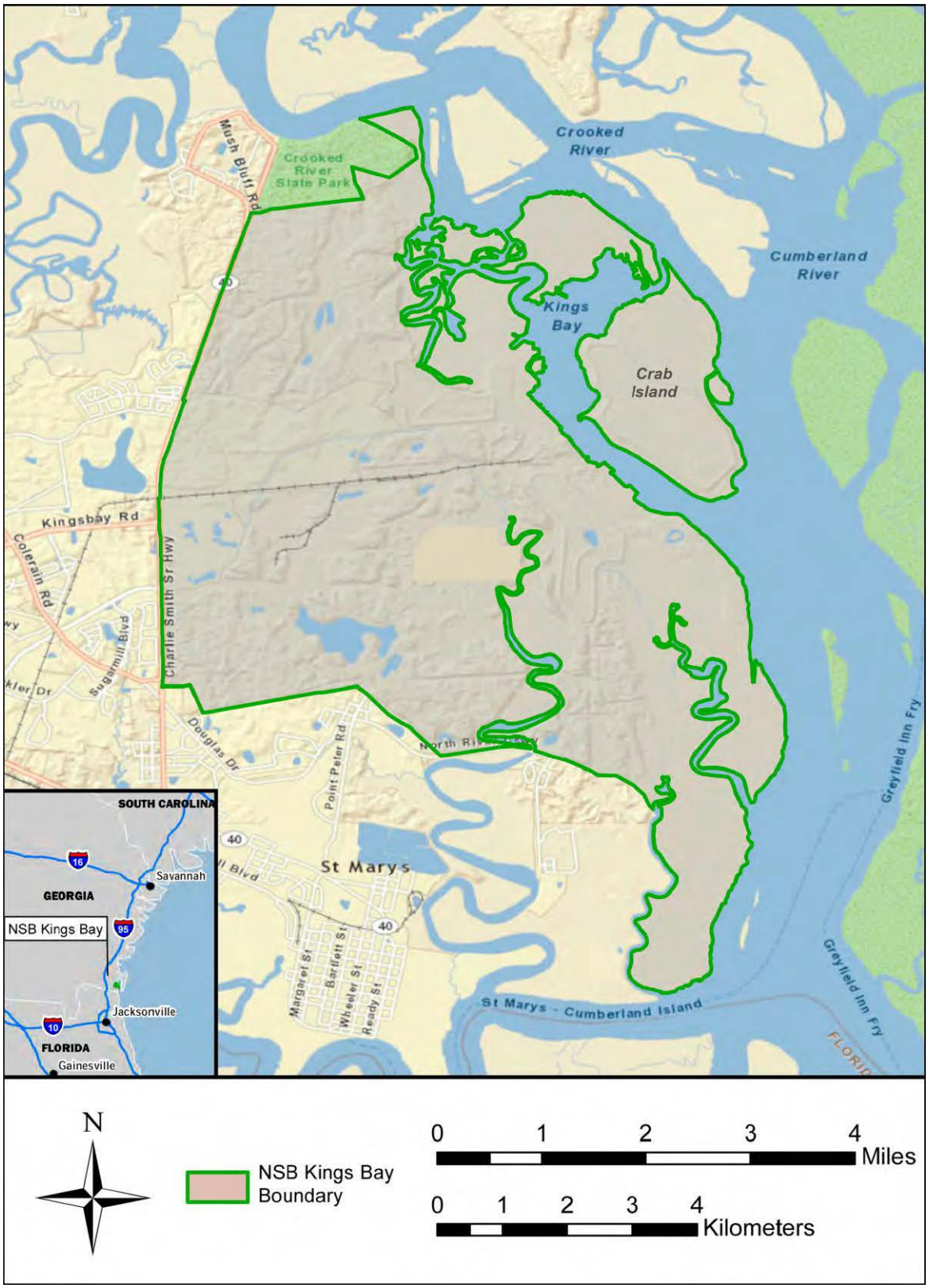


Figure 2-1. SUBASE Kings Bay Location Map

3 MARINE MAMMAL SPECIES AND NUMBERS

The species and numbers of marine mammals likely to be found within the activity area

The Navy has reviewed marine mammal species occurring in the western Atlantic along the east coast of southern Georgia and northern Florida, and has determined that only bottlenose dolphins (*Tursiops truncatus*) and West Indian manatees (*Trichechus manatus*) may occur in the vicinity of the Project (Table 3-1). The West Indian manatee, while protected under the MMPA, is not regulated by NMFS and therefore is not considered further in this application. The responsible regulator for manatees is the U.S. Fish and Wildlife Service (USFWS). USFWS has promulgated guidance for protecting manatees occurring in the vicinity of near shore construction. The Navy and its contractors shall comply with the conditions intended to protect manatees from in-water work as outlined in Appendix A.

Bottlenose dolphin density was calculated based on surveys of the Kings Bay region during 2006 – 2007 (U.S. Department of the Navy 2009).

Table 3-1. Species Potentially Occurring in the Project Area

Species and Estimated Density	Stock	Occurrence[1] and Abundance Best (CV) / MIN	STATUS	
			MMPA[2]	ESA
bottlenose dolphin 1.12 / km^2	Southern Georgia Estuarine System	Likely – year round 194 (0.05)/185[2]	Strategic Stock	n/a
	Western North Atlantic South Carolina-Georgia Coastal Stock	Likely – year round 4,377 (0.43) / 3,097[2]	Strategic Stock (depleted)	n/a
	Western North Atlantic Offshore	Extralimital 77,532 (0.40) / 56,053[2]	n/a	n/a
	Western North Atlantic Northern Florida Coastal	Rare – year round 1,219 (0.67) / 730[2]	Strategic Stock	n/a
	Jacksonville Estuarine System	Extralimital- year round, numbers may be slightly lower in winter unknown / unknown[2]	Strategic Stock	n/a
	Western North Atlantic Southern Migratory Coastal	Seasonal - January to March 9,173 (0.46) / 6,326[2]	Strategic Stock	n/a

Sources: U. S. Department of the Navy 2009; [1]Extralimital: there may be a small number of sighting or stranding records, but the activity area is outside the species' range of normal occurrence; Rare: there may be a few confirmed sightings, or the distribution of the species is near enough to the area of concern that the species could occur there; the species may occur but only infrequently or in small numbers; Likely: confirmed and regular sightings of the species occur year-round; [2]Waring et al. 2014

4 AFFECTED SPECIES STATUS AND DISTRIBUTION

A description of the status, distribution, and seasonal distribution (when applicable) of the affected species or stocks of marine mammals likely to be affected by such activities.

Bottlenose Dolphin

Bottlenose dolphins occurring in the waters of SUBASE Kings Bay may be individuals belonging to any of the following stocks: the Southern Georgia Estuarine System Stock; the Western North Atlantic South Carolina-Georgia Coastal Stock; the Western North Atlantic Southern Migratory Coastal Stock; the Western North Atlantic Northern Florida Coastal stock; and extralimitally, the Western North Atlantic Offshore Stock and the Jacksonville Estuarine System stock.

Along the Atlantic coast of the U.S., where the majority of detailed work on bottlenose dolphins has been conducted, male and female bottlenose dolphins reach physical maturity at 13 years, with females reaching sexual maturity as early as seven years (Mead and Potter 1990). Bottlenose dolphins are flexible in their timing of reproduction. Seasons of birth for bottlenose dolphin populations are likely responses to seasonal patterns of availability of local resources (Urian et al. 1996). Thayer et al. (2003) found bottlenose dolphins in North Carolina to exhibit a strong calving peak in spring, particularly May and June, and a diffuse peak from late spring to early fall. There is a gestation period of one year (Caldwell and Caldwell 1972). Calves are weaned as early as one and a half years of age (Reynolds et al. 2000), and typically remain with their mothers for a period of three to eight years (Wells et al. 1987), although longer periods are documented (Reynolds et al. 2000). There are no specific breeding locations for this species.

Dive durations as long as 15 min are recorded for trained individuals (Ridgway et al. 1969). Typical dives, however, are shallower and have a much shorter duration. Mean dive durations of Atlantic bottlenose dolphins typically range from 20 to 40 seconds at shallow depths (Mate et al. 1995).

Bottlenose dolphins typically occur in groups of 2 – 15 individuals, but significantly larger groups have also been reported (Shane et al. 1986; Kerr et al. 2005). Coastal bottlenose dolphins typically exhibit smaller group sizes than larger forms, as water depth appears to be a significant influence on group size (Shane et al. 1986). Shallow, confined water areas typically support smaller group sizes, some degree of regional site fidelity, and limited movement patterns (Shane et al. 1986; Wells et al. 1987).

An Unusal Mortality Event (UME) was declared for bottlenose dolphins along the Atlantic Coast between New York and Florida starting in July 2013, and is considered ongoing. Preliminary testing has indicated that the elevated numbers of stranded dolphins is likely due to cetacean morbillivirus, a disease which may affect the lungs and brain of infected individuals (National Marine Fisheries Service 2015). Strandings have been reported through 12 July 2015; as of that time, 103 bottlenose dolphins had stranded in the state of Georgia since 1 July 2013. While no individuals have been found stranded at SUBASE Kings Bay, 31 dolphins have been found

along the ocean shore of Cumberland Island, five of these with confirmed morbillivirus infections (National Marine Fisheries Service 2015).

There are two genetically and morphologically distinct common bottlenose dolphin morphotypes described as the coastal and offshore forms (Waring et al. 2014). Offshore bottlenose dolphins are considered extralimital in the action area because they are primarily found along the outer continental shelf and slope; however, they have appeared in the stranding records (Waring et al. 2014).

Prior to 2009, coastal bottlenose dolphins were managed as one stock, the Western North Atlantic Coastal Stock (Waring et al. 2014). In 2009, this stock was split into multiple stocks based on genetic and photo identification studies. Additionally, genetic and photo-identification studies showing a distinct difference between animals inhabiting coastal waters near the shore, and those inhabiting bays, sounds, and estuaries prompted several estuarine stocks to be named (Waring et al. 2014). The stocks considered likely within the action area are the Southern Georgia Estuarine System Stock, and the Western North Atlantic South Carolina-Georgia Coastal Stock. The stock most likely to be present within the action area is the Southern Georgia Estuarine System Stock, because the stock boundaries encompass the action area, and the animals within this stock are thought to exhibit high site fidelity based on their contaminant loads (Waring et al. 2014). The Western North Atlantic South Carolina-Georgia stock is primarily found in the coastal waters outside the action area, but could enter the neighboring bays and estuaries including the action area. The Western North Atlantic Northern Florida Coastal Stock is considered rare because the Northern boundary of the stock is the Georgia/Flordida line, however these animals could potentially enter the action area. The Jacksonville Estuarine System (JES) stock is considered extralimital because while Jacksonville is close enough for animals to be able to reasonably travel to Kings Bay, photo-ID studies have shown that 96% of the animals within the northernmost area of the JES stock boundary have only been seen within the Jacksonville estuary system and exhibit yearround site fidelity (Waring et al. 2014), so it is unlikely that these animals would enter the Kings Bay estuarine system. The Western North Atlantic Southern Migratory Coastal stock has a seasonal presence in the coastal waters of Georgia during winter (Waring et al. 2014) and could potentially enter the action area.

Surveys performed at SUBASE Kings Bay have shown that bottlenose dolphins in the vicinity of the action area occur in groups (range of 1 – 11 animals), pairs, and individually (U.S.

5 TAKE AUTHORIZATIONS REQUESTED

The type of incidental taking authorization that is being requested (i.e., takes by harassment only, takes by harassment, injury, and/or death), and the method of incidental taking.

Under the 1994 Amendments to the MMPA, harassment is statutorily defined as, any act of pursuit, torment, or annoyance which:

- **Level A Harassment** has the potential to injure a marine mammal or marine mammal stock in the wild; or,
- **Level B Harassment** has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering but which does not have the potential to injure a marine mammal or marine mammal stock in the wild (National Marine Fisheries Service 2013).

The marine mammal density data used for this analysis was determined from surveys conducted at SUBASE Kings Bay between 2006 and 2007 (U.S. Department of the Navy 2009). While a number of stocks have been identified as occurring or possibly occurring in this area (see Chapters 3 and 4), it is not currently possible to determine which stock an affected individual belongs to or to estimate take numbers based on stocks. The Navy therefore uses a single year-round average site-specific density for all bottlenose dolphin stocks occurring at SUBASE Kings Bay.

The full methods and data used for density calculations are given in U.S. Department of the Navy 2009. A brief summary is given here. Transect lines were run in the waters around SUBASE Kings Bay during summer and fall 2006 and during winter and spring 2007. The survey area included estuarine waters extending from the mouth of the St. Marys River north through the Cumberland Sound to approximately 8 nautical miles inland along the Satilla River. The Crooked River and the Brickhill River, which flow into Cumberland Sound, were also part of the study area, though line transects were not possible in these locations, and census counts were substituted here. The geographic limits ranged from 30°40’ N to 31°00’ N and inland limits to 81°40’ W. Nearshore Atlantic waters were not included in the surveys.

Observations were made with 7x50 power binoculars and with the naked eye, scanning from 0º to 90º relative to the vessel’s line of travel, and reported sightings, radial distance, angle, and number of individuals to the data recorder. For census count areas, the vessel was driven along the center line of the river and distance and angle to sightings were noted. Distance 5.0® was used to analyze the collected data, including area surveyed (in km^2), and calculate a seasonal density. Seasonal densities were combined to calculate the average annual density of 1.12 dolphins per km^2.

The density of bottlenose dolphins, which are the only cetacean found in the Project Area, was estimated to be 1.12 / km^2 (U.S. Navy 2009) based on prior survey results. The estimated number of exposures that could result for the five year period of construction for the Project from 2017 -

2022 is summarized in Table 5-. Takes are divided by year of the Project and by individual projects within years. Total numbers of takes are summarized in Table 5-2.

The density of each species was multiplied by the size of the relevant zone of influence to determine the estimated number of exposures per day. This number was rounded to the nearest whole number and multiplied by the estimated number of pile-driving days to calculate takes for the entire Project. The Navy is requesting authorization for a total of 0 Level A and 845 Level B (behavioral) incidental takes of bottlenose dolphins due to acoustic impacts from pile driving, over the course of the Project (Table 5-3). Exposures may be to any age / reproductive class of the species. No incidental takes are requested for any other marine mammal species.

Methods for developing the incidental take estimate are detailed in Chapter 6.

Table 5-1. Estimated Marine Mammal Exposures from Vibratory Pile Driving by Fiscal Year

Project			Species	Density (per km^2)	Calculated Exposures		Totals
Map ID	FAC#	Name			Level A	Level B	
Beginning in FY 2017[1]							
1A	5926	Tug Pier	bottlenose dolphin	1.12	0	124	124
1B	5888	General Access Pier Crab Island			0	6	6
2	5976	UMC Layberth Fender Pile Modification			N/A	N/A	N/A
3A	5109	EHW #2			0	4	4
3D	5910	Refit Wharf #2			0	4	4
5	5980	Magnetic Silencing Facility			0	36	36
Beginning in FY 2017 Calculated Vibratory Exposure Totals					0	174	174
Beginning in FY 2018[1]							
3C	5909	Refit Wharf #1	bottlenose dolphin	1.12	0	4	4
3E	5916	Refit Wharf #3			0	4	4
Beginning in FY 2018 Calculated Vibratory Exposure Totals					0	8	8

Table 5-1. Estimated Marine Mammal Exposures from Vibratory Pile Driving by Fiscal Year (*continued*)

Project			Species	Density (per km^2)	Calculated Exposures		Totals
Map ID	FAC #	Name			Level A	Level B	
Beginning in FY 2017[1]							
4A	P617	New Facility	bottlenose dolphin	1.12	0	64	64
4B	P617	Small Craft Berth Site VI			0	32	32
Beginning in FY 2020 Calculated Vibratory Exposure Totals					0	96	96
Beginning in FY 2021[1]							
3B	5995	(Dry Dock) Interface Wharf	bottlenose dolphin	1.12	0	21	21
3F	5877	Warping Wharf W/Capstan (4)			0	8	8
Beginning in FY 2021 Calculated Vibratory Exposure Totals					0	29	29
Beginning in FY 2022[1]							
3A	5109	EHW #2	bottlenose dolphin	1.12	0	4	4
					0	12	12
3G	5926	Tug Pier			0	32	32
6A	5934	TPS Pier Demolition			0	410	410
6B	5977	North Trestle Demolition			0	60	60
Beginning in FY 2022 Calculated Vibratory Exposure Totals					0	518	518
5-YEAR VIBRATORY CALCULATED EXPOSURE TOTALS					**0**	**825**	**825**

Sources: U.S. Department of the Navy 2009

[1] Work that begins in one fiscal year may continue into the following fiscal year; however, since exact project start dates are not available at this time, the takes resulting from each project are assumed to occur duing the fiscal year in which a given project starts.

Table 5-2. Estimated Marine Mammal Exposures from Impact Pile Driving by Fiscal Year

PROJECT			SPECIES	DENSITY (per km^2)	CALCULATED EXPOSURES		TOTALS
ID	FAC#	Project Name			Level A	Level B	
Beginning in FY 2017[1]							
1A	5926	Tug Pier	bottlenose dolphin	1.12	0	0	0
					0	0	0
1B	5888	General Access Pier Crab Island			N/A	N/A	N/A
2	5976	UMC Layberth Fender Pile Modification			0	0	0
3A	5109	EHW #2			0	1	1
3D	5910	Refit Wharf #2			0	1	1
5	5980	Magnetic Silencing Facility			N/A	N/A	N/A
Beginning in FY 2017 Calculated Impact Exposure Totals					0	2	2
Beginning in FY 2018[1]							
3C	5909	Refit Wharf #1	bottlenose dolphin	1.12	0	1	1
3E	5916	Refit Wharf #3			0	1	1
Beginning in FY 2018 Calculated Impact Exposure Totals					0	2	2
Beginning in FY 2019[1] – No Scheduled Work							
Beginning in FY 2020[1]							
4A	P617	New Facility	bottlenose dolphin	1.12	0	0	0
4B	P617	Small Craft Berth Site VI			0	8	8
Beginning in FY 2020 Calculated Impact Exposure Totals					0	8	8

Sources: U.S. Department of the Navy 2009

[1] Work that begins in one fiscal year may continue into the following fiscal year; however, since exact project start dates are not available at this time, the takes resulting from each project are assumed to occur duing the fiscal year in which a given project starts.

Table 5-2. Estimated Marine Mammal Exposures from Impact Pile Driving by Fiscal Year (*continued*)

PROJECT			SPECIES	DENSITY (per km^2)	CALCULATED EXPOSURES		TOTALS
ID	FAC#	Project Name			Level A	Level B	
Beginning in FY 2021[1]							
3B	5995	(Dry Dock) Interface Wharf	bottlenose dolphin	1.12	0	0	0
3F	5877	Warping Wharf W/Capstan (4)			0	4	4
Beginning in FY 2021 Calculated Impact Exposure Totals					0	4	4
Beginning in FY 2022[1]							
3A	5109	EHW #2	bottlenose dolphin	1.12	0	0	0
					0	4	4
3G	5926	Tug Pier			0	0	0
6A	5934	TPS Pier Demolition			N/A	N/A	N/A
6B	5977	North Trestle Demolition			N/A	N/A	N/A
Beginning in FY 2022 Calculated Impact Exposure Totals					0	4	4
5-YEAR IMPACT CALCULATED EXPOSURE TOTALS					**0**	**20**	**20**

Sources: U.S. Department of the Navy 2009

[1] Work that begins in one fiscal year may continue into the following fiscal year; however, since exact project start dates are not available at this time, the takes resulting from each project are assumed to occur duing the fiscal year in which a given project starts.

Table 5-3. Estimated Marine Mammal Exposures by Fiscal Year and Pile Driving Method

Fiscal Year	Species (density)	Vibratory		Impact		Exposure totals
		Level A	Level B	Level A	Level B	
FY 2017	Bottlenose dolphin (1.12 / km^2)	0	174	0	2	176
FY 2018		0	8	0	2	10
FY 2019		0	0	0	0	0
FY 2020		0	96	0	8	104
FY 2021		0	29	0	4	33
FY 2022		0	518	0	4	522
Estimated total exposures by method		0	825	0	20	
Total Level A exposures						0
Total Level B exposures						845
Total exposures (entire Project)						845

6 NUMBERS AND SPECIES TAKEN

By age, sex, and reproductive condition (if possible), the number of marine mammals (by species) that may be taken by each type of taking identified in Section 5, and the number of times such takings by each type of taking are likely to occur.

The methods for estimating the number and types of exposure are described in the sections below, followed by the method for quantifying exposures of marine mammals to sources of energy exceeding those threshold values. Exposure of each was determined by:

- The potential of each species to be impacted by the acoustic sources as determined by the acoustic criterion for marine mammals.
- The potential presence of each species and their estimated density in the zone of influence for the Project.
- The area of impact for each pile driving sound source (estimated by taking into account the source levels, propagation loss and thresholds at which each acoustic criterion are met).

Potential exposures were calculated by multiplying the density of each marine mammal species potentially present by the total impacted area for each threshold value by the potential number of days of pile driving.

An introduction to the fundamentals of acoustics and use of the decibel unit can be found in Appendix B.

Assessing whether a sound may disturb or injure a marine mammal involves understanding the characteristics of the acoustic source and the potential effects that sound may have on the animal's physiology and behavior. Although it is known that sound is important for marine mammal communication, navigation, and foraging (National Research Council 2003, 2005), there are many unknowns in assessing impacts such as the potential interaction of different effects and the biological significance of responses by marine mammals to sound exposures (Nowacek et al. 2007; Southall et al. 2007). Furthermore, many factors other than the received level of sound may affect an animal's reaction, such as the animal's physical condition, prior experience with the sound, and proximity to the source of the sound (Nowacek et al. 2007).

Acoustically-mediated behaviors, including social interactions, foraging, and navigation, may be particularly vulnerable to disturbance during pile-driving activities, and it is important to understand the source characteristics of marine mammal vocalizations in order to address potential masking (see Appendix B) and disturbance. The following sections address hearing and sound production of all marine mammals that may be present in the Project Area during pile driving.

6.1 HEARING AND VOCALIZATION FOR BOTTLENOSE DOLPHINS

Bottlenose dolphins can typically hear within a broad frequency range of 200 Hz to 160 kHz (Au 1993; Turl 1993), though with exposure during testing some dolphins might receive information

as low as 50 Hz (Turl 1993). Electrophysiological experiments suggest the bottlenose dolphin brain has a dual analysis system: one specialized for ultrasonic clicks and another for lower-frequency sounds, such as whistles (Ridgway 2000). Scientists have reported a range of highest sensitivity between 25 and 70 kHz, with peaks in sensitivity at 25 and 50 kHz (Nachtigall et al. 2000). Recent research on the same individuals indicates auditory thresholds obtained by electrophysiological methods correlate well with those obtained in behavior studies, except at the some lower (10 kHz) and higher (80 and 100 kHz) frequencies (Finneran and Houser 2006).

Sounds emitted by bottlenose dolphins have been classified into two broad categories: pulsed sounds (including clicks and burst-pulses) and narrow-band continuous wave sounds (whistles), which usually are frequency modulated. Clicks and whistles have dominant frequency ranges of 110 to 130 kHz and source levels of 218 to 228 dB re 1 μPa-m (Au 1993) and 3.4 to 14.5 kHz and 125 to 173 dB re 1 μPa-m, respectively (Ketten 1998). Whistles are primarily associated with communication and can serve to identify specific individuals (i.e., signature whistles) (Caldwell and Caldwell 1965; Janik et al. 2006). Up to 52% of whistles produced by bottlenose dolphin groups with mother-calf pairs have been classified as signature whistles (Cook et al. 2004).

Sound production is also influenced by group type (single or multiple individuals), habitat, and behavior (Nowacek 2005). Bray calls (low-frequency vocalizations; majority of energy below four kHz), for example, are used when capturing fishes, specifically sea trout (*Salmo trutta*) and Atlantic salmon (*Salmo salar*), in some regions (i.e., Moray Firth, Scotland) (Janik 2000). Additionally, whistle production has been observed to increase while feeding (Acevedo-Gutiérrez and Stienessen 2004; Cook et al. 2004). Both whistles and clicks have been demonstrated to vary geographically in terms of overall vocal activity, group size, and specific context (e.g., feeding, milling, traveling, and socializing) (Jones and Sayigh 2002; Zaretsky et al. 2005; Baron 2006). For example, preliminary research indicates characteristics of whistles from populations in the northern Gulf of Mexico significantly differ (i.e., in frequency and duration) from those in the western north Atlantic (Zaretsky et al. 2005; Baron 2006).

6.2 SOUND EXPOSURE CRITERIA AND THRESHOLDS

Under the MMPA, NMFS has defined levels of harassment for marine mammals. Level A harassment is defined as ~~"a~~ny act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild." Level B harassment is defined as ~~"A~~ny act of pursuit, torment, or annoyance which has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including but not limited to migration, breathing, nursing, breeding, feeding or sheltering."

Since 1997, NMFS has used generic sound exposure thresholds to determine when an activity in the ocean that produces sound might result in impacts to a marine mammal such that a take by harassment might occur (70 FR 1871). Current NMFS practice regarding exposure of marine mammals to pile driving sounds is that cetaceans exposed to impulsive sounds $\geq$180 re 1 μPa rms are considered to have been taken by Level A (i.e., injurious) harassment. Level A injury thresholds have not been established for non-impulsive sounds such as vibratory pile driving, but the Navy has applied the threshold values for impulsive sounds to vibratory sound in this analysis.

Behavioral harassment (Level B) is considered to have occurred when marine mammals are exposed to underwater sounds below the injury threshold, but $\geq$ 160 dB re 1 μPa rms for

impulsive sounds (e.g., impact pile driving) and 120 dB re 1 μPa rms for non-impulsive noise (e.g., vibratory pile driving).

6.2.1 Limitations of Existing Noise Criteria

To date, there is no research or data supporting a response by odontocetes to non-impulsive sounds from vibratory pile driving as low as the 120 dB re 1 μPa rms threshold. The application of the 120 dB re 1μPa rms threshold can be problematic because this threshold level can be either at or below the ambient noise level of certain locations. For example, noise levels at some industrialized ports in Puget Sound, WA, have been measured at between 120 and 130 dB re 1μPa (Washington State Department of Transportation 2012). Assuming a 120 dB disturbance threshold in such environments implies any animals in the area will be disturbed with or without additional pile driving noise. This has led to analyses that may be overly conservative, and as a result of these issues, the threshold level is subject to ongoing discussion (74 FR 41684). NMFS is developing new science-based thresholds to improve and replace the current generic exposure level thresholds, but the criteria have not been finalized (Southall et al. 2007). The 120 dB re 1 μPa rms threshold level for non-impulsive noise originated from research conducted by Malme et al. (1984, 1988) for California gray whale response to non-impulsive industrial sounds such as drilling operations. Note: The 120 dB re 1 μPa rms *non-impulsive* sound threshold should not be confused with the 120 dB re 1 μPa rms *impulsive* sound criterion established for migrating bowhead whales in the Arctic as a result of research in the Beaufort Sea (Richardson et al. 1995; Miller et al. 1999).

6.2.2 New Critieria in Development

NMFS is currently developing new acoustic criteria to evaluate the effects of sound on marine mammals. On 27 December 2013, draft criteria for thresholds at which temporary threshold shift (TTS) and permanent threshold shift (PTS) effects occur were published for public comment (78 FR 78822). Revised draft criteria were published for public comment on 31 July 2015 (80 FR 45642). At the time of this application, these new criteria have not yet been finalized. If the finalized criteria take effect during the period of this Project, the Project proponent may re-consult to determine accurate take estimates.

The criteria in development do not currently include changes to the behavioral criteria; as such, the existing thresholds of 160 dB re 1μPa rms (impact) and 120 dB re 1μPa rms (vibratory) will remain.

6.3 AMBIENT NOISE

The baseline noise level along the waterfront is referred to as the ―ambient noise level". Ambient noise is comprised of sounds produced by a number of natural and anthropogenic sources. Natural noise sources can include wind, waves, precipitation, and biological sources such as shrimp, fish, and cetaceans. These sources produce sound in a wide variety of frequency ranges (Urick 1983; Richardson et al. 1995) and can vary over both long (days to years) and short (seconds to hours) time scales. In shallow waters, precipitation may contribute up to 35 dB to the existing sound level, and increases in wind speed of five to 10 knots can cause a 5 dB increase in ambient ocean noise between 20 Hz and 100 kHz (Urick 1983). High noise levels may also occur in near shore areas during heavy surf, which may increase low frequency (200 Hz – 2 kHz) underwater noise levels by 20 dB or more within 200 yards of the surf zone (Wilson et al. 1985).

At SUBASE Kings Bay, vessel passages may cause breaking waves on shore, contributing to the ambient acoustic environment.

Anthropogenic noise sources also contribute to ambient noise levels, particularly in ports and other high use areas in coastal regions. Normal port activities include vessel traffic (from large ships, support vessels, and security boats), loading and maintenance operations, and other activities (sonar and echo-sounders from commercial and recreational vessels, construction, etc.) which all generate underwater sound (Urick 1983). Additionally, noise produced by mechanized equipment on wharves or adjacent shorelines may propagate underwater and contribute to underwater ambient noise levels.

The underwater acoustic environment at SUBASE Kings Bay is dominated by noise from day-to-day port and vessel activities. The base is sheltered from most wave noise, but is a high-use area for naval ships, tugs, submarines, and security vessels. When underway, these sources can create noise between 20 Hz and 16 kHz (Lesage et al. 1999), with broadband noise levels up to 180 dB re 1 µPa rms (Table 6-1). Normal port operations, including transits, docking, and maintenance by multiple vessels would continue. Measurements of ambient noise levels at SUBASE Kings Bay were taken in February 2015, finding that ambient sound levels averaged around 135 dB re 1 µPa rms, with peake levels ranging from 145 to 155 dB peak (Acentech 2015). The high levels of anthropogenic activity in the area are the likely cause of ambient noise levels significantly above ―quiet" habitats in which marine mammal reactions to 120 dB sounds were observed (Malme et al. 1984, 1988).

The existing sources of anthropogenic noise at SUBASE Kings Bay are generally non-impulsive (see Appendix B), intermittent sources such as vessel engines; this category also includes noise from vibratory pile driving. Impact pile driving noise differs from these sources in that it is impulsive, with a fast rise time and multiple short-duration (50 – 100 millisecond; Illingworth & Rodkin 2001) events. Because of the relatively short term use of impact pile driving during the Project (days – weeks per project), the Navy expects no long-term change in the average ambient noise environment with respect to impulsive sounds as a result of impact pile driving.

Table 6-1. Representative Levels of Noise from Anthropogenic Sources

Noise Source	Frequency Range (Hz)	Underwater Noise Level (dB re 1 µPa)
Small vessels[1]	250–6,000	151 dB rms at 1 m
Large vessels[2]	20 – 1,500	170 – 180 dB rms at 1 m
Tug docking barge[3]	200–1,000	149 dB rms at 100 m

m = meter ; Sources: [1]Lesage et al. 1999; [2]Richardson et al. 1995; [3]Blackwell and Greene 2002

Airborne ambient noise in industrial areas such as the SUBASE Kings Bay waterfront is comprised of sounds from trucks, cranes, compressors, generators, pumps, ship engines, and other equipment. While there are no current measurements of airborne ambient noise, expected noise levels range from a daytime minimum of 55 dBA to a maximum of 99 dBA, assuming that multiple sources will be operating simultaneously (Washington State Department of Transportation 2007).

6.4 UNDERWATER NOISE FROM PILE DRIVING

Noise levels produced by pile driving are greatly influenced by factors including pile type, driving method, and the physical environment in which the activity takes place. A number of studies have examined sound pressure levels recorded from underwater pile driving projects in California and Washington, and a few studies have recently been conducted on the U.S. East Coast at a number of naval installations. Data are generally concentrated on steel pipe piles of a range of diameters, but other pile types have also been measured. These data were used to determine source level values for modeling the pile driving activities associated with the Project.

While some pile types are well-represented in the existing data, other types have been measured only infrequently. There were therefore a few different methods for determining the proxy source levels for modeling for the Project. The full methodology and source data are given in Appendix C. Data from the East Coast were prioritized due to the differences in bathymetry and sediment between west coast sites in Washington and California, and the location at Kings Bay. For pile types for which East Coast data were not available, averages of west coast data were used to approximate source levels.

For composite piles (used in projects 1B and 5), no measured data are available. The source level estimates for this type of pile were based on data from timber piles driven on the east coast of the U.S.

Tables 6-2 and 6-3 summarize the proxy source levels and rationale used to model sound propagation for each pile type, as well as the projects associated with that pile type.

Table 6-2. Vibratory Installation and Extraction Underwater Sound Pressure Levels* Expected Based on Similar In-Situ Monitored Construction Activities

Pile Type	Projects	Model Proxy	Proxy Source Level[1] [dB rms]
18” Concrete	1A	24" steel pipe	166
24” Concrete	3A, 4A, 6A, 6B	24" steel pipe	166
16 – 18” Composite	1B, 5	12 – 16” timber piles	161
16” Timber piles	1A, 1B	12 – 16” timber piles	161
14” Steel H	2, 3B, 3G	14” Steel H	163
24” Steel pipe	3A, 3C, 3D, 3E, 4B	24" steel pipe	166
30” Steel pipe	3C, 3D, 3E, 3F	30” Steel Pipe	166

*Note that Peak and SEL metrics are not measured for vibratory driving.
[1]See Appendix C for full reference list and source data.

Table 6-3. Impact Installation Underwater Sound Pressure Levels Expected Based on Similar In-Situ Monitored Construction Activities

Pile Type	Projects	Model Proxy	Proxy Source Level[1]		
			dB rms	dB Peak	dB SEL
18” Concrete	1A, 4A	18" concrete	170	184	159
24” Concrete	1A, 3A, 4A	24" concrete	174	184	165
14” Steel H	2, 3B, 3G	18" steel pipe	178	196	168
24” Steel pipe	3A, 3C, 3D, 3E, 4B	24" steel pipe	190	208	181
30” Steel pipe	3F	30" steel pipe	193	209	188

[1]See Appendix C for full reference list and source data.

6.4.1 Underwater Sound Propagation

Pile driving can generate underwater noise that may result in disturbance to marine mammals within the Project Area. Modeling sound propagation is useful in evaluating noise levels to determine which marine mammals may be exposed at a given distance from the pile driving activity. The decrease in acoustic intensity as a sound wave propagates outward from a source is known as transmission loss (TL).

The formula for transmission loss is:

$$TL = B * log_{10}\left(\frac{R_1}{R_2}\right) + C * R_1, \text{ where}$$

B = logarithmic (predominantly spreading) loss

C = linear (scattering and absorption) loss

R_1 = range from source in meters

R_2 = range from driven pile to original measurement location (generally 10 m)

The amount of linear loss (C) is proportional to the frequency of a sound. Due to the low frequencies of sound generated by impact and vibratory pile driving, this factor was assumed to be zero for all calculations in this assessment and transmission loss was calculated using only logarithmic spreading. Therefore, using practical spreading (B=15), the revised formula for transmission loss is TL = 15 $\log_{10}$ (R_1/10).

6.4.2 Calculated Zones of Influence

The practical spreading loss model discussed above was used to calculate the propagation of pile driving sound in and around the individual project locations within the Project Area. No sound mitigation methods (bubble curtains, cofferdams, etc.) are proposed and therefore no attenuation was included in the acoustic model. All projects are assumed to happen independently, with only one pile driving rig operating at any given time. No simultaneous driving of multiple piles was modeled.

The calculations presented in Tables 6-4 and 6-5 assume a field free of obstruction, which is unrealistic because the waters of SUBASE Kings Bay do not represent open water conditions (free field) and sounds will attenuate as they encounter land or other solid obstacles. As a result, the distances calculated may not actually be attained at the Project Area. The actual distances to the behavioral disturbance thresholds for impact and vibratory pile driving are likely to be shorter than those calculated due to the irregular contour of the waterfront and the maximum fetch (farthest distance sound waves travel without obstruction [i.e. line of sight]) at the Project Area. Tables 6-4 and 6-5 depict the actual areas encompassed by the marine mammal thresholds during the project.

Marine mammal densities were multiplied by the size of the applicable zone of influence to estimate number of incidental takes per day. This number was rounded to the nearest whole number and multiplied by the estimated number of pile-driving days (Table 2-2) to calculate takes for the entire Project (see Chapter 5).

Table 6-4. Calculated Distances to / Areas Encompassed by the Underwater Marine Mammal Noise Thresholds for Vibratory Pile Driving

PROJECT			Pile Type and Size	Source Level (dB re 1µPa rms @ 10 m)	Level A (180 dB re 1µPa rms)		Level B (120 dB re 1µPa rms)	
ID	FAC#	Project Name			Distance (m)	Area (km^2)[1,2]	Distance (m)	Area (km^2)
Beginning in FY 2017								
1A	5926	Tug Pier	16" Timber	161	< 1	0	5,412	3.685649
1B	5888	General Access Pier Crab Island	16" Composite	161	< 1	0	5,412	3.124661
			16" Timber	161	< 1	0	5,412	3.124661
3A	5109	EHW #2	24" Steel pipe	166	1.2	0	11,659	3.64538
3D	5910	Refit Wharf #2	24" and 30" Steel pipes	166	1.2	0	11,659	3.167033
5	5980	Magnetic Silencing Facility	18" Composite	161	< 1	0	5,412	10.745466
			16" Timber	161	< 1	0	5,412	10.745466
Beginning in FY 2018								
3C	5909	Refit Wharf #1	24" and 30" Steel pipes	166	1.2	0	11,659	3.315251
3E	5916	Refit Wharf #3	24" and 30" Steel pipes	166	1.2	0	11,659	3.723009
Beginning in FY 2019 – No Scheduled Work Starts								
Beginning in FY 2020								
4A	P617	New Facility	24" Concrete	166	1.2	0	11,659	7.512735
4B	P617	Small Craft Berth Site VI	24" Steel pipe	166	1.2	0	11,659	63862192
Beginning in FY 2021								
3B	5995	(Dry Dock) Interface Wharf	14" Steel H	163	< 1	0	7,356	2.396074
3F	5877	Warping Wharf W/Capstan (4)	30" Steel pipe	166	1.2	0	11,659	3.485042

[1] Areas less than 0.0001 km^2 are rounded down to 0 km^2.

[2] Areas given indicate exact area depicted in figures presented later in this chapter, adjusted for interactions with shorelines and line-of-sight transmission pathways.

Table 6-5. Calculated Distances to / Areas Encompassed by the Underwater Marine Mammal Noise Thresholds for Vibratory Pile Driving (*continued*)

PROJECT			Pile Type and Size	Source Level (dB re 1µPa rms @ 10 m)	Level A (180 dB re 1µPa rms)		Level B (120 dB re 1µPa rms)	
ID	FAC#	Project Name			Distance (m)	Area (km^2)[1,2]	Distance (m)	Area (km^2)
Beginning in FY 2022								
3A	5109	EHW #2	24" Concrete	166	1.2	0	11,659	3.62879
			24" Steel pipe	166	1.2	0	11,659	3.62879
3G	5926	Tug Pier	14" Steel H	163	< 1	0	7,356	3.995195

dB = decibel; rms = root-mean-square; µPa = micro Pascal; NA = Not Applicable
Practical spreading loss (15 log, or 4.5 dB per doubling of distance) used for calculations.
Sound pressure levels used for calculations are given in Tables 6-2 and 6-3.

[1] Areas less than 0.0001 km^2 are rounded down to 0 km^2.

[2] Areas given indicate exact area depicted in figures presented later in this chapter, adjusted for interactions with shorelines and line-of-sight transmission pathways.

Table 6-5. Calculated Distances to / Areas Encompassed by the Underwater Marine Mammal Noise Thresholds for Impact Pile Driving

PROJECT			Pile Type and Size	Source Level (dB re 1µPa rms @ 10 m)	Level A (180 dB re 1µPa rms)		Level B (160 dB re 1µPa rms)	
ID	FAC#	Project Name			Distance (m)	Area (km^2) [1,2]	Distance (m)	Area (km^2)
Beginning in FY 2017								
1A	5926	Tug Pier	18" Concrete	170	2.2	0	46.4	0.006744
			24" Concrete	174	4.0	0	85.8	0.023042
2	5976	UMC Layberth Fender Pile Modification	14" Steel H	178	7.4	0.000171	159	0.063433
3A	5109	EHW #2	24" Steel pipe	190	46.4	0.006744	1,000	0.879388
3D	5910	Refit Wharf #2	24" Steel pipe	190	46.4	0.003402	1,000	0.900136
Beginning in FY 2018								
3C	5909	Refit Wharf #1	24" Steel pipe	190	46.4	0. 003411	1,000	0.753328
3E	5916	Refit Wharf #3	24" Steel pipe	190	46.4	0.003411	1,000	0.884824
Beginning in FY 2019 – No Scheduled Work Starts								
Beginning in FY 2020								
4A	P617	New Facility	18" Concrete	170	2.2	0	46.4	0.023042
			24" Concrete	174	4.0	0	85.8	0.006729
4B	P617	Small Craft Berth Site VI	24" Steel pipe	190	46.4	0.006744	1,000	1.630796
Beginning in FY 2021								
3B	5995	(Dry Dock) Interface Wharf	14" Steel H	178	7.4	0	159	0.03779
3F	5877	Warping Wharf W/Capstan (4)	30" Steel pipe	193	73.6	0.016343	1,585	1.345953
Beginning in FY 2022								
3A	5109	EHW #2	24" Concrete	174	4.0	0	85.8	0.023042
			24" Steel pipe	190	46.4	0.006744	1,000	0.879388
3G	5926	Tug Pier	14" Steel H	178	7.4	0.000171	159	0.066822

dB = decibel; rms = root-mean-square; µPa = micro Pascal; NA = Not Applicable
Practical spreading loss (15 log, or 4.5 dB per doubling of distance) used for calculations.
Sound pressure levels used for calculations are given in Tables 6-2 and 6-3.

[1] Areas less than 0.0001 km^2 are rounded down to 0 km^2.

[2] Areas given indicate exact area depicted in figures presented later in this chapter, adjusted for interactions with shorelines and line-of-sight transmission pathways.

6.4.2.1 Projects Beginning in FY 2017

Six projects would be completed during 2017. Maps of ZOIs for each project and summary of estimated exposures are briefly described below. A total of 0 Level A and 176 Level B sound exposures were estimated for this year of the Project.

6.4.2.1.1 Project 1A: Tug Pier Repair

Project 1A was modeled based on an estimated 31 days of vibratory pile extraction of 16" timber piles, generating the ZOI shown in Figure 6-1. This resulted in an estimate of 0 Level A and 124 Level B sound exposures to bottlenose dolphins.

Impact installation of 18" and 24" concrete piles during the Tug Pier repair project was estimated to take 34 days of pile driving, leading to the ZOI displayed in Figure 6-2. No sound exposures rising to the level of harassment were estimated during this phase of Project 1A.

A total of 0 Level A and 124 Level B exposures are expected during this project.

6.4.2.1.2 Project 1B: Crab Island Access Pier Repairs

The Crab Island Access Pier repair project requires 2 days of vibratory pile extraction of 16" timber piles and installation of 16" composite piles (ZOI shown in Figure 6-3), resulting in 0 Level A and 6 Level B exposures.

A total of 0 Level A and 6 Level B exposures are expected during this project.

6.4.2.1.3 Project 2: Unspecified Minor Construction Layberth Fender Pile Modification P661

Upgrading the Layberth pier would require seven days of impact pile driving of 55 steel H piles, resulting in 0 Level A and 0 Level B exposures (Figure 6-5). It is anticipated that an average of eight piles would be installed per day for approximately seven days of in-water work.

A total of 0 Level A and 0 Level B exposures are expected during this project.

6.4.2.1.4 Project 3A: Explosives Handling Wharf #2 Pier with Capstans (7)

Repairs to EHW-2 at SUBASE Kings Bay during 2017 will require one day of vibratory extraction of 24" steel pipe piles (Figure 6-5), resulting in 0 Level A and 4 Level B exposures. Installation of replacement 24" steel pipe piles will require 1 day of impact driving (Figure 6-6), with an estimated 0 Level A and 1 Level B exposures.

A total of 0 Level A and 5 Level B exposures are expected during this project.

6.4.2.1.5 Project 3D: Refit Wharf 2

Project 3D requires one day of vibratory extraction of 30" steel pipe piles (Figure 6-7), resulting in 0 Level A and 4 Level B exposures. Installation of replacement 24" steel pipe piles will

require 1 day of impact driving (Figure 6-8), with an estimated 0 Level A and 1 Level B exposures.

A total of 0 Level A and 5 Level B exposures are expected during this project.

6.4.2.1.6 Project 5: RM14-1710 TRIREFFAC Waterfront Facilities Repair, Magnetic Silencing Facility with Cranes

The repairs to the Magnetic Silencing Facility required three days of vibratory extraction of 16" timber piles and three days of vibratory installation of 18" composite piles (Figure 6-9). The relatively exposed location of this facility resulted in a large ZOI, leading to 0 Level A and 36 Level B estimated sound exposures from this project.

A total of 0 Level A and 36 Level B exposures are expected during this project.

Figure 6-1. Project 1A – Tug Pier Repair Vibratory Driving ZOIs

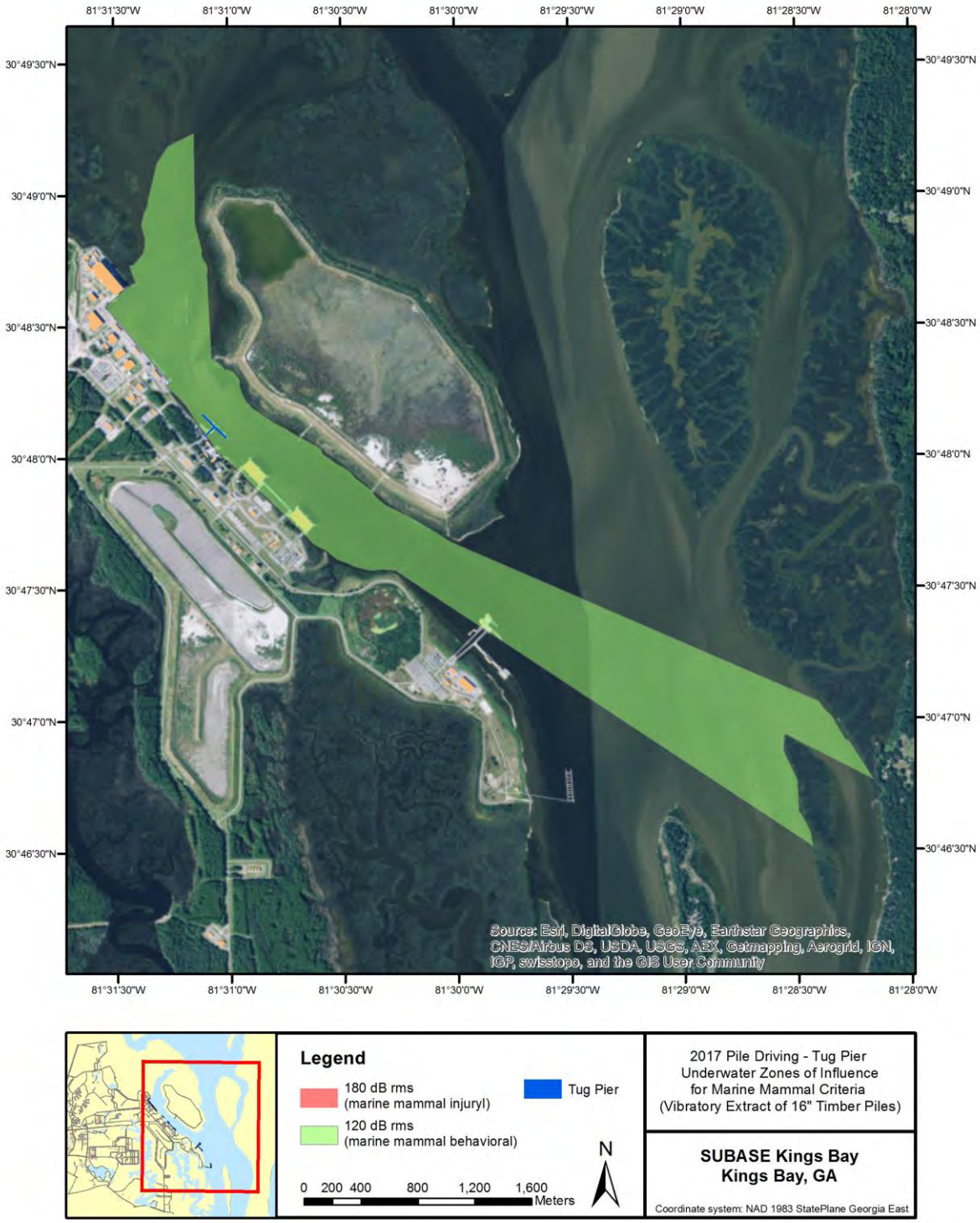


Figure 6-2. Project 1A – Tug Pier Repair Impact Driving ZOIs

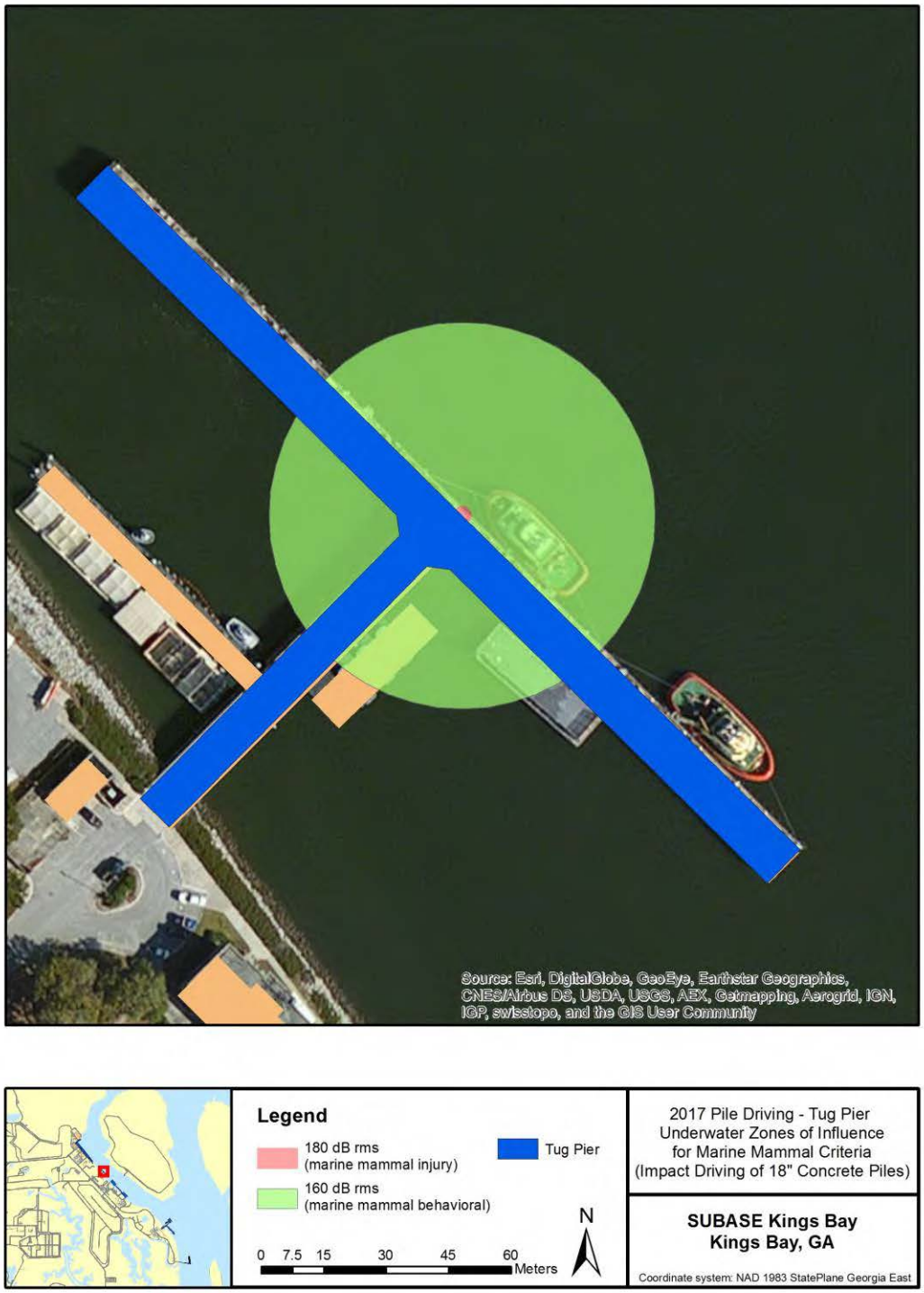


Figure 6-3. Project 1B – Crab Island Access Pier RepairsVibratory Driving ZOIs

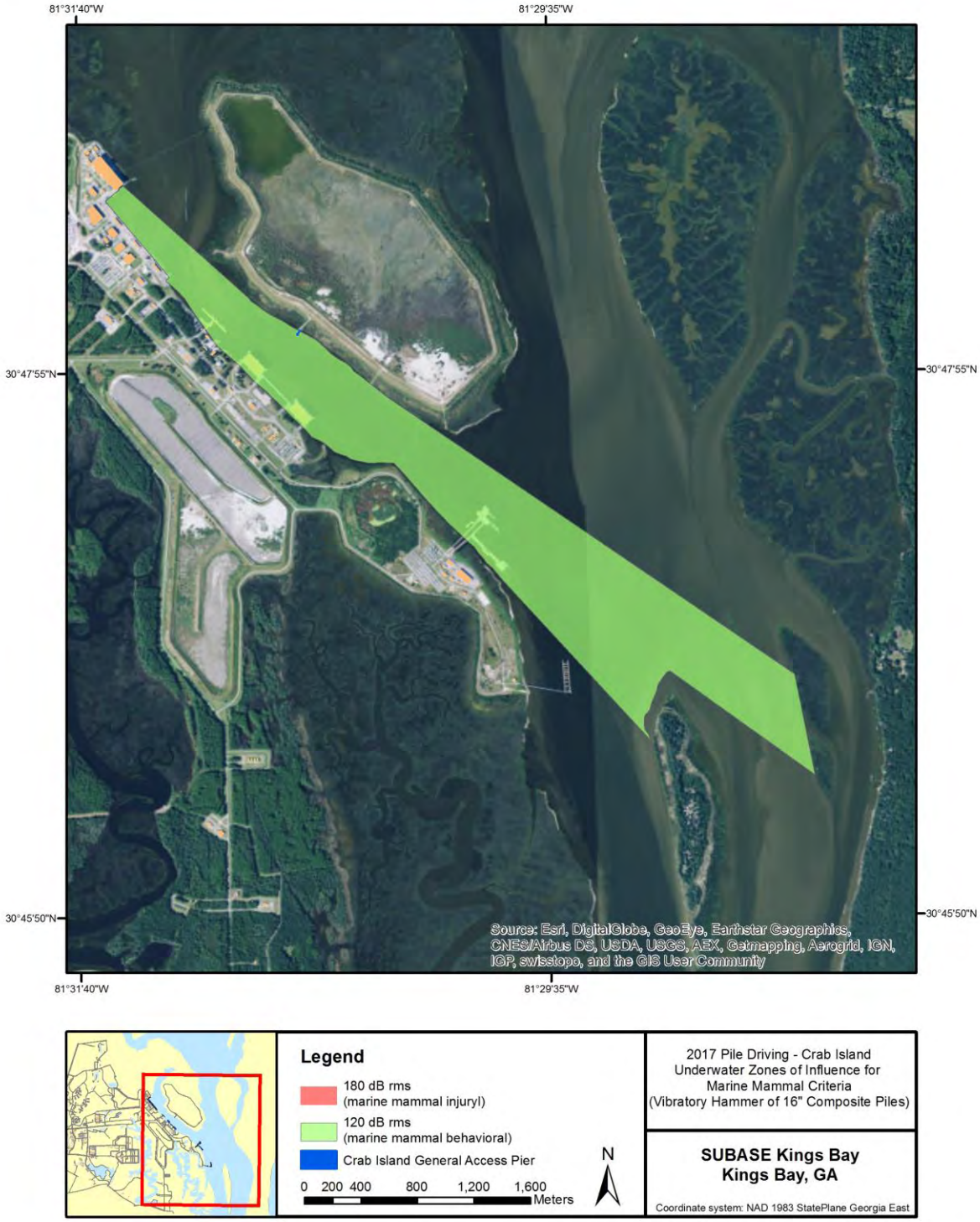


Figure 6-4. Project 2 – UMC Layberth Fender Pile Modification Impact Driving ZOIs

Figure 6-5. Project 3A – EHW-2 Repairs Vibratory Driving ZOIs

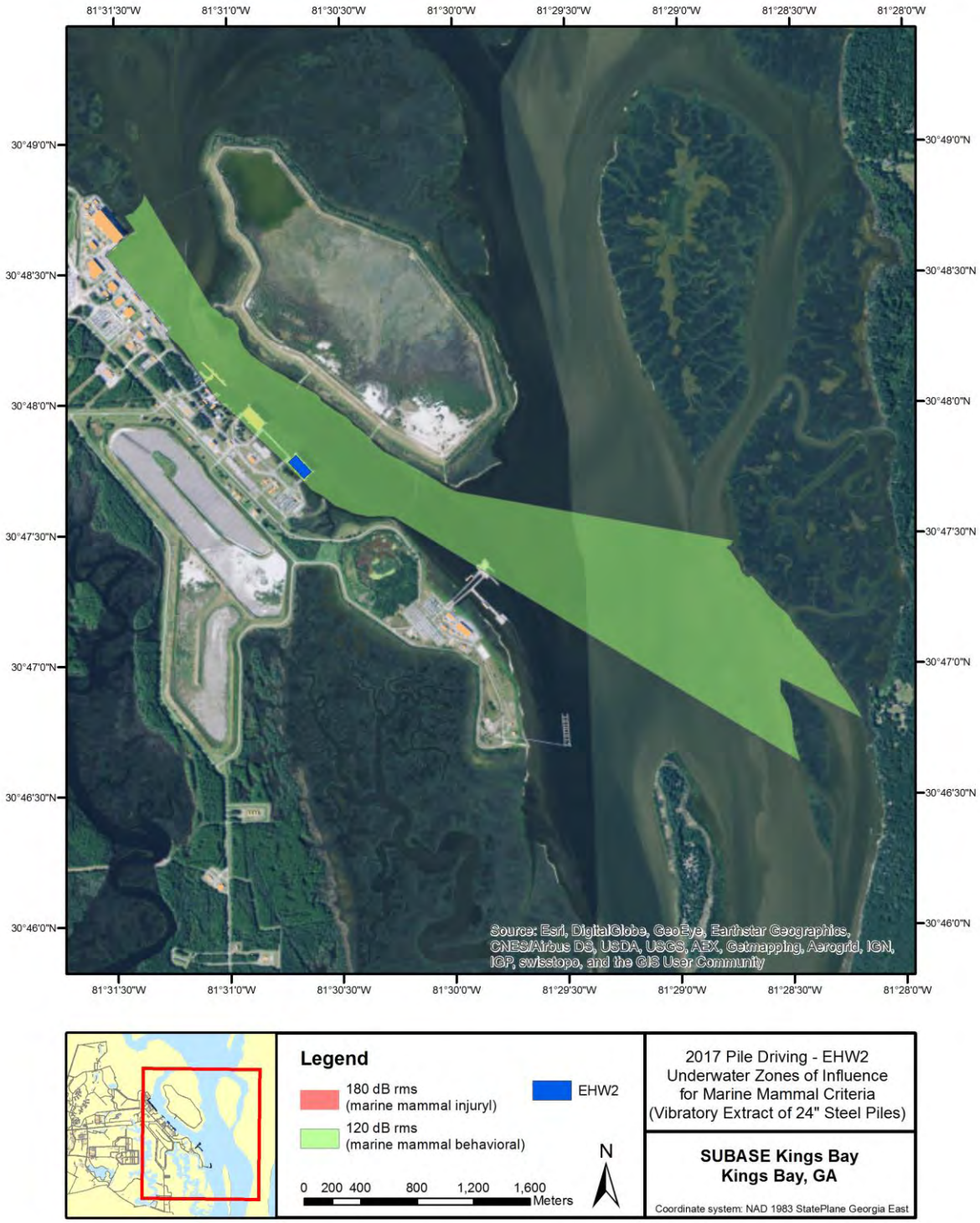


Figure 6-6. Project 3A – EHW-2 Repairs Impact Driving ZOIs

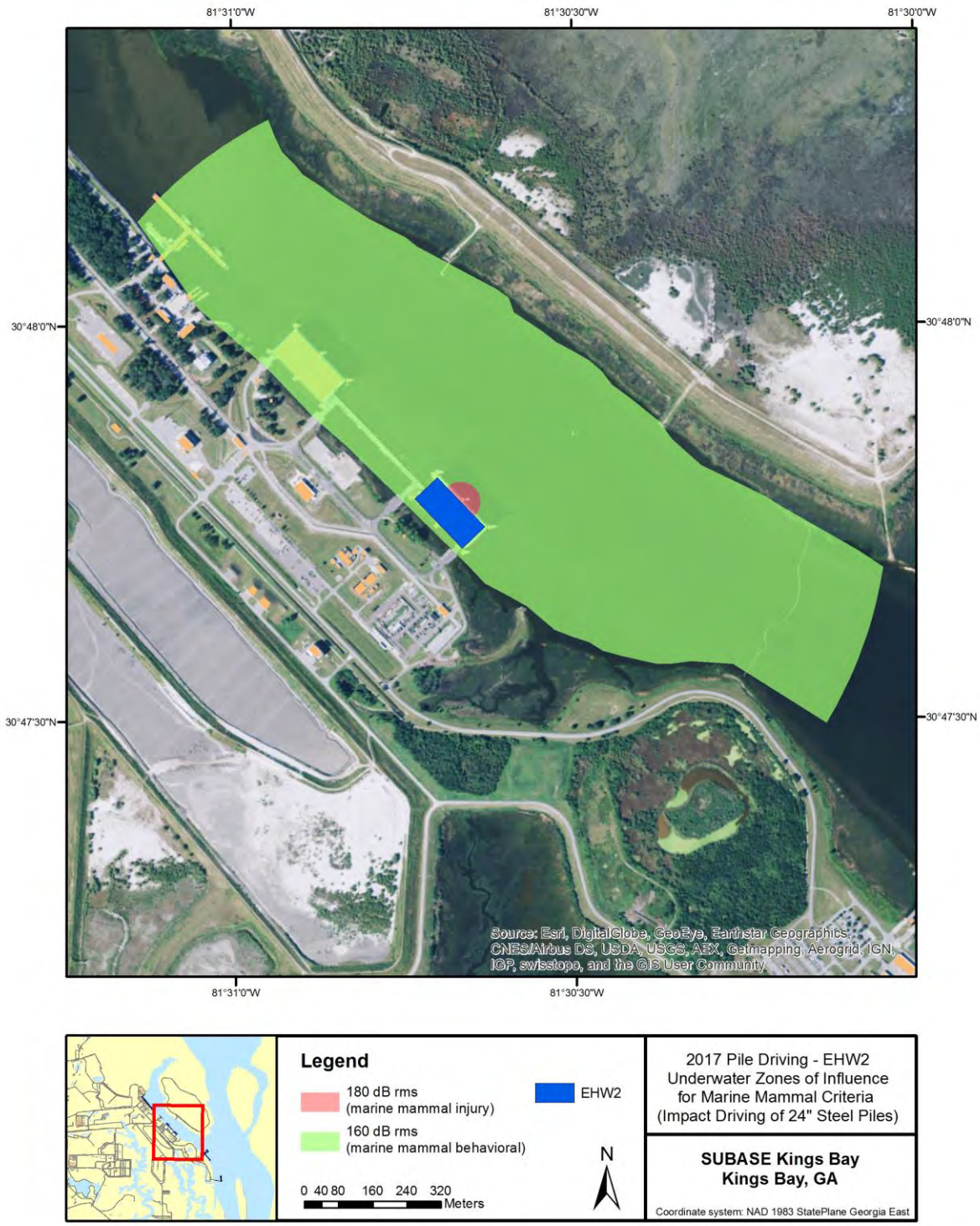


Figure 6-7. Project 3D – Refit Wharf 2 Vibratory Driving ZOIs

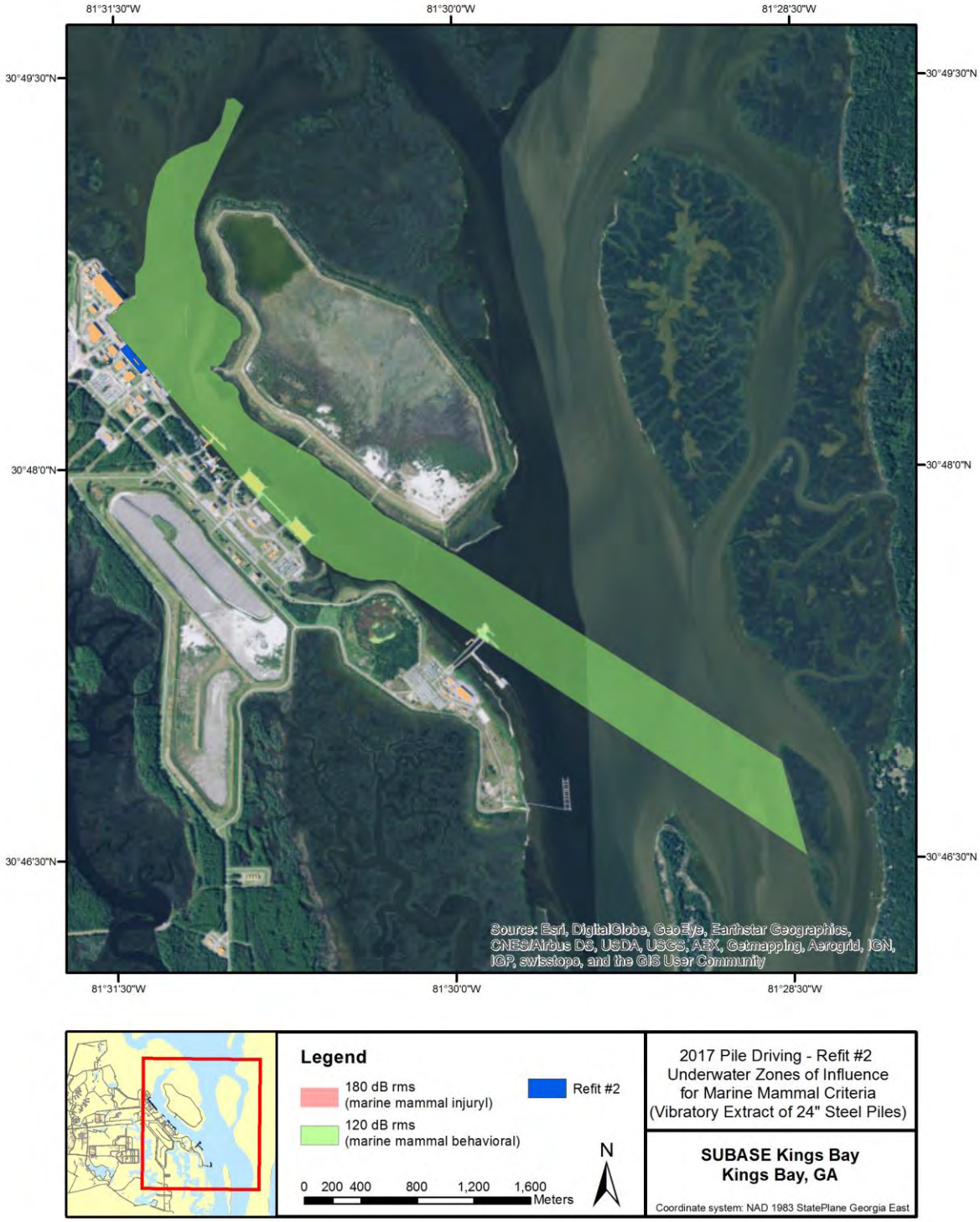


Figure 6-8. Project 3D – Refit Wharf 2 Impact Driving ZOIs

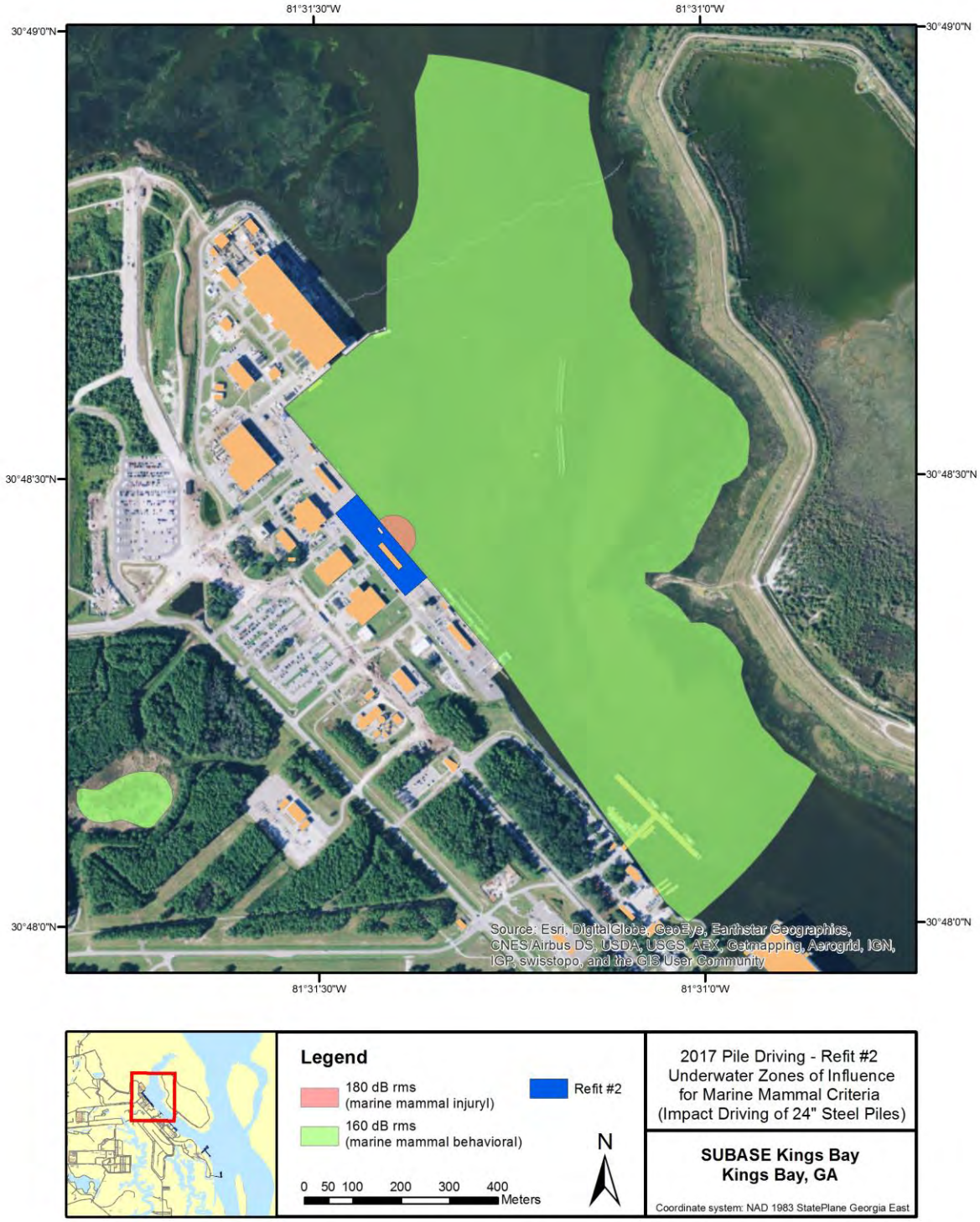
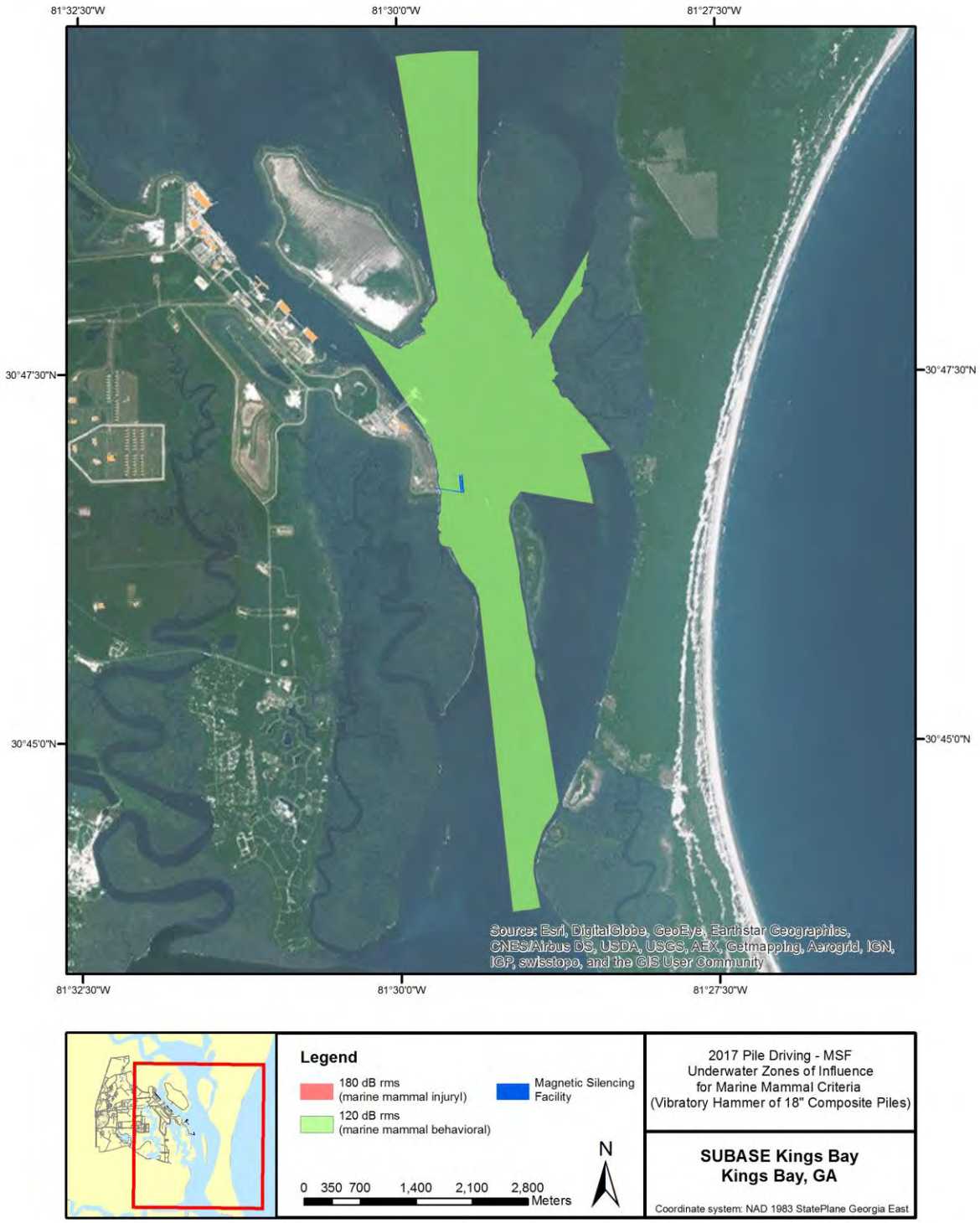


Figure 6-9. Project 5 – MSF Repairs Vibratory Driving ZOIs



6.4.2.2 Projects beginning in FY 2018

Two projects would be completed during 2018. Maps of ZOIs for each project and summary of estimated exposures are briefly described below. A total of 0 Level A and 10 Level B sound exposures were estimated for this year of the Project.

6.4.2.2.1 Project 3C: Refit Wharf 1

Project 3C requires one day of vibratory extraction of 30" steel pipe piles (Figure 6-10), resulting in 0 Level A and 4 Level B exposures. Installation of replacement 24" steel pipe piles will require 1 day of impact driving (Figure 6-11); no sound exposures rising to the level of harassment are expected for this portion of the project.

A total of 0 Level A and 4 Level B exposures are expected during this project.

6.4.2.2.2 Project 3E: Refit Wharf 3

Project 3E requires one day of vibratory extraction of 30" steel pipe piles (Figure 6-12), resulting in 0 Level A and 4 Level B exposures. Installation of replacement 24" steel pipe piles will require 1 day of impact driving (Figure 6-13), with an estimated 0 Level A and 1 Level B exposures.

A total of 0 Level A and 6 Level B exposures are expected during this project.

Figure 6-10. Project 3C – Refit Wharf 1 Vibratory Driving ZOIs

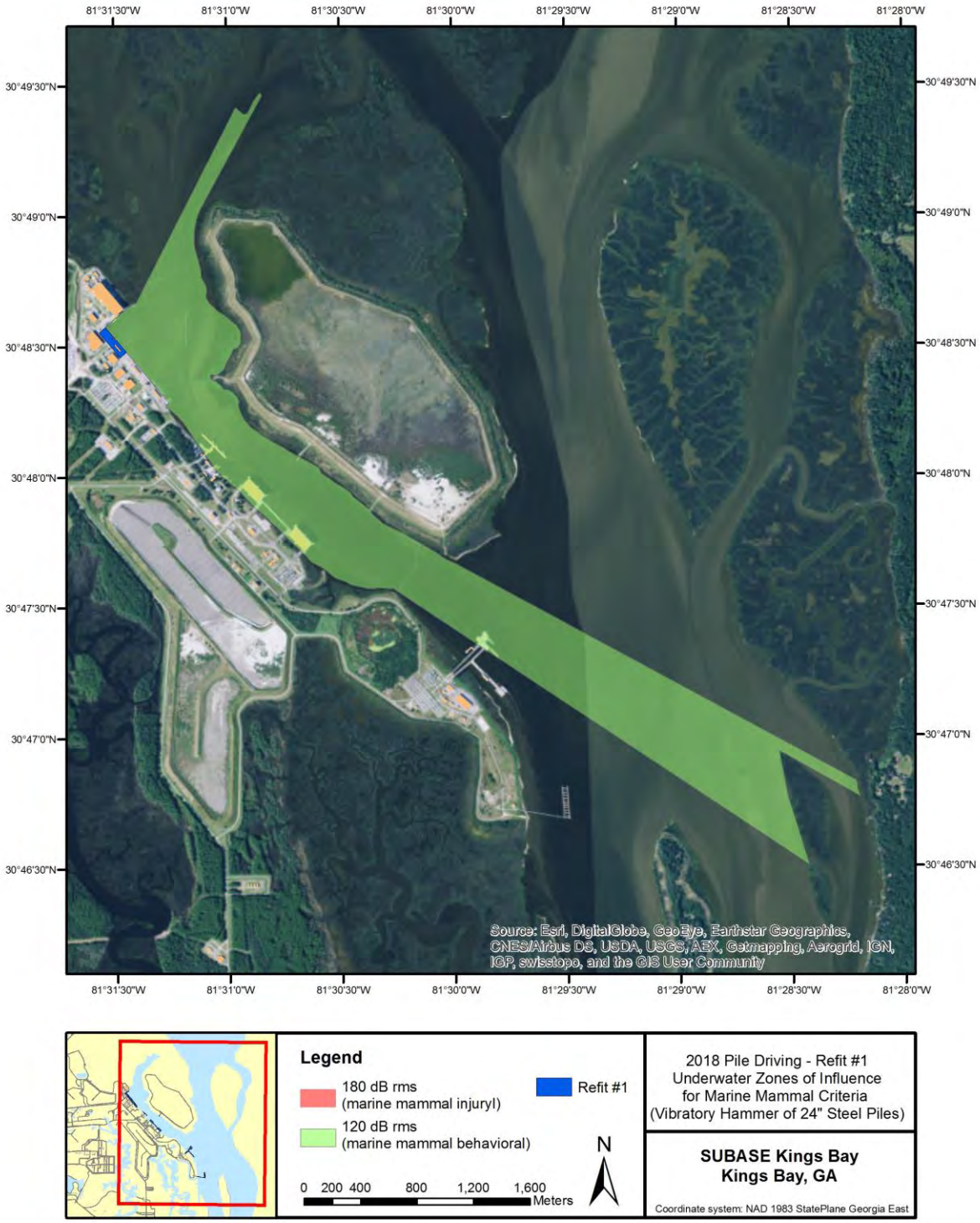


Figure 6-11. Project 3C – Refit Wharf 1 Impact Driving ZOIs

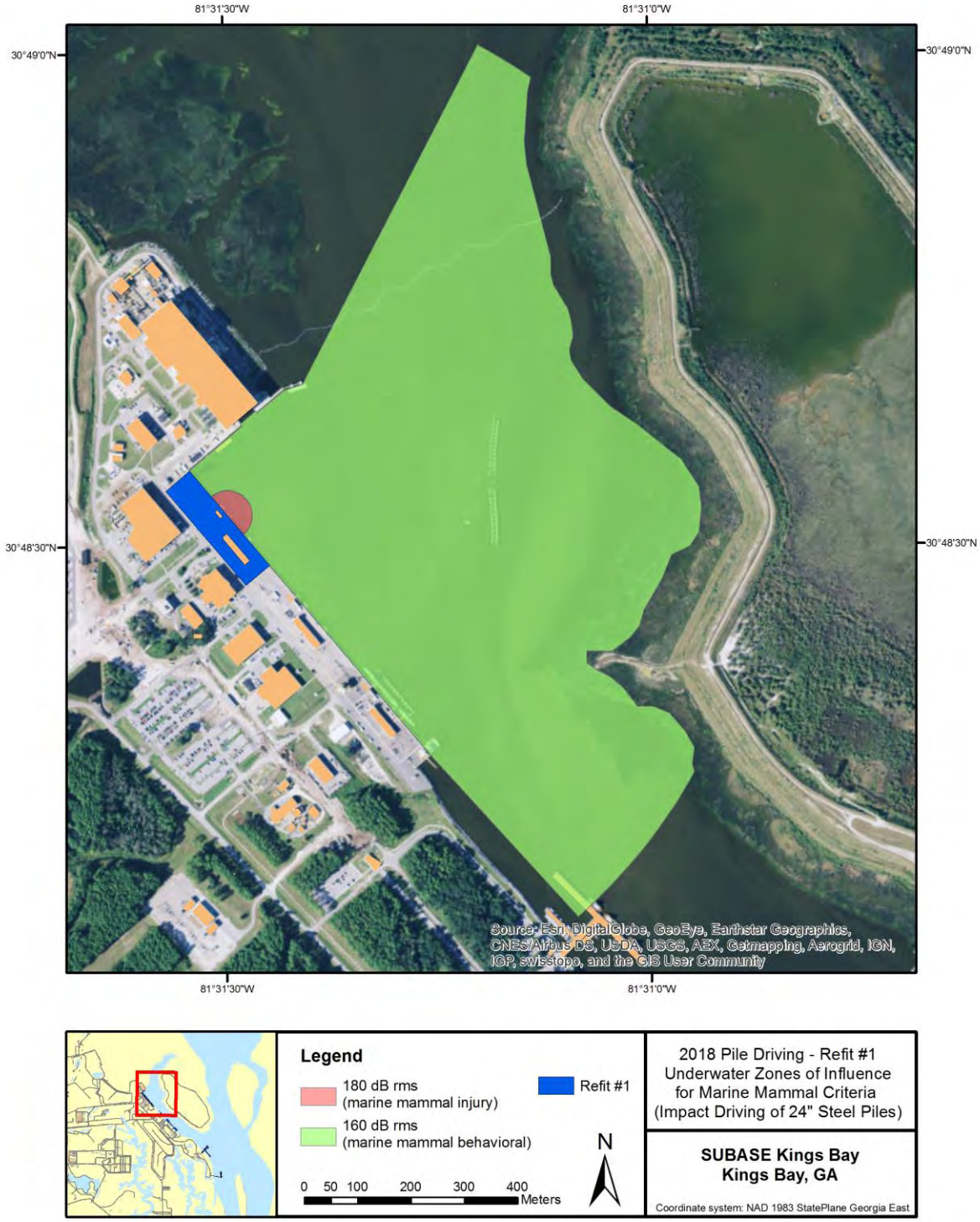


Figure 6-12. Project 3E – Refit Wharf 3 Vibratory Driving ZOIs

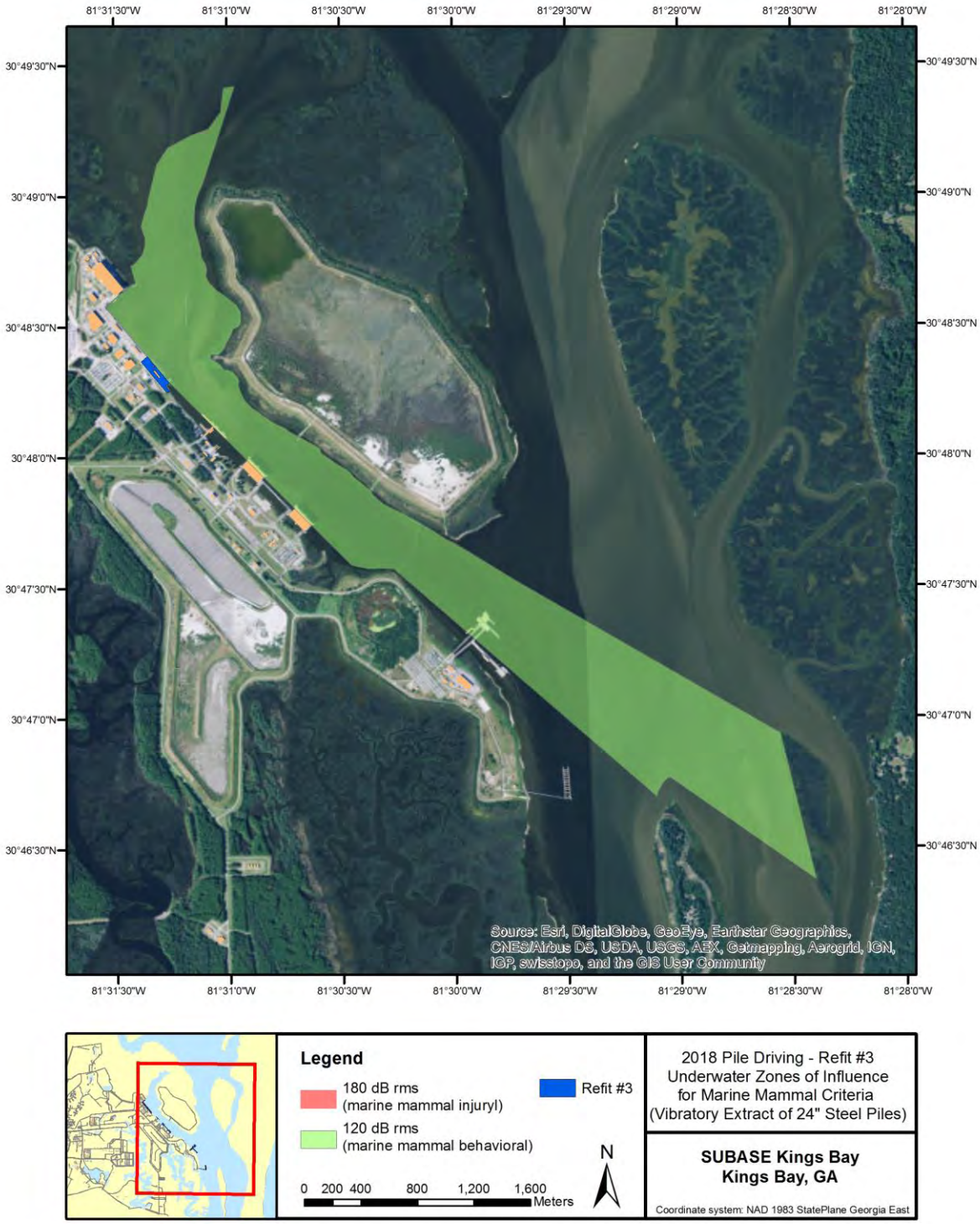
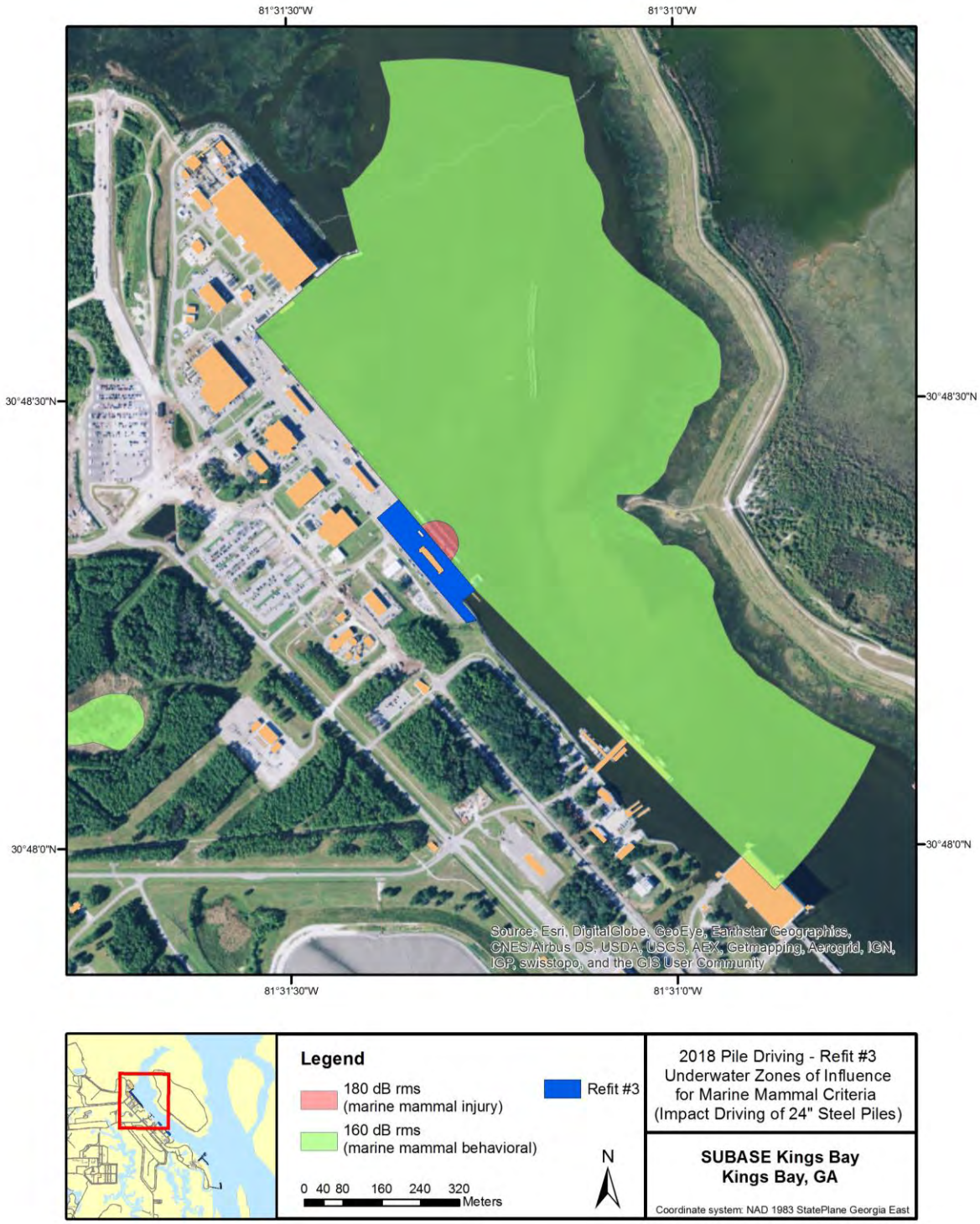


Figure 6-13. Project 3E – Refit Wharf 3 Impact Driving ZOIs



6.4.2.3 Projects beginning in FY 2019

No projects are expected to begin during FY 2019. While projects beginning in previous fiscal years may continue into this year, those potential exposures are accounted for in the fiscal years in which the projects begin.

6.4.2.4 Projects beginning in FY 2020

Two projects would be completed during 2020. Maps of ZOIs for each project and summary of estimated exposures are briefly described below. A total of 0 Level A and 104 Level B sound exposures were estimated for this year of the Project.

6.4.2.4.1 Project 4A: New Facility

The new facility project would require installation of 165 new 24-inch square concrete piles and 50 new 18-inch square concrete piles. Approximately 121 piles would be removed with a vibratory hammer. It is anticipated 16 to 22 piles would be removed and three to 12 piles would be installed per day for approximately 80 days of in-water work. Figures 6-14 and 6-15 illustrate the zones of influence for this project; modeling estimated 0 Level A and 64 Level B exposures.

A total of 0 Level A and 64 Level B exposures are expected during this project.

6.4.2.4.2 Project 4B: Small Craft Berth Site VI P617

Pile driving at the Site VI Small Craft Berth Site requires four days of vibratory extraction of 24” steel pipe piles (Figure 6-16), resulting in an estimated 0 Level A exposures and 32 Level B exposures. Impact installation of replacement 24” steel pipe piles will require 4 days of driving (Figure 6-17), resulting in 0 Level A and 8 Level B exposures.

A total of 0 Level A and 40 Level B exposures are expected during this project.

Figure 6-14. Project 4A – New Facility Vibratory Driving ZOIs

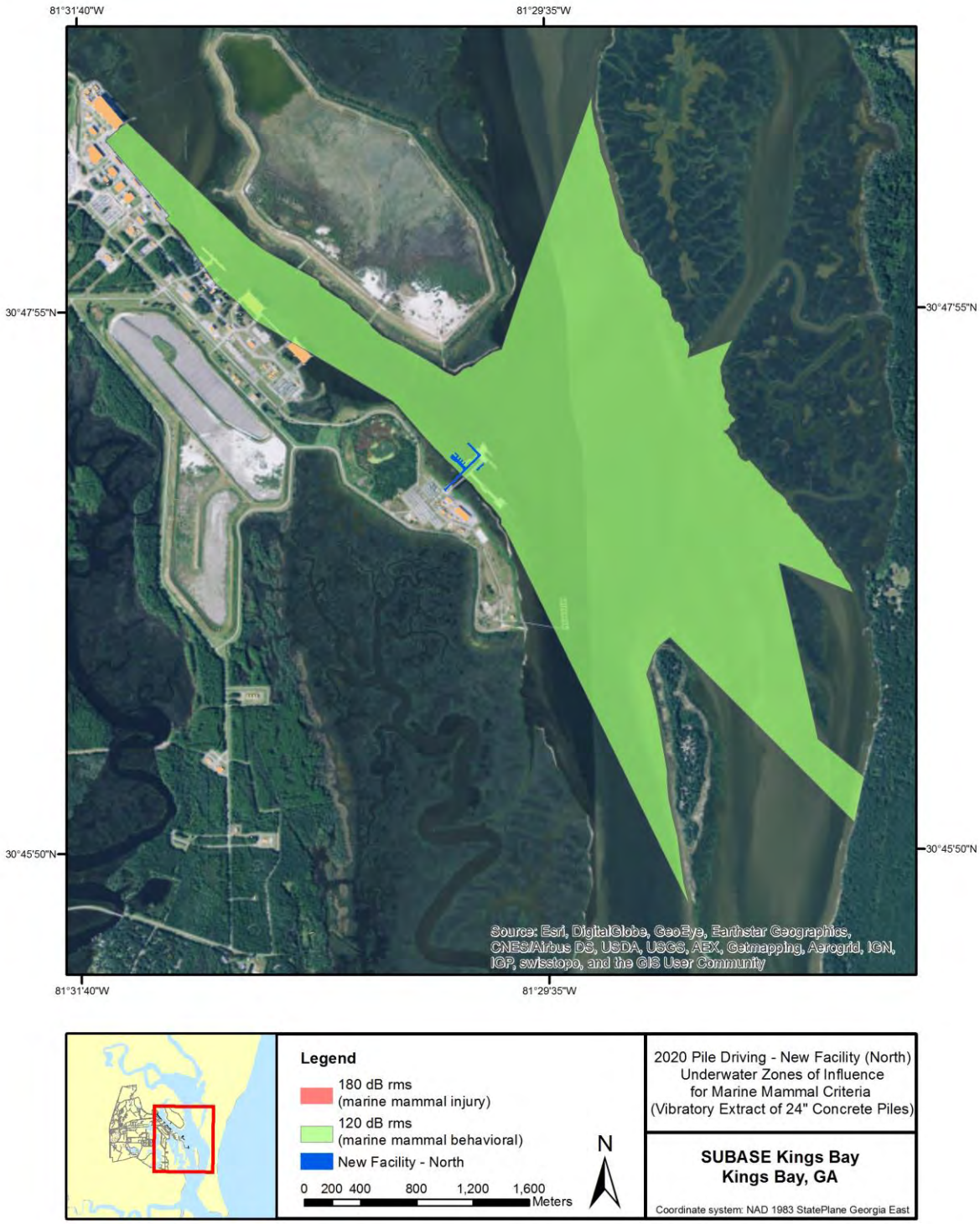


Figure 6-15. Project 4A – New Facility Impact Driving ZOIs

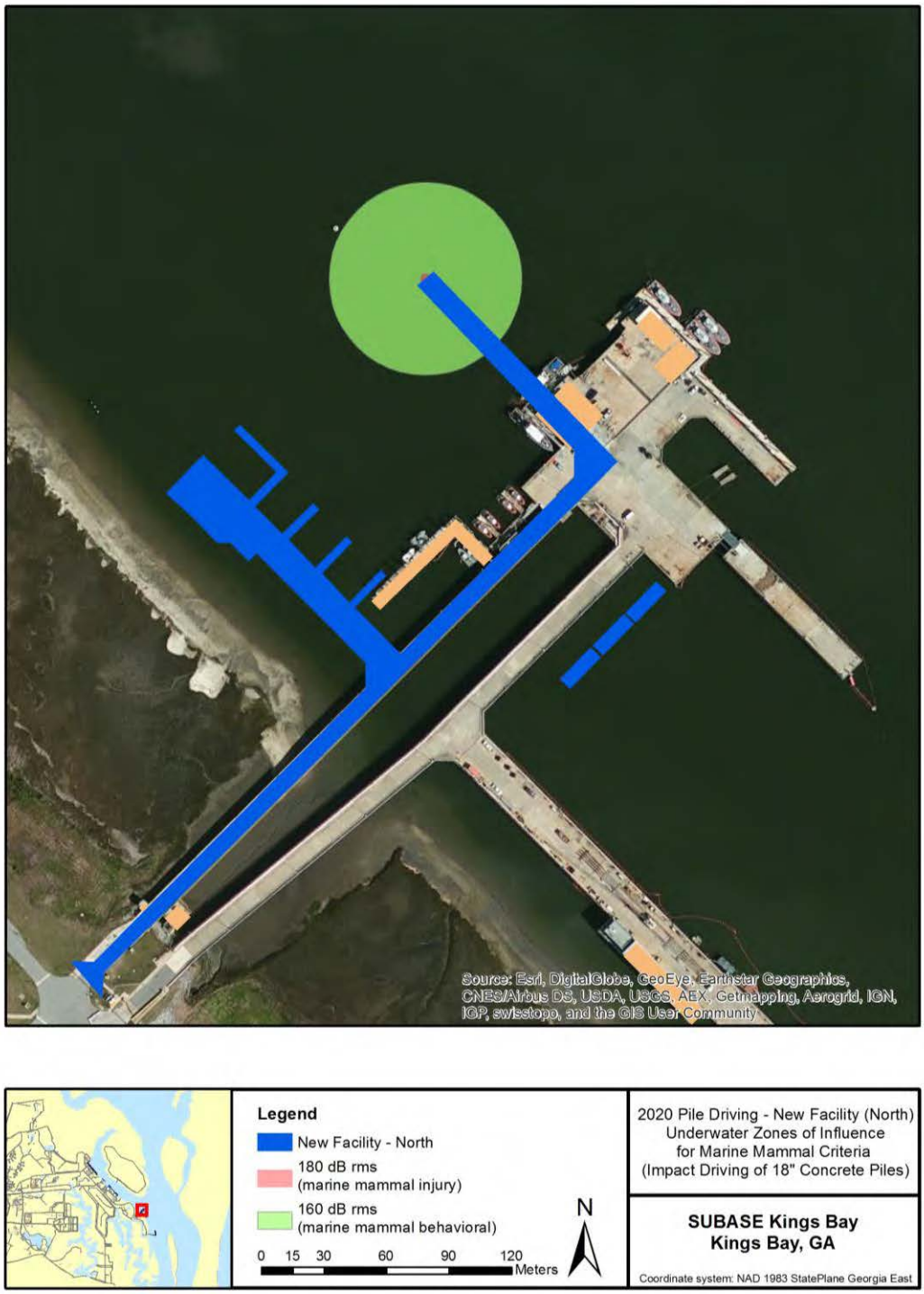


Figure 6-16. Project 4B – Small Craft Berth Site VI Vibratory Driving ZOIs

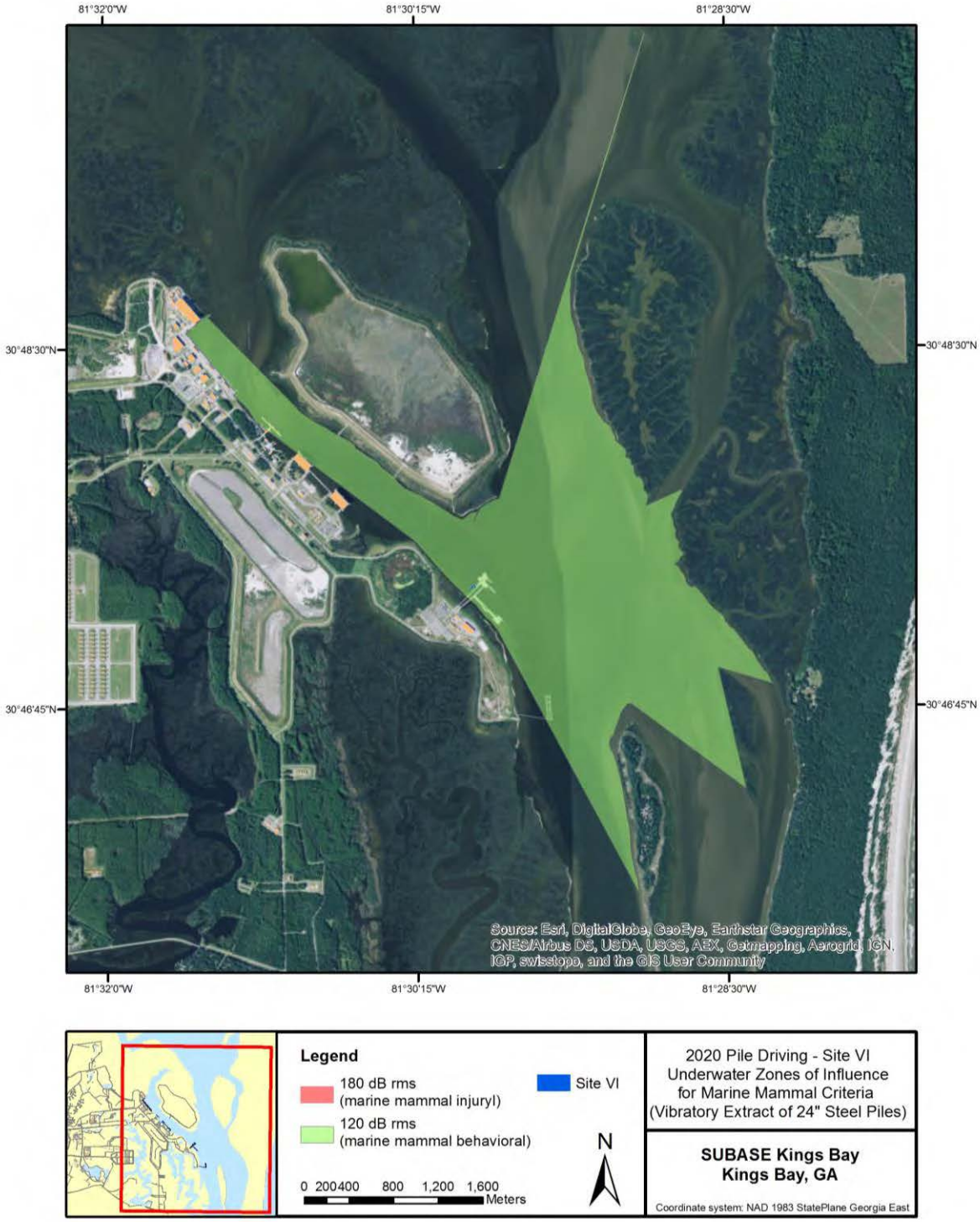
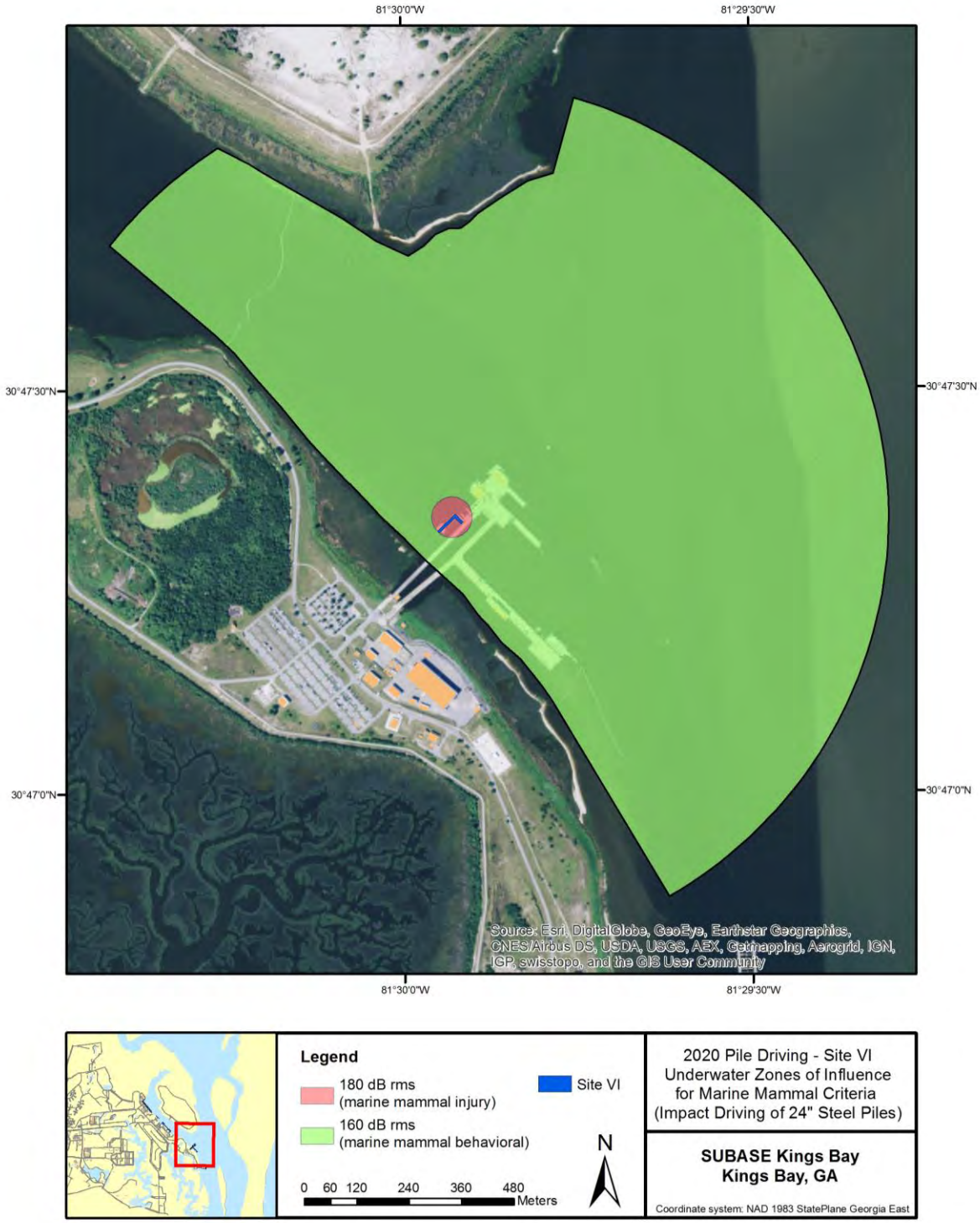


Figure 6-17. Project 4B – Small Craft Berth Site VI Impact Driving ZOIs



6.4.2.5 Projects beginning in FY 2021

Four projects would be completed during 2021. Maps of ZOIs for each project and summary of estimated exposures are briefly described below. A total of 0 Level A and 33 Level B sound exposures were estimated for this year of the Project.

6.4.2.5.1 Project 3B: (Dry Dock) Interface Wharf

Project 3B requires seven days of vibratory extraction of 14" steel H piles (Figure 6-18), resulting in an estimated 0 Level A exposures and 21 Level B exposures. Impact installation of replacement 14" steel H piles will require eight days of driving (Figure 6-19), resulting in 0 Level A and 0 Level B exposures.

A total of 0 Level A and 21 Level B exposures are expected during this project.

6.4.2.5.2 Project 3F: Warping Wharf with Capstan (4)

Project 3B requires two days of vibratory extraction of 30" steel pipe piles (Figure 6-20), resulting in an estimated 0 Level A exposures and 8 Level B exposures. Impact installation of replacement 30" steel pipe piles will require two days of driving (Figure 6-21), resulting in 0 Level A and 4 Level B exposures.

A total of 0 Level A and 12 Level B exposures are expected during this project.

Figure 6-18. Project 3B – (Dry Dock) Interface Wharf Vibratory Driving ZOIs

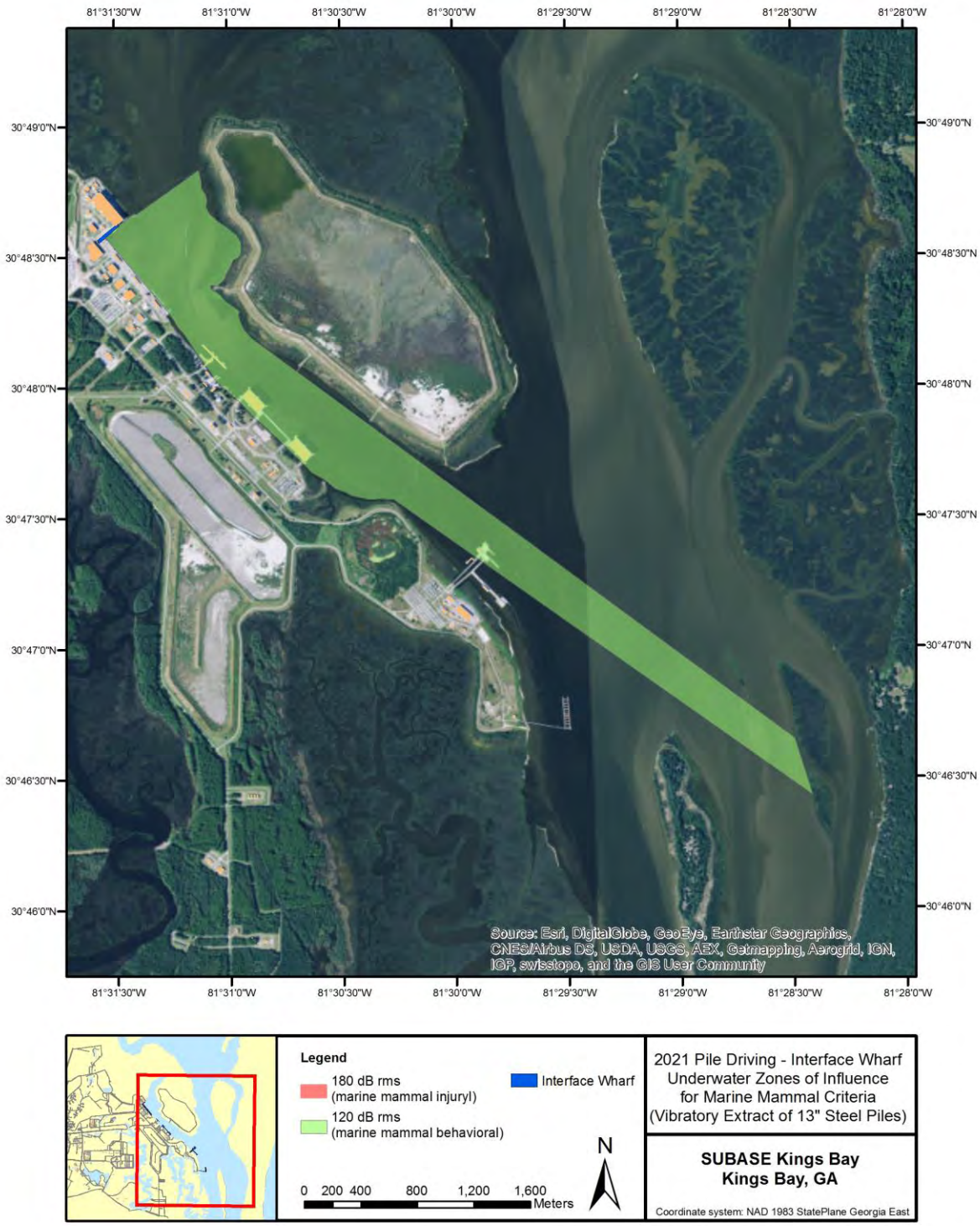


Figure 6-19. Project 3B – (Dry Dock) Interface Wharf Impact Driving ZOIs

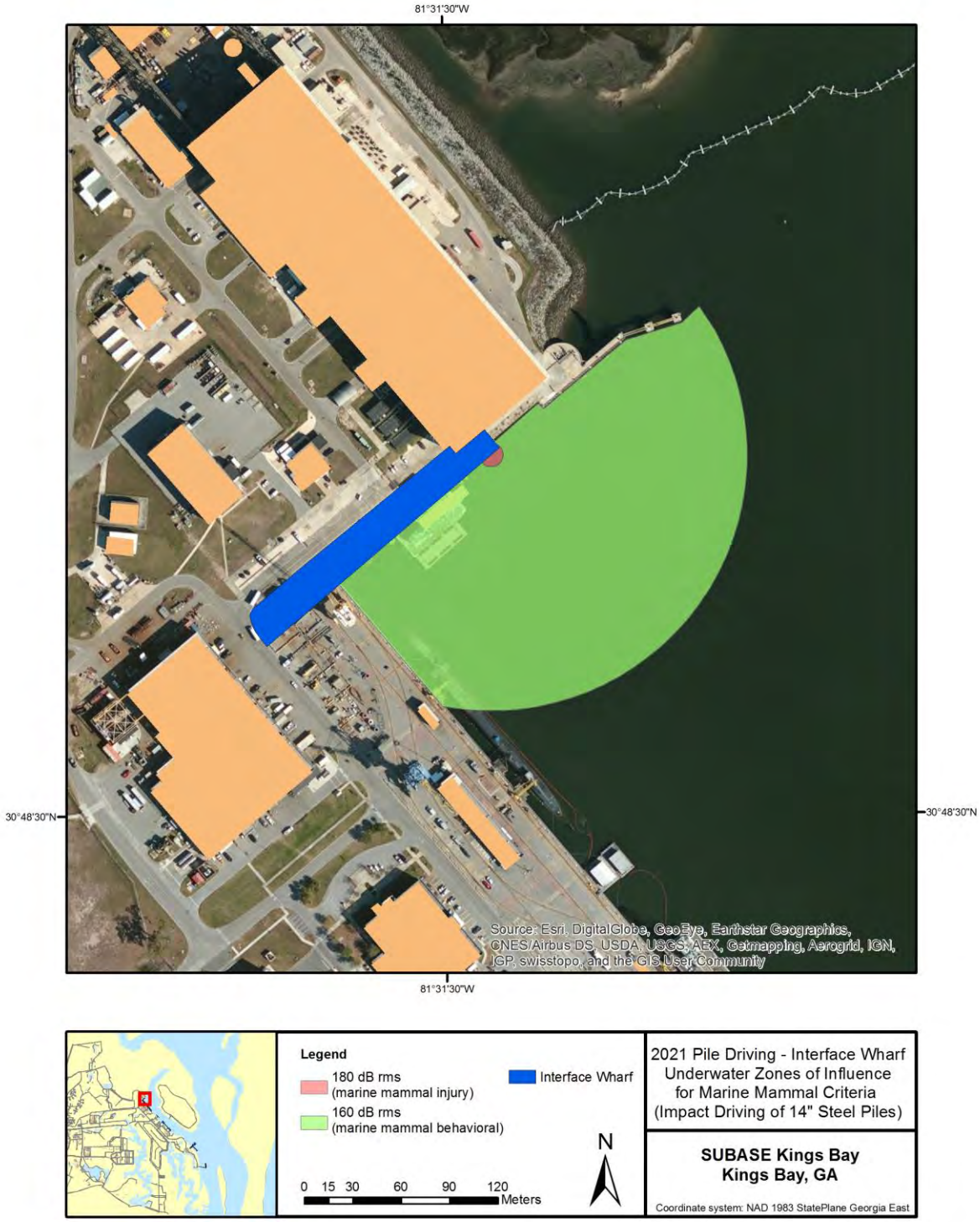


Figure 6-20. Project 3F – Warping Wharf Vibratory Driving ZOIs

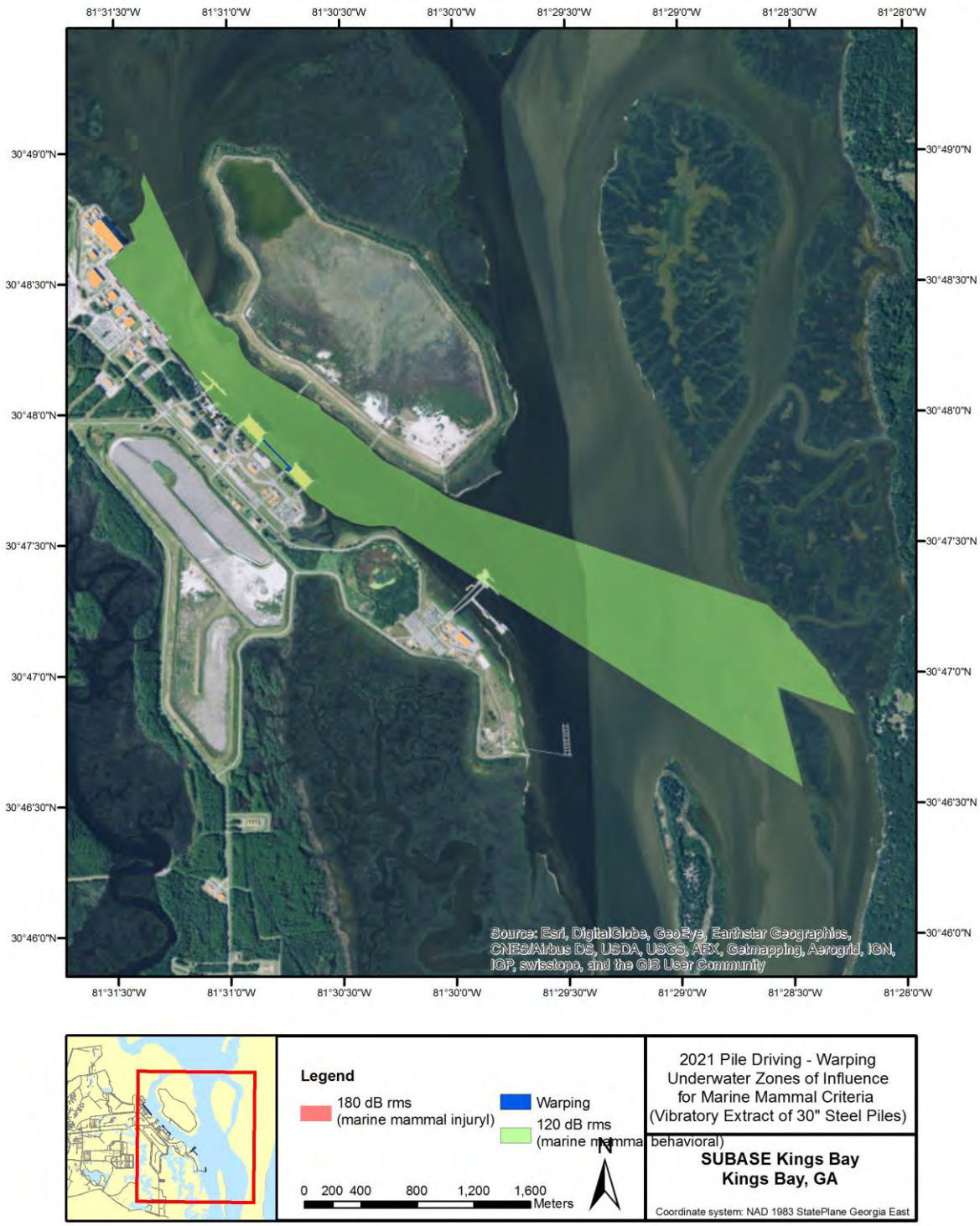
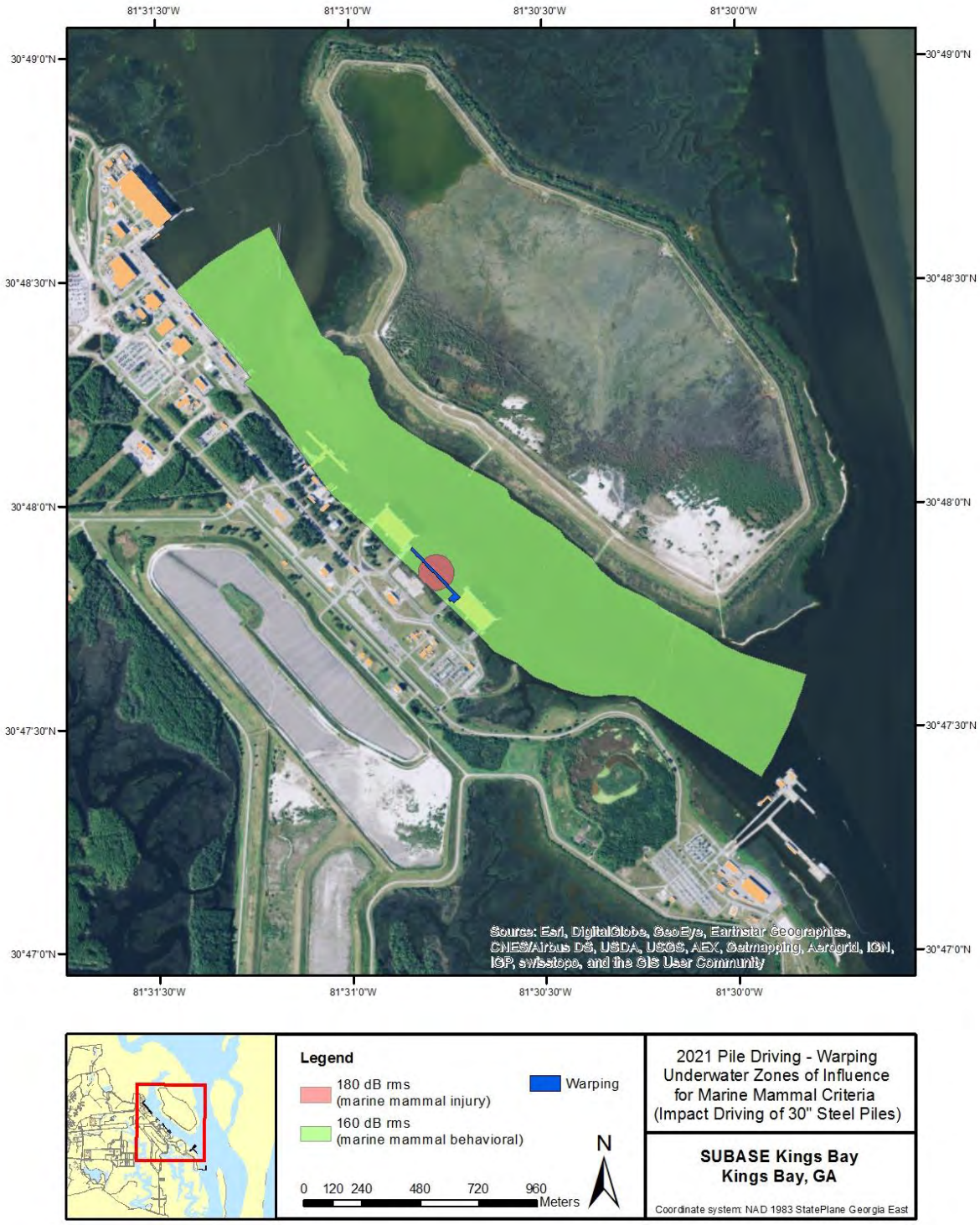


Figure 6-21. Project 3F – Warping Wharf Impact Driving ZOIs



6.4.2.6 Projects beginning in FY 2022

Three projects would be completed during 2022. Maps of ZOIs for each project and summary of estimated exposures are briefly described below. A total of 0 Level A and 522 Level B sound exposures were estimated for this year of the Project.

6.4.2.6.1 Project 3A: Explosives Handling Wharf #2 Pier with Capstans (7)

Repairs to EHW-2 at SUBASE Kings Bay during 2022 will require one day of vibratory extraction of 24" concrete piles, and three days of vibratory extraction of 24" steel pipe piles. These ZOIs are shown in Figure 6-24. Vibratory extraction is expect to result in 0 Level A and 16 Level B exposures. Installation of replacement 24" concrete and steel pipe piles will require one and four days of impact driving, respectively (Figure 6-25), with an estimated 0 Level A and 4 Level B exposures.

A total of 0 Level A and 20 Level B exposures are expected during this project.

6.4.2.6.2 Project 3G: Tug Pier

Repairs to the Tug Pier (Project 3G) at SUBASE Kings Bay will require eight days of vibratory extraction of 14" steel H piles (Figure 6-26), resulting in 0 Level A and 32 Level B exposures. Installation of replacement 14" steel H piles will require eight days of impact driving (Figure 6-27), with an estimated 0 Level A and 0 Level B exposures.

A total of 0 Level A and 32 Level B exposures are expected during this project.

6.4.2.6.3 Project 6A: Demolition of TPS Pier

Demolition at the TPS Pier will require 41 days of vibratory extraction of 24" concrete piles (Figure 6-28), resulting in 0 Level A and 410 Level B exposures.

A total of 0 Level A and 410 Level B exposures are expected during this project.

6.4.2.6.4 Project 6B: Demolition of Layberth North Trestle

Demolition at the Layberth North Trestle will require 6 days of vibratory extraction of 24" concrete piles (Figure 6-28), resulting in 0 Level A and 60 Level B exposures.

A total of 0 Level A and 60 Level B exposures are expected during this project.

Figure 6-22. Project 3A – EHW-2 Vibratory Driving ZOIs

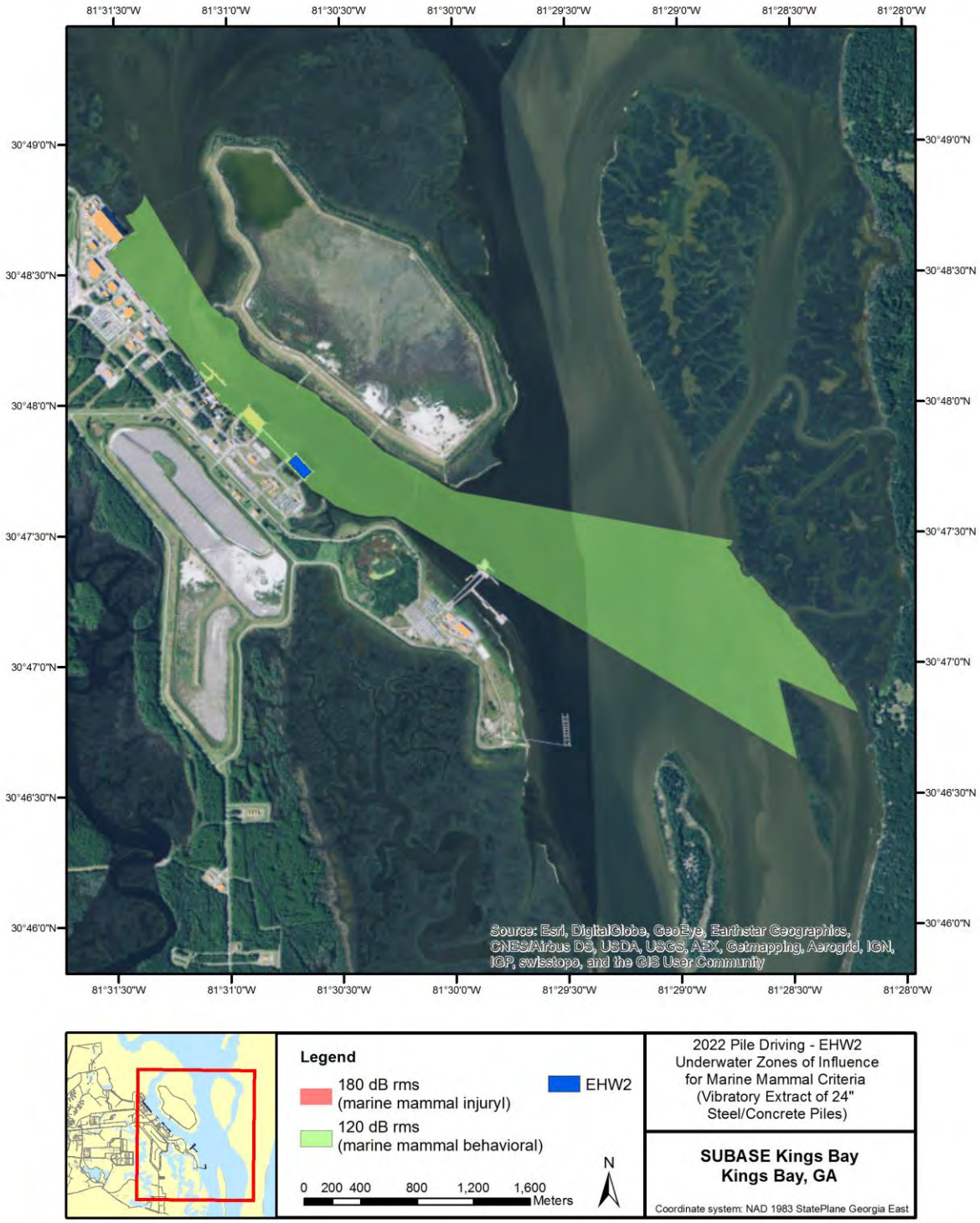


Figure 6-23. Project 3A – EHW-2 Impact Driving ZOIs

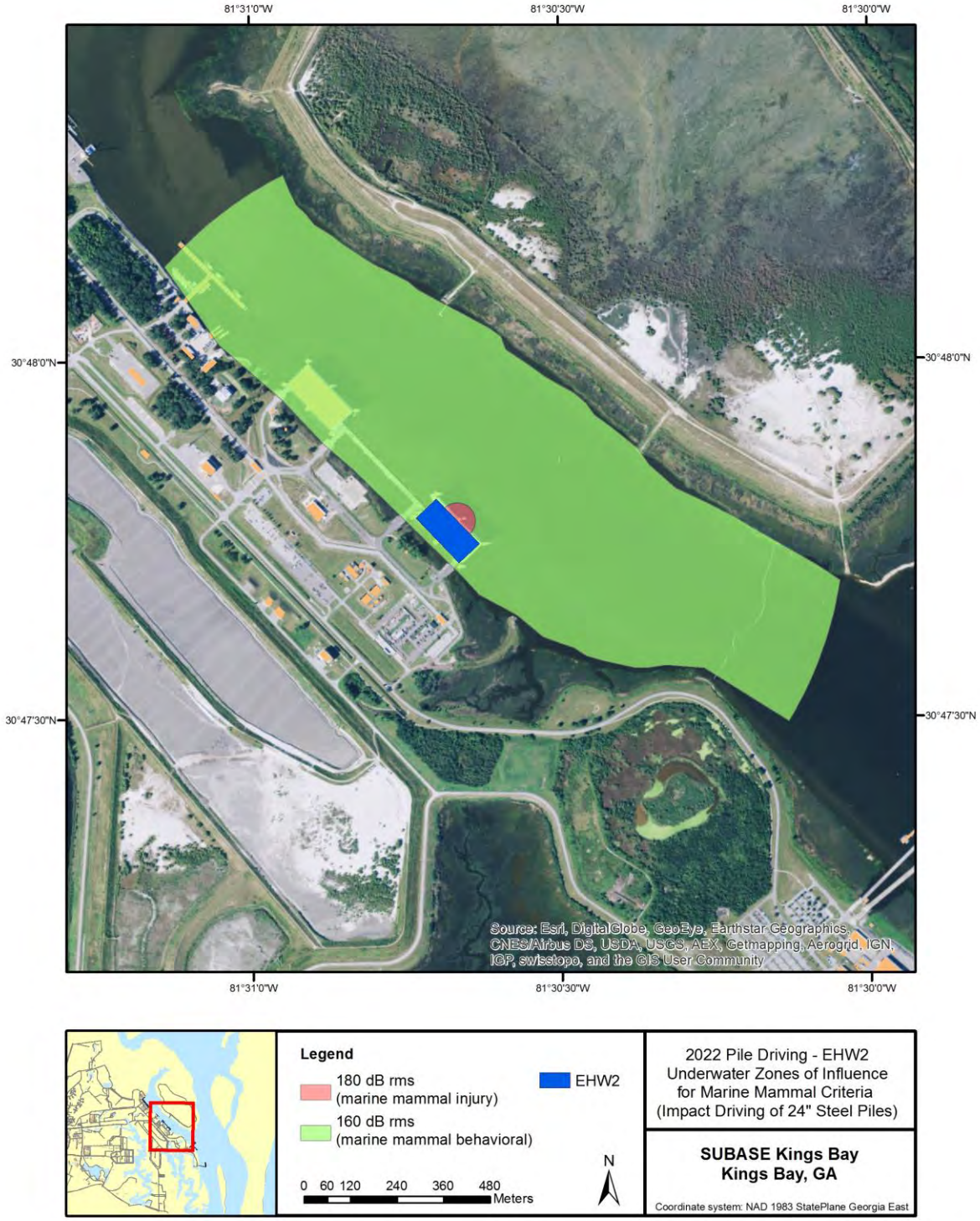


Figure 6-24. Project 3G – Tug Pier Repairs Vibratory Driving ZOIs

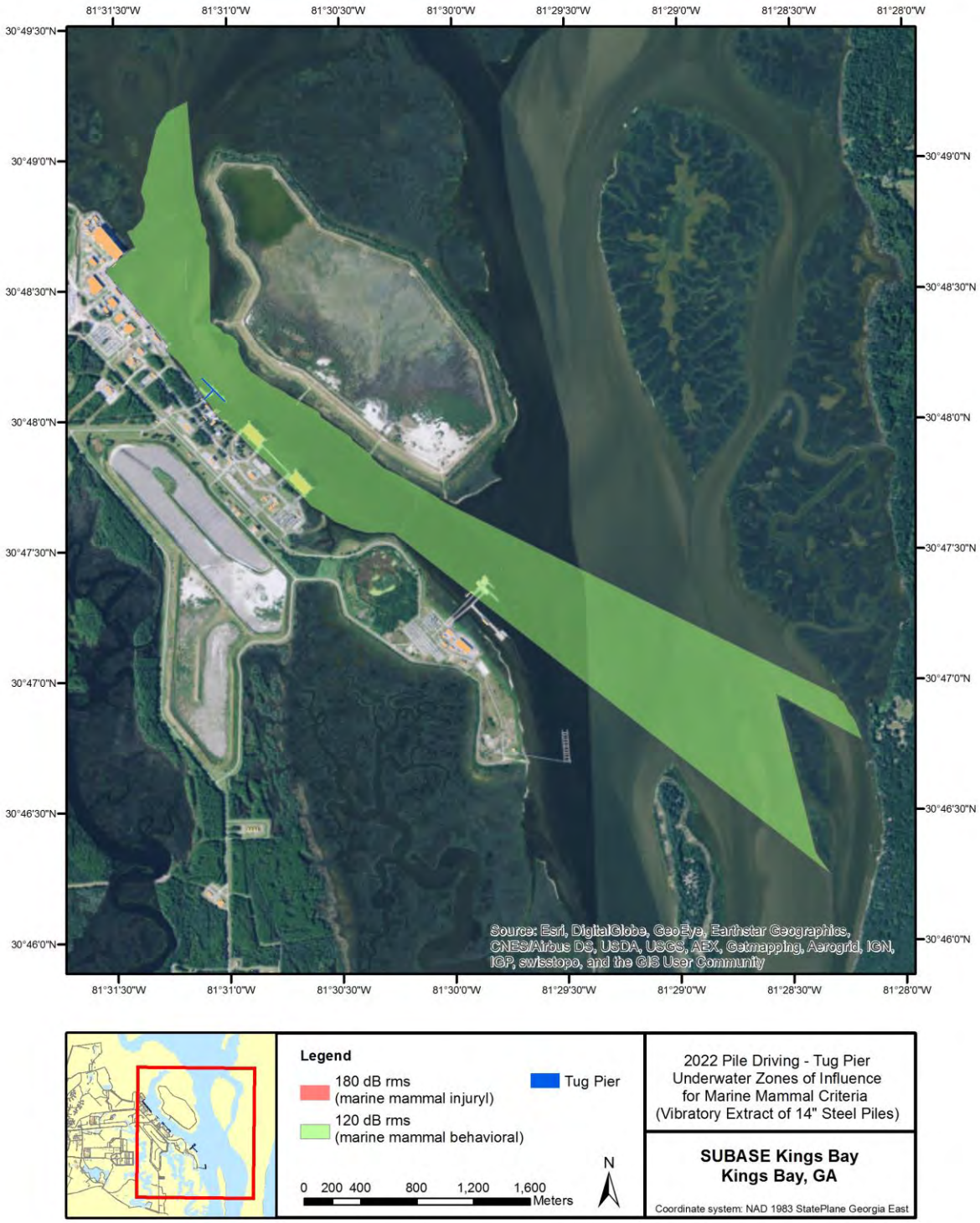
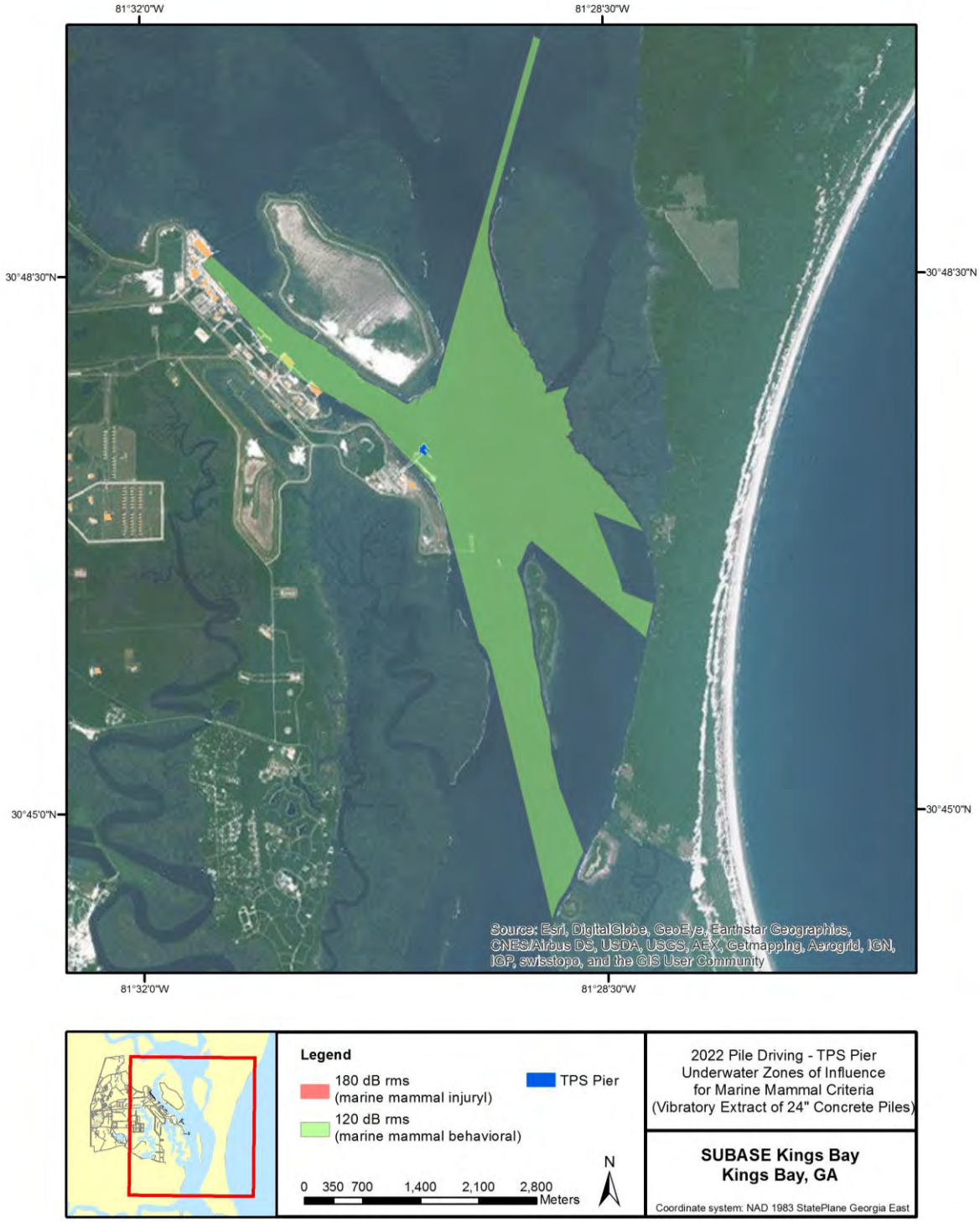


Figure 6-25. Project 3G – Tug Pier Repairs Impact Driving ZOIs

Figure 6-26. Projects 6A and 6B – Demolition of TPS Pier and North Trestle Vibratory Driving ZOIs



7 IMPACTS ON MARINE MAMMAL SPECIES OR STOCKS

The anticipated impact of the activity upon the species or stock of marine mammals

The effects of pile driving noise on marine mammals depend on several factors, including:

- Type, depth, intensity, and duration of the pile driving sound,
- species,
- size of the animal and its proximity to the source,
- depth of the water column,
- substrate of the habitat, and
- sound propagation properties of the environment.

Impacts to marine mammals from pile driving activities are expected to result primarily from acoustic pathways. As such, the degree of effect is intrinsically related to the received level and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The farther away from the source, the less intense the exposure will be. The substrate and depth of the habitat affect the sound propagation properties of the environment. Shallow environments are typically more structurally complex, which leads to rapid sound attenuation. In addition, substrates that are soft (i.e., sand) absorb and attenuate the sound more readily than hard substrates (rock) which may reflect the acoustic wave. Soft porous substrates will also likely require less time to drive the pile, and possibly less forceful equipment, which would ultimately decrease the intensity of the acoustic source to other locations

Behavioral impacts may occur, but the type and severity of these effects are difficult to define due to individual differences in response and limited studies addressing the behavioral effects of sounds on marine mammals. The behavioral responses most likely to occur during the proposed Project are habituation and temporary relocation (Ridgway et al. 1997; Finneran et al. 2003; Wartzok et al. 2003). The time required to drive each pile would be short, so anticipated behavioral disturbances are expected to be discreet and brief. Injurious impacts to marine mammal species are not expected, but would be the result of physiological responses to both the type and strength of the acoustic signature (Viada et al. 2008).

7.1 PHYSIOLOGICAL RESPONSES

No Level A exposures are expected during the Project due to the mitigation measures outlined in Chapter 11 and the conservative modeling assumptions discussed in Chapter 5. In general, physiological responses of marine mammals to impulsive sound stimulation range from non-injurious vibration or compression of tissue to injurious tissue trauma, although BMPs and mitigation measures would minimize or eliminate such occurrences during this Project.

7.2 BEHAVIORAL RESPONSES

The intent of the Project is to complete repairs and modernizations of port facilities at SUBASE Kings Bay. These projects will require vibratory extraction of exisiting pilings, as well as impact installation of replacement and new piles. The geology of the SUBASE Kings Bay area includes

a relatively shallow limestone layer that prevents the use of vibratory installation of piles. However, the time required to extract and install piles via vibratory and impact methods is expected to be short (< 60 min per pile). Therefore, potential behavioral disturbances are anticipated to be intermittent and brief.

Studies of marine mammal responses to pile driving (both impact and vibratory methods) are limited. Marine mammal monitoring at the Port of Anchorage marine terminal redevelopment project in Anchorage, Alaska, found no response by marine mammals swimming within the threshold distances to noise impacts from construction activities including pile driving (both impact hammer and vibratory driving) (Integrated Concepts & Research Corporation 2009). Small numbers of cetaceans (beluga whales, harbor porpoise) and pinnipeds (harbor seals, Steller sea lions) were observed. This study also noted that the background noise levels at this port are typically relatively high (~125 dB rms). This background noise is due to both strong tidal currents and marine traffic from shipping vessels at the Port of Anchorage. Such high background noise levels could help habituate marine mammals to non-impulsive sounds from vibratory pile driving in their environment.

Responses to impact pile driving are expected to be more acute than response to vibratory driving. Controlled experiments with captive marine mammals showed pronounced behavioral reactions, including avoidance of loud sound sources (Ridgway et al. 1997; Finneran et al. 2003). Observed responses of wild marine mammals to loud impulsive sound sources (typically seismic guns or acoustic harassment devices) have been varied, but often consist of avoidance behavior or other behavioral changes suggesting discomfort (Morton and Symonds 2002; also see reviews in Gordon et al. 2003; Wartzok et al. 2003; and Nowacek et al. 2007).

Regardless of the source of the sound, behavioral responses to sound are highly variable. The magnitude of each potential behavioral change ultimately determines the severity of the response. A number of factors may influence an animal's response to noise, including its previous experience, its auditory sensitivity, its biological and social status (including age and sex), and its behavioral state and activity at the time of exposure.

A comprehensive review of acoustic and behavioral responses to noise exposure by Nowacek et al. (2007) concluded one of the most common responses is displacement. To assess the significance of displacements, it is necessary to know the areas to which the animals relocate, the quality of that habitat, and the duration of the displacement in the event they return to the pre-disturbance area. Short-term displacement may not be of great concern unless the disturbance happens repeatedly. Similarly, long-term displacement may not be of concern if adequate replacement habitat is available.

Marine mammals exposed to pile driving sound over the course of the Project would likely avoid affected areas if they experience noise-related discomfort. As described in the section above, individual responses to pile driving noise are expected to be variable. Some individuals may occupy the Project Area during pile driving without apparent discomfort while others may be displaced with undetermined long-term effects. Avoidance of the affected area during pile driving operations would reduce or eliminate the likelihood of injury impacts, but may also reduce access to foraging areas on SUBASE Kings Bay. Given the duration of the project there is a potential for displacement of marine mammals from the affected area due to these behavioral disturbances during the in-water work period. However, the time required to drive each pile by impact and/or vibratory methods would be short (< 60 min per pile), and the number of days of

pile driving for each project within the action is limited. Potential behavioral disturbances are therefore expected to be discreet and brief. Further, since pile driving will only occur during daylight hours, marine mammals transiting the activity area or foraging or resting in the Project Area at night will not be affected.

At SUBASE Kings Bay, the background sound levels exceed 120 dB re 1µPa, with average levels as high as 135 dB rms. Marine mammals that regularly inhabit the installation's waters may therefore become habituated to non-impulsive sound over 120 dB rms, and would in fact not be able to distinguish noise from pile driving at or below background sound levels. The modeling for this project was thus very conservative, as ZOIs were modeled out to the 120 dB rms criterion.

Habituation is a response that occurs when an animal's reaction to a stimulus wanes with repeated exposure, usually in the absence of unpleasant associated events (Wartzok et al. 2003). Animals are most likely to habituate to sounds that are predictable and unvarying. The opposite process is sensitization—when an unpleasant experience leads to subsequent responses, often in the form of avoidance, at a lower level of exposure. Behavioral state or differences in individual tolerance levels may affect the type of response as well. For example, animals that are resting may show greater behavioral change in response to disturbing noise levels than animals that are highly motivated to remain in an area for feeding (Richardson et al. 1995; National Research Council 2003; Wartzok et al. 2003). Indicators of disturbance may include sudden changes in the animal's behavior or avoidance of the affected area. A marine mammal may show signs that it is startled by the noise and/or it may swim away from the sound source and avoid the area. Increased surfacing time and temporary cessation of foraging in the Project Area could indicate disturbance or discomfort in marine mammals.

Given the relatively low density of marine mammals found in the SUBASE Kings Bay waters, it is unlikely that the area is used extensively for foraging by a discrete population of animals. Effects of pile driving activities may be experienced by individual marine mammals, but are highly unlikely to cause population-level impacts or affect the continued survival of the stock.

7.3 CONCLUSIONS REGARDING IMPACTS TO SPECIES OR STOCKS

Individual marine mammals may be exposed to high sound pressure levels during pile removal and installation, which may result in Level B behavioral harassment. Any marine mammals exposed (harassed) may change their normal behavior patterns (i.e., swimming speed, foraging habits, etc.) or be temporarily displaced from the construction area. Any exposures will likely have only a minor effect on individuals and no effect on their populations. The sound generated from vibratory pile driving is non-impulsive, which is not known to cause injury to marine mammals, and mitigation measures and BMPs are expected to prevent adverse physiological impacts to marine mammals from impact pile driving. Nevertheless, some exposure is unavoidable. The expected level of unavoidable exposure (defined as acoustic harassment) is presented in Chapter 6. This level of effect is not anticipated to have any adverse impact to bottlenose dolphins' population recruitment, or survival.

8 IMPACTS ON SUBSISTENCE USE

The anticipated impact of the activity on the availability of the species or stock of marine mammals for subsistence uses.

Potential marine mammal impacts resulting from the Project will be limited to populations for which there is no known historic or current subsistence use. Therefore, no impacts on the availability of species or stocks for subsistence use are considered.

9 IMPACTS ON MARINE MAMMAL HABITAT AND THE LIKELIHOOD OF RESTORATION

The anticipated impact of the activity upon the habitat of the marine mammal populations, and the likelihood of restoration of the affected habitat.

Activities associated with the Project are expected to result in removal of a small amount of low-quality habitat, and disturb sediments, and benthic and forage fish communities, on a temporary, highly localized scale. The relatively high amount of vessel traffic in the confined space of the SUBASE Kings Bay area and the transition to the federal navigation channel, has resulted in a determination the Kings Bay project area encompasses relatively low quality habitat for most marine species.

Pile installation and deployment of anchors and / or spuds from barges may result in temporary, small scale disturbance of benthic communities and marine vegetation in the immediate vicinity of the project. Benthic organisms may be disturbed, buried or crushed by anchors and / or spuds and removal of piles; this may result in a temporary degradation or loss of isolated foraging habitat for marine mammals. However, sediments and marine vegetation are expected to return to their prior conditions and cover within a short time of the conclusion of the in-water work.

The new surfaces associated with the piles and exposed concrete will likely result in establishment of fouling communities on the new and existing structures, and may attract fish and benthic organisms resulting in very small scale shifts in prey distribution.

Overall, small-scale, temporary changes to habitat and community assemblages in the immediate project area are expected to occur, but natural sedimentation and succession / recruitment will likely return the project footprint to pre-construction conditions within a short amount of time after in-water work is completed.

10 IMPACTS ON MARINE MAMMALS FROM LOSS OR MODIFICATION OF HABITAT

The anticipated impact of the loss or modification of the habitat on the marine mammal populations involved.

The Project is not expected to have any habitat-related effects that could cause significant or long-term consequences for individual or populations of marine mammals because of the relatively small footprint and existing disturbed conditions. Further, all impacts will be temporary, with pile driving activity for each project within the Project being completed within days to weeks of the project start. Information provided in Chapter 9 (Impacts on Marine Mammal Habitat and the Likelihood of Restoration) indicates there may be temporary impacts, but those impacts would be limited to the immediate area. Impacts will cease upon the completion of activities associated with the Project.

11 MEANS OF EFFECTING THE LEAST PRACTICABLE ADVERSE IMPACTS – STANDARD OPERATING PROCEDURES AND MITIGATION MEASURES

The availability and feasibility (economic and technological) of equipment, methods, and manner of conducting such activity or other means of affecting the least practicable adverse impact upon the affected species or stocks, their habitat, and on their availability for subsistence uses, paying particular attention to rookeries, mating grounds, and areas of similar significance.

This section summarizes best management practices and mitigation measures that will be implemented during in-water construction activities. Best Management Practices (BMPs) are essential to maintaining safety and mission success, and in many cases have the added benefit of reducing potential environmental impacts. Mitigation measures are designed to help reduce or avoid potential impacts on marine resources. When applicable, mitigation measures developed for construction activities are consistent with those developed as part of the Atlantic Fleet Training and Testing EIS/OEIS and section 7 consultation for the West Indian manatee (*Trichechus manatus*). BMPs and minimization measures are included in the construction contract plans and specifications and must be agreed upon by the contractor prior to any construction activities. Upon signing the contract, it becomes a legal agreement between the contractor and the Navy. Failure to follow the prescribed BMPs and minimization measures is a contract violation.

A separate *Marine Mammal Monitoring Plan for Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, Georgia* has been prepared, and contains specific details for each project.

General Construction Best Management Practices

1. All work shall adhere to performance requirements of the Clean Water Act, Section 404 permit and Section 401 Water Quality Certification. No in-water work shall begin until after issuance of regulatory authorizations.
2. The construction contractor is responsible for preparation of an Environmental Protection Plan. The plan shall be submitted and implemented prior to the commencement of any construction activities and is a binding component of the overall contract. The plan shall identify construction elements and recognize spill sources at the site. The plan shall outline BMPs, responsive actions in the event of a spill or release, and notification and reporting procedures. The plan shall also outline contractor management elements such as personnel responsibilities, project site security, site inspections, and training.
3. No petroleum products, lime, chemicals, or other toxic or harmful materials shall be allowed to enter surface waters.
4. Washwater resulting from washdown of equipment or work areas shall be contained for proper disposal, and shall not be discharged unless authorized.

5. Equipment that enters surface waters shall be maintained to prevent any visible sheen from petroleum products.
6. No oil, fuels, or chemicals shall be discharged to surface waters, or onto land where there is a potential for re-entry into surface waters shall occur. Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. shall be checked regularly for leaks, and be maintained and stored properly to prevent spills.
7. No cleaning solvents or chemicals used for tools or equipment cleaning shall be discharged to ground or surface waters.
8. Construction materials shall not be stored where high tides, wave action, or upland runoff could cause materials to enter surface waters.
9. Barge operations shall be restricted to tidal elevations adequate to prevent grounding of a barge.
10. All in-water construction activities shall occur during daylight hours (one hour post sunrise to one hour prior to sunset[1]). Construction activities on land could occur between 6:00 AM and 10:00 PM during any time of the year.

<u>Pile Removal and Installation Best Management Practices</u>

1. A containment boom surrounding the work area shall be used during creosote-treated pile removal to contain and collect any floating debris and sheen. The boom may be lined with oil-absorbing material to absorb released creosote.
2. Oil-absorbent materials shall be used in the event of a spill if any oil product is observed in the water.
3. All creosote-treated material and associated sediments shall be disposed of in a landfill that meets Georgia environmental standards.
4. Removed piles and associated sediments (if any) shall be contained on a barge. If a barge is not utilized, piles and sediments may be stored in a containment area near the construction site.
5. Soft starts are performed at the beginning of impact pile driving. During a soft start, an initial set of strikes from the impact hammer at reduced energy are performed before it is able to be operated at full power and speed. The energy reduction of an individual hammer cannot be quantified because they vary by individual drivers. Also, the number of strikes will vary at reduced energy because raising the hammer at less than full power and then releasing it results in the hammer ―bouncing" as it strikes the pile resulting in multiple ―strikes." Initiating impact pile driving at a lower power may allow marine mammals an opportunity to move away from the immediate vicinity of the activity,

[1] Sunrise and sunset are to be determined based on the National Oceanic and Atmospheric Administration data which can be found at http://www.srrb.noaa.gov/highlights/sunrise/sunrise.html.

thereby reducing the likelihood of exposure to sound levels that could cause further behavioral disturbance or injury.

6. Pilings that break or are already broken below the waterline may be removed by wrapping the piles with a cable or chain and pulling them directly from the sediment with a crane. If this is not possible, they shall be removed with a clamshell bucket. To minimize disturbance to bottom sediments and splintering of piling, the contractor shall use the minimum size bucket required to pull out piling based on pile depth and substrate. The clam shell bucket shall be emptied of piling and debris on a contained barge before it is lowered into the water. If the bucket contains only sediment, the bucket shall remain closed and be lowered to the mud line and opened to redeposit the sediment. In some cases (depending on access, location, etc.), piles may be cut below the mud line and the resulting hole backfilled with clean sediment.
7. Any floating debris generated during installation shall be retrieved. Any debris in a containment boom shall be removed by the end of the work day or when the boom is removed, whichever occurs first. Retrieved debris shall be disposed of at an upland disposal site.
8. Whenever activities that generate sawdust, drill tailings, or wood chips from treated timbers are conducted, tarps or other containment material shall be used to prevent debris from entering the water.
9. If excavation around piles to be replaced is necessary, hand tools or a siphon dredge shall be used to excavate around piles to be replaced.

Additional Minimization Measures for Marine Mammals

The following minimization measures shall be implemented during pile driving to avoid marine mammal exposure to Level A injurious noise levels generated from impact pile driving and to reduce to the lowest extent practicable exposure to Level B noise levels.

Coordination

Barge operators, construction observers, and compliance monitors will complete applicable portions of the Navy's *Marine Species Awareness Training*, and a general environmental awareness briefing conducted by Navy marine resources specialists. Specific characteristics and sample photos of the marine mammal species that would most likely be observed in the project area, as well as techniques to estimate distance and document behavior, would be included in the briefing. This training is tailored to the audience and designed to improve the effectiveness of visual observations for protected species and provides information on sighting cues, visual observation tools and techniques, and sighting notification procedures.

Standard Conditions

Marine mammal construction observers and compliance monitors shall also read and ensure adherence to the following conditions (Appendix A):

- *NFMS Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines*
- *Sea Turtle and Smalltooth Sawfish Construction Conditions*
- *Special Provisions for Manatees*

Compliance Monitoring and Shutdown Procedures

The *Marine Mammal Monitoring Plan for Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, Georgia* include all details for shutdown and monitoring.

Observers and Procedures

Construction crews and barge operators will complete applicable portions of the Navy's *Marine Species Awareness Training*, and a general environmental awareness briefing prior to the start of repair and maintenance activities. This training is designed to improve the effectiveness of visual observations for protected species and provides information on sighting cues, visual observation tools and techniques, and sighting notification procedures.

Marine species observers (~~"o~~bservers") designated by the contractor will be placed at the best vantage point(s) practicable to monitor for protected species and implement shutdown/delay procedures when applicable by calling for the shutdown to equipment operators. The observers shall have no other construction related tasks while conducting monitoring.

Methods

Construction observer(s) will monitor the entire shutdown zone before, during, and after pile driving and removal. The shutdown zone for impact pile driving was calculated based on acoustic modeling at a notional pile location. The zone to be viewed varies at each location; shutdown zones are listed in Table 11-1. In no case will the shutdown zone be less than 15 m (50 ft), which is the standoff distance required in the Manatee Protection Measures given in Appendix A. This measure allows for a physical buffer zone between protected marine mammals and construction equipment. The construction observer(s) will have full visibility of the shutdown zone regardless of the type of driving taking place, and will be able to immediately report a marine mammal observation and initiate shutdown procedures.

Table 11-1. Vibratory and Impact Shutdown Zones For All Projects

Project	FAC #	Fiscal Year	Vibratory Shutdown Zone [m]	Impact Shutdown Zone [m]
1A	5926	2017	15	15
1B	5888	2017	15	N/A
2	5976	2017	N/A	15
3A	5109	2017/2022	15	50
3B	5955	2021	15	15
3C	5909	2018	15	50
3D	5910	2017	15	50
3E	5916	2018	15	50
3F	5877	2021	15	75
3G	5926	2022	15	15
4A	P617	2020	15	15
4B	P617	2020	15	50
5	5980	2017	15	N/A
6A	5934	2022	15	N/A
6B	5977	2022	15	N/A

Construction observers and compliance monitors designated by the contractor will be placed at a vantage point (e.g., from a small boat, construction barges, on shore, elevated perch [e.g. scissor lift], or any other suitable location) to observe all waters encompassed by the calculated zone.

The shutdown zone shall be viewed for 15 minutes prior to in water construction activities. If a marine mammal is observed in the shutdown zone, in-water activities shall be delayed until the animal(s) leaves the shutdown zone. Activity shall resume only after the construction observer has determined, through re-sighting or by waiting approximately 15 minutes that the animal(s) has moved outside the shutdown zone. The construction observer(s) shall notify the foreman/point of contact (POC) when construction activities can commence. Observation of the shutdown zone will continue for 30 minutes following the completion of pile driving.

Data Collection

The following information shall be recorded on sighting forms used by construction observers and compliance monitors:

- Date and time that pile driving or removal begins or ends
- Construction activities occurring during each observation period
- Weather parameters identified in the acoustic monitoring (e.g., wind, temperature, percent cloud cover, and visibility)
- Tide and sea state

If a marine mammal approaches or enters the shutdown zone, the following information will be recorded once shutdown procedures have been implemented:

- Any shutdown procedures implemented
- Species, numbers, and if possible sex and age class of the species (to estimate number of potential incidental takes)
- Behavior patterns observed, including bearing and direction of travel
- Location of the construction observer / compliance monitor, and distance from the animal(s) to the observer

Data collection forms shall be furnished to the NAVFAC Southeast POC within a mutually agreeable timeframe.

Interagency Notification

If the contractors encounter a marine mammal that is injured, sick, or dead, the installation natural resources manager shall be notified immediately. The Navy will in turn notify the appropriate regulatory agencies.

The Navy will provide the regulatory agencies with information as requested, such as the species or description of the animal(s), the condition of the animal (including carcass condition if the animal is dead), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

In preservation of biological materials from a dead animal, the construction observer / compliance monitor has the first responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed. Construction observers / compliance monitors shall not handle dead animals.

Reporting

Monitoring reports will be provided to NMFS in accordance with permit requirements and timelines.

12 MINIMIZATION OF ADVERSE IMPACTS ON SUBSISTENCE USE

Where the proposed activity would take place in or near a traditional Arctic subsistence hunting area and/or may affect the availability of a species or stock of marine mammal for Arctic subsistence uses, the applicant must submit either a plan of cooperation or information that identifies what measures have been taken and/or will be taken to minimize any adverse effects on the availability of marine mammals for subsistence uses. A plan must include the following:

(i) A statement that the applicant has notified and provided the affected subsistence community with a draft plan of cooperation;

(ii) A schedule for meeting with the affected subsistence communities to discuss proposed activities and to resolve potential conflicts regarding any aspects of either the operation or the plan of cooperation;

(iii) A description of what measures the applicant has taken an/or will take to ensure that proposed activities will not interfere with subsistence whaling or sealing; and

(iv) What plans the applicant has to continue to meet with the affected communities, both prior to and while conducting activity, to resolve conflicts and to notify the communities of any changes in the operation.

As detailed in Chapter 8, no impacts on the availability of species or stocks for subsistence use are considered. Therefore, no minimization efforts are applicable.

13 MONITORING AND REPORTING EFFORTS

The suggested means of accomplishing the necessary monitoring and reporting that will result in increased knowledge of the species, the level of taking or impacts on populations of marine mammals that are expected to be present while conducting activities and suggested means of minimizing burdens by coordinating such reporting requirements with other schemes already applicable to persons conducting such activity. Monitoring plans should include a description of the survey techniques that would be used to determine the movement and activity of marine mammals near the activity site(s) including migration and other habitat uses, such as feeding.

The Navy is committed to demonstrating environmental stewardship while executing its National Defense Mission and complying with the suite of Federal environmental laws and regulations. As a complement to the Navy's commitment to avoiding and reducing impacts of the Proposed Action through mitigation (Chapter 11, Means of Effecting the Least Practicable Adverse Impacts), the Navy will implement monitoring efforts under the existing Integrated Comprehensive Monitoring Program. Taken together, mitigation and monitoring comprise the Navy's integrated approach for reducing environmental impacts from the Proposed Action. The Navy's overall monitoring approach will seek to leverage and build on existing research efforts whenever possible.

13.1 INTEGRATED COMPREHENSIVE MONITORING PROGRAM TOP-LEVEL GOALS

The Integrated Comprehensive Monitoring Program is intended to coordinate monitoring efforts across all regions where the Navy trains and tests and to allocate the most appropriate level and type of effort for each range complex (U. S. Department of the Navy 2010). Originally, the Navy monitoring program was composed of a collection of ―range-specific" monitoring plans, each developed individually as part of Marine Mammal Protection Act and Endangered Species Act compliance processes as environmental documentation was completed. These individual plans established specific monitoring requirements for each range complex and were collectively intended to address the Integrated Comprehensive Monitoring Program top-level goals.

A 2010 Navy-sponsored monitoring meeting in Arlington, Virginia, initiated a process to critically evaluate the Navy monitoring plans and begin development of revisions and updates to both the region-specific plans as well as the Integrated Comprehensive Monitoring Program. Discussions at that meeting as well as the following Navy and NMFS annual adaptive management meeting established a way ahead for continued refinement of the Navy's monitoring program. This process included establishing a Scientific Advisory Group of leading marine mammal scientists with the initial task of developing recommendations that would serve as the basis for a Strategic Planning Process for Navy monitoring. The Strategic Plan is intended to be a primary component of the Integrated Comprehensive Monitoring Program and provide a ―vision" for Navy monitoring across geographic regions - serving as guidance for determining how to most efficiently and effectively invest the marine species monitoring resources to address Integrated Comprehensive Monitoring Program top-level goals and satisfy MMPA Letter of Authorization regulatory requirements.

The objective of the Strategic Planning Process is to continue the evolution of Navy marine species monitoring towards a single integrated program, incorporating Scientific Advisory Group recommendations, and establishing a more transparent framework for soliciting, evaluation, and implementing monitoring work across the range complexes and testing ranges. The Strategic Planning Process must consider a range of factors in addition to the scientific recommendations including logistic, operational, and funding considerations and will be revised regularly as part of the annual adaptive management process.

Details on the Navy's marine species monitoring program including the ICMP and Strategic Planning Process can be found on the program's web portal –

www.navymarinespeciesmonitoring.us.

14 RESEARCH EFFORTS

Suggested means of learning of, encouraging, and coordinating research opportunities, plans, and activities relating to reducing such incidental taking and evaluating its effects.

At this time the Navy does not anticipate any specific research conducted in conjunction with the Project.

The Navy strives to be a world leader in marine species research and has provided more than $100 million over the past five years to universities, research institutions, federal laboratories, private companies, and independent researchers around the world to increase the understanding of marine species physiology and behavior with several projects ongoing in Washington.

The Navy sponsors 70 percent of all U.S. research concerning the effects of human-generated sound on marine mammals and 50 percent of such research conducted worldwide. Major topics of Navy-supported research include the following:

- Gaining a better understanding of marine species distribution and important habitat areas
- Developing methods to detect and monitor marine species before and during training
- Understanding the effects of sound on marine mammals
- Developing tools to model and estimate potential effects of sound

The Navy has sponsored several workshops to evaluate the current state of knowledge and potential for future acoustic monitoring of marine mammals. The workshops brought together acoustic experts and marine biologists from the Navy and outside research organizations to present data and information on current acoustic monitoring research efforts and to evaluate the potential for incorporating similar technology and methods into Navy activities. The Navy supports research efforts on acoustic monitoring and will continue to investigate the feasibility of passive acoustics as a potential monitoring tool. Overall, the Navy will continue to research and contribute to university/external research to improve the state of the science regarding marine species biology and acoustic effects. These efforts include monitoring programs, data sharing with NMFS from research and development efforts, and future research as previously described.

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LIST OF PREPARERS

Cara Hotchkin, Marine Resources Specialist, NAVFAC Atlantic
Ph.D., 2012, Ecology, The Pennsylvania State University
B.S., Marine Biology, University of Rhode Island
B.S., Coastal and Marine Policy and Management, University of Rhode Island
Years of Experience: 3

Jonathan Crain, Marine Resources Specialist, NAVFAC Atlantic
B.S., Geography, University of Louisville
Years of Experience: 6

Jacqueline Bort, Marine Resources Specialist, NAVFAC Atlantic
B.S., Marine Biology, University of North Carolina Wilmington
M.Phil, Human Ecology, College of the Atlantic
Years of Experience: 3

Appendix A

Construction Conditions for Protected Marine Species

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006
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Southeast Region Marine Mammal & Sea Turtle Viewing Guidelines

Limit your viewing time.

- Prolonged exposure to one or more vessels increases the likelihood that marine mammals will be disturbed.
- Viewing periods of greater than 1/2 hour should be undertaken only if you are absolutely sure that you are not causing disturbance or any changes in behavior.
- Since individual animals' reactions will vary, carefully observe all animals and leave the vicinity if you see signs of disturbance.
- Your vessel may not be the only vessel in the day that approaches the same animal(s); please be aware of cumulative impacts.

Travel in a predictable manner.

- Marine mammals appear to be less disturbed by vessels that are traveling in a predictable manner.
- The departure from a viewing area has as much potential to disturb animals as the approach.
- If a marine mammal or sea turtle approaches, put your engine in neutral and allow the animal to pass.
- Never pursue of follow marine wildlife.
- Never attempt to herd, chase, or separate groups of marine mammals or females from their young.
- Avoid excessive speed or sudden changes in speed or direction in the vicinity of animals.

If you need to move around marine wildlife, do so from behind (i.e., never approach head-on).

- Vessels that wish to position themselves so that the animals would pass them, should do so in a manner that stays fully clear of the animal's path.

Be aware that marine mammals may surface in unpredictable locations.

- Breaching and flipper slapping whales may endanger people and/or vessels.

Be on the look-out for seals.

- As their populations expand, seals are being found in southeastern states with increasing regularity, especially in North Carolina.
- Viewing or approaching seals hauled out on land should be done without the animal's awareness of your presence.
- Avoid detection by sight, smell, or sound (e.g., by staying hidden behind natural cover and approaching viewing areas quietly by avoiding conversation and noisy movements).
- Pups are often left alone when the mother is feeding. *They are not abandoned and should be left alone.*

Marine mammals are more likely to be disturbed when more than one boat is near them.

- Avoid approaching the animals when another vessel is near.
- Always leave marine mammals an "escape route."
- When several vessels are in an area, communication between operators will help ensure that you do not cause disturbance.

Marine mammals have sensitive hearing and many species communicate by vocalizing underwater.

- Underwater sound produced by a vessel's engines and propellers can disturb these animals.

Cautiously move away from the animals if you observe any of the following behaviors:

- Rapid changes in direction or swimming speed.
- Erratic swimming patterns.
- Escape tactics such as prolonged diving, underwater exhalation, underwater course changes, or rapid swimming at the surface.
- Tail slapping or lateral tail swishing at the surface.
- Female attempting to shield a calf with her body or by her movements.

Even if approached by a marine mammal or sea turtle:

- Do not touch or swim with the animals.

Never feed or attempt to feed marine mammals or sea turtles.

- It can alter their natural behavior, make them dependent on handouts, and can be harmful to their health.
- Marine mammals, like all wild animals, may bite and inflict injuries to people who try to feed them.

Note: NMFS regulations at 50 CFR § 216.3 strictly prohibit feeding or attempting to feed a marine mammal in the wild.

Close approaches by humans to marine mammals may cause them to lose their natural wariness and become aggressive towards people. They are also vulnerable to injury or death from entanglement in fishing gear or boat strikes. NMFS strongly encourages people to follow the guidelines presented here while spending time on or near the water.

Please review these guidelines and make the "Code of Conduct" personal practice. Bring binoculars along on a viewing excursion to assure a good view from the recommended viewing distances. Together we can assure marine mammal viewing will be as rewarding as it is today for many generations to come.

Special Provisions for Manatee

The following conditions are intended as a minimum to protect this species and its habitat during any activities that are in close proximity to the known locations of this species on this project.

1. The permittee agrees that all personnel associated with the project will be advised that there are civil and criminal penalties for harming, harassing or killing manatees, which are protected under the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972. The permittee and contractor will be held responsible for any manatee harmed, harassed, or killed as a result of construction activities.

2. All on-site project personnel are responsible for observing water-related activities for the presence of manatees. All construction and activities in open water will cease upon sighting of manatees within 100 feet of the project area. Construction activities will not resume until the manatees have left the project area for at least thirty minutes.

3. A trained spotter provided by the Contractor, shall be onsite for sightings of manatees during the construction of the project. Personnel designated by the Contractor shall receive training by the Georgia Department of Natural Resources, Coastal Resources Division, Brunswick, Georgia. The contact person for the Georgia Department of Natural Resources is Clay George at 912-262-3336.

4. Siltation barriers will be made of material in which manatees cannot become entangled, are properly secured, and are regularly monitored to avoid manatee entrapment. Barriers must not block manatee entry to or exit from essential habitat.

5. All vessels associated with the project will operate at “no wake/idle” speeds at all times while in the construction area. All vessels will follow routes of deep water whenever possible.

6. Propellers on all boats 21 feet or less in length shall be equipped with propeller guard systems, approved by the Project Manager, designed to prevent harm to manatees.

7. Extreme care will be taken in lowering equipment or materials, including, but not limited to piles, sheet piles, casings for drilled shaft construction, spuds, pile templates, anchors, etc., below the water surface and into the stream bed; taking any precaution not to harm any manatee(s) that may have entered the construction area undetected. All such equipment or materials will be lowered at the lowest possible speed.

8. Prior to initiation of construction, the permittee shall install at least two (2) temporary manatee awareness construction signs in locations clearly visible from the navigation channel (Attachment A). The signs shall be displayed and maintained throughout construction and shall be removed by the permittee upon completion of construction. Placement of all signs shall be as approved by the Georgia Department of Natural

Resources, Coastal Resources Division, Brunswick, Georgia. The contact person for the Georgia Department of Natural Resources is Clay George at 912-262-3336.

9. All temporary construction materials will be removed upon completion of the work, and salt marsh areas will be restored. No construction debris or trash will be discarded in the water.

10. Any dead manatee(s) found in the project area must be secured to a stable object to prevent the carcass from being moved by the current. The Contractor shall immediately notify the Government Project Manager who in turn will notify the Environmental Office at 912 573-4678. The Environmental Office will notify:

a. the U. S. Fish and Wildlife Service, Coastal Sub-Office at 912-832-8739 and,
b. the GDNR, Nongame Conservation Section at 912-262-3336.

11. The Contractor shall immediately report to the Government Project Manager any incident (e.g. collisions, injuries and mortalities) which occurs that causes harm or could be detrimental to the continued existence of the manatee along the project corridor. The Government Project Manager will in turn notify the Environmental Office at 912 573-4678. The Environmental Office will notify:

a. the U. S. Fish and Wildlife Service, Coastal Sub-Office at 912-832-8739 and,
b. the GDNR, Nongame Conservation Section at 912-262-3336 or,
800-2-SAVE-ME.

12. In the event of injury or mortality of a manatee, all aquatic activity in the project area must cease pending section 7 consultation under the Endangered Species Act with the U. S. Fish and Wildlife Service and the lead Federal agency.

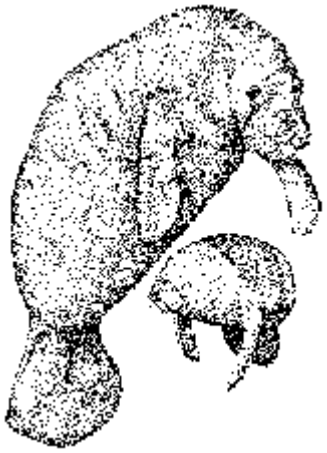
13. The Contractor shall keep a log detailing sightings, collisions, or injury to manatees, which have occurred during the contract period. Following project completion, the log and a report summarizing the any incidents and / or sightings of manatees will be submitted to the Government Project Manager and Environmental Office.

14. The Environmental office will submit above mentioned log to:

a. the U. S. Fish and Wildlife Service, 4980 Wildlife Drive, NE, Townsend, Georgia 31331 and,
b. the GDNR, Nongame Conservation Section, One Conservation Way, Brunswick, Georgia 31520

Attachment A

MARINE FACILITY
MANATEE SIGNS
PLACEMENT PROCEDURES



The West Indian manatee (*Trichechus manatus*) is an endangered species throughout its range. Manatees are protected at the Federal level by the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972, as amended. Protection measures such as these signs are necessary to increase boater awareness. The increased level of Georgia coastal development and associated marinas and boat traffic will increase the probability of negative impacts to the seasonal manatee population. Manatees inhabit Georgia waters from March through November. The main threat to manatee populations is human related boat/barge collisions. Raising boater awareness and educating the public is necessary for manatee conservation in Georgia waters and has been proven effective.

The informational/educational display sign, "Manatee Habitat", is intended to increase boater awareness of manatees that are present in Georgia waters. This sign informs boaters of the potential threat boats pose to the animals and how to help decrease negative impacts caused by those vessels. Although the placement of these signs is mandatory and required by permit, they are informative and non-regulatory in nature.

<u>Procedure for Approval of Sign Installation</u>:

1. The applicant should forward a project site plan, including the proposed location for the permanent signs to: Manatee Sign Approval, Nongame Conservation Section, Department of Natural Resources, One Conservation Way, Brunswick, Georgia 31520. The applicant should also include a chart indicating the location of the facility in relation to waterways, location within a

given county (specify county name), Contact person with phone number, and the Permit and/or Lease number associated with the project

2. The Nongame Conservation Section of the Georgia Department of Natural Resources (GDNR) will review the proposed sign placement site plan and will respond to the applicant within 30 days. If the proposed location is unacceptable, guidance on an alternate site will be provided. The contact person should notify the Nongame Conservation Section when sign placement has been completed (912-264-7218). A photograph(s) of the posted manatee signage at your facility must be submitted with the required permit compliance form to the Marsh and Shore Regulatory Program of the Coastal Resources Division/Georgia Department of Natural Resources.

3. If during a site visit, approved signs, and their locations are found not to be in compliance with the instructions given in this document, relocation or addition of signs will be required. Annual site visits will be conducted to document sign placement and condition. All signs locations will be recorded in the GDNR manatee database.

Approved Sign Suppliers:

The signs are available through the companies listed below and may also be available from other local suppliers throughout the state. Permit/lease holders, marinas, and boat docking/launching facilities should contact sign companies directly to obtain pricing information and arrange for shipping and billing.

Approved Suppliers of Manatee Signs:

Grafix, Inc.
455 Montgomery Street
Post Office Box 1028
Savannah, Georgia 31402
Voice: 912-691-1117
Fax: 912-232-3845

Image Sign Company
785 King George Blvd., Bldg. 3
Savannah, Georgia 31419
Voice: 912-961-1444
Fax: 912-961-1499

Doug Bean Signs, Inc.
160 Dean Forest Rd
Savannah, Georgia 31408
Voice: 912-964-1900
Fax: 912-964-2900

Fendig Signs
411 Arnold Rd
Saint Simons Island, Georgia 31522

Good & Associates
Saint Simons Island, Georgia
(912) 638-7664

Temporary Construction Signs

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Appendix B

Fundamentals of Acoustics

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B.1 Fundamentals of Acoustics

Bioacoustics, or the study of how sound affects living organisms, is a complex and interdisciplinary field that includes the physics of sound production and propagation, the source characteristics of sounds, and the perceptual capabilities of receivers. This appendix is intended to introduce the reader to the basics of sound measurements and sound propagation, as well as the hearing and vocal production abilities of species that may occur in the project area. The potential for noise from pile driving to cause auditory masking for marine mammals within the project area is also considered.

Sound is an oscillation in pressure, particle displacement, or particle velocity, as well as the auditory sensation evoked by these oscillations, although not all sound waves evoke an auditory sensation (i.e., they are outside of an animal's hearing range) (ANSI S1.1-2013). Sound may be described in terms of both physical and subjective attributes. Physical attributes may be directly measured. Subjective (or sensory) attributes cannot be directly measured and require a listener to make a judgment about the sound. Physical attributes of a sound at a particular point are obtained by measuring pressure changes as sound waves pass. The following material provides a short description of some of the basic parameters of sound.

Sound can be characterized by several factors, including frequency, intensity, and pressure (Richardson et al. 1995). Sound frequency (measured in Hertz [Hz]) and intensity (amount of energy in a signal [Watts per meter^2]) are physical properties of the sound which are related to the subjective qualities of pitch and loudness (Kinsler et al. 1999). Sound intensity and sound pressure (measured in Pascals [Pa]) are also related; of the two, sound pressure is easier to measure directly, and is therefore more commonly used to evaluate the amount of disturbance to the medium caused by a sound ("amplitude").

Because of the wide range of pressures and intensities encountered during measurements of sound, a logarithmic scale known as the decibel is used to evaluate these properties; in acoustics, "level" indicates a sound measurement in decibels. The decibel [dB] scale expresses the logarithmic strength of a signal (pressure or intensity) relative to a reference value of the same units. This document reports sound levels with respect to sound pressure only. Each increase of 20 dB reflects a ten-fold increase in signal pressure, i.e., an increase of 20 dB means ten times the pressure, 40 dB means one hundred times the pressure, 60 dB means one thousand times the pressure, and so on.

The sound levels in this document are given as sound pressure levels [SPL]. For measurements of underwater sound, the standard reference pressure is 1 microPascal [μPa, or 10^{-6} Pascals], and is expressed as "dB re 1μPa". For airborne sounds, the reference value is 20 μPa, expressed as "dB re 20 μPa". Sound levels measured in air and water are not directly comparable, and it is important to note which reference value is associated with a given sound level.

Airborne sounds are commonly referenced to human hearing using a method which weights sound frequencies according to measures of human perception, de-emphasizing very low and very high frequencies which are not perceived well by humans. This is called A-weighting, and the decibel level measured is called the A-weighted sound level [dBA]. A similar method has been proposed for evaluating underwater sound levels with respect to marine mammal hearing. While preliminary weighting functions for marine mammal hearing have been developed (Southall et al. 2007), they are not yet applied to sound exposure from pile driving activities. Therefore, underwater sound levels given in this document are not weighted and evaluate all frequencies equally.

Table B-1 summarizes common acoustic terminology. Two of the most common descriptors are the instantaneous peak SPL and the root-mean-square [rms] SPL. The peak SPL is the instantaneous maximum or minimum over- or underpressure observed during each sound event and is presented in dB re 1 μPa peak. The rms level is the square root of the energy divided by a defined time period, given as dB re 1 μPa rms.

Table B-1. Definitions of Acoustical Terms

Term	Definition
Decibel [dB]	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure or intensity of the sound measured to the appropriate standard reference value. This document uses only sound pressure measurements to calculate decibel levels. The reference pressure for water is 1 microPascal (µPa) and for air is 20 µPa (approximate threshold of human audibility).
Sound Pressure Level [SPL]	Sound pressure is the force per unit area, usually expressed in microPascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. Sound pressure level is the quantity that is directly measured by a sound level meter, and is expressed in decibels referenced to the appropriate air or water standard.
Frequency, Hz	Frequency is expressed in terms of oscillations, or cycles, per second. Cycles per second are commonly referred to as Hertz (Hz). Typical human hearing ranges from 20 Hz to 20,000 Hz; hearing ranges in non-humans are widely variable and species specific.
Peak Sound Pressure (unweighted), dB re 1µPa peak	The maximum absolute value of the instantaneous sound pressure expressed as dB re 1µPa peak.
Root-Mean-Square [rms], dB re 1µPa	The rms level is the square root of the pressure divided by a defined time period, expressed in decibels. For impulsive sounds, the rms has been defined as the average of the squared pressures over the time that comprise that portion of waveform containing 90 percent of the sound energy for one impact pile driving impulse. For non-impulsive sounds, rms energy represents the average of the squared pressures over the measurement period and is not limited by the 90 percent energy criterion. Expressed as dB re 1µPa.
Sound Exposure Level [SEL], dB re 1µPa^2 sec	Sound exposure level is a measure of energy. Specifically, it is the dB level of the time integral of the squared-instantaneous sound pressure, normalized to a 1-second period. It can be an extremely useful metric for assessing cumulative exposure because it enables sounds of differing duration to be compared in terms of total energy.
Waveforms, µPa over time	A graphical plot illustrating the time history of positive and negative sound pressure of individual pile strikes shown as a plot of µPa over time (i.e., seconds).
Frequency Spectra, dB over frequency range	A graphical plot illustrating the frequency content over a given frequency range. Bandwidth is generally defined as linear (narrowband) or logarithmic (broadband) and is stated in frequency (Hz).
A-Weighted Sound Level, dBA	A frequency-weighted measure used for airborne sounds only. A-weighting de-emphasizes the low and high frequency components of a given sound in a manner similar to the frequency response of the human ear and correlates well with subjective human reactions to noise. A-weighted levels are referenced to 20 µPa unless otherwise noted.
Ambient Noise Level	The background noise level, which is a composite of sounds from all sources near and far. The normal or existing level of environmental noise at a given location, given in dB referenced to the appropriate pressure standard.

Adapted and derived from URS Corporation (2007)

B.2 Sound vs. Noise

Sound may be purposely created to convey information, communicate, or obtain information about the environment. Examples of such sounds are sonar pings, marine mammal vocalizations/echolocations, tones used in hearing experiments, and small sonobuoy explosions used for submarine detection.

Noise is undesired sound (ANSI S1.1-1994). Whether a sound is noise depends on the receiver (i.e., the animal or system that detects the sound). For example, small explosives and sonar used to locate an enemy submarine produce *sound* that is useful to sailors engaged in anti-submarine warfare, but is may be aversive *noise* to marine species. Sounds produced by naval aircraft and vessel propulsion are considered noise because they represent possible energy inefficiency and increased detectability, which are undesirable.

Noise also refers to all sound sources that may interfere with detection of a desired sound and the combination of all of the sounds at a particular location (ambient noise).

B.3 Description of Noise Sources

Ambient noise in the project area is a composite of sounds from natural sources, normal port activities, and temporary projects such as maintenance dredging or pile driving.

In-water construction activities associated with this project include vibratory and impact pile driving. The sounds produced by these activities fall into two sound types: impulsive (impact driving) and non-impulsive (vibratory driving). Distinguishing between these two general sound types is important because of each sound type may cause different types of physical effects, particularly with regard to hearing (Ward 1997).

Impulsive sounds (e.g., explosions, seismic airgun pulses, and impact pile driving) are referred to as pulsed sounds in Southall et al. (2007), and are brief, broadband, atonal transient sounds which can occur as isolated events or be repeated in some succession (Southall et al. 2007). Impulsive sounds are characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a decay period that may include a period of diminishing, oscillating maximal and minimal pressures (Southall et al. 2007). Impulsive sounds generally have a greater capacity to induce physical injury compared with sounds that lack these features (Southall et al. 2007).

Non-impulsive sounds ("non-pulsed" in Southall et al. 2007) can be tonal, broadband, or both. They lack the rapid rise time and can have longer durations than impulsive sounds. Non-impulsive sounds can be either intermittent or continuous sounds. Examples of non-impulsive sounds include vessels, aircraft, and machinery operations such as drilling, dredging, and vibratory pile driving (Southall et al. 2007).

In environments with non-porous boundaries (i.e. rock seafloor, rigid sides, etc.), reverberation may extend the duration of both impulsive and non-impulsive sounds.

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Appendix C

Extended Methods – Proxy Source Levels for Acoustic Modeling

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C.1 Acoustic Modeling

Acoustic modeling was conducted to estimate the zones of influence in which acoustic energy produced during pile driving has the potential to affect marine mammal physiology and behavior. This modeling was conducted using the current thresholds that NMFS uses to evaluate marine mammal harassment (Table C-1).

Table C-1. Current Thresholds for Physiological and Behavioral Impacts to Marine Mammals from Sounds Produced by Pile Driving

Species	Sound type	Level A (Injury) [dB re 1µPa rms]	Level B (Behavioral Harassment) [dB re 1µPa rms]
Cetaceans	Impulsive	180	160
	Non - impulsive	180	120

The ambient noise environment in the waters of SUBASE Kings Bay was measured during an ongoing project in early 2015 (Acentech 2015). Average background noise levels were around 135 dB rms, which is significantly higher than the NMFS' threshold for behavioral harassment from non-impulsive noise (120 dB rms). Our modeling estimates are therefore very conservative and are likely overestimates of ZOI size and marine mammal exposures during pile driving.

C.2 Proxy Source Levels

Noise levels produced by pile driving are greatly influenced by factors including pile type, driving method, and the physical environment in which the activity takes place. A number of studies have examined sound pressure levels recorded from underwater pile driving projects in California and Washington, and a few studies have recently been conducted on the U.S. East Coast at a number of naval installations. Proxy source levels were determined using existing data from piles driven in previous projects. Published data was gathered from reports published by the California Department of Transportation (CALTRANS), the Washington State Department of Transportation (WSDOT), and the U.S. Navy. A regional source level proxy document was compiled by NAVFAC Northwest for Puget Sound projects (U.S. Navy 2014); some of these analyses were also applied to the Kings Bay projects due to a lack of additional data.

While some pile types are well-represented in the existing data, other types have been measured only infrequently. There were therefore a few different methods for determining the proxy source levels for modeling for the Action. For all projects, data points that were not reported at 10 m distance from the incident pile were normalized using the practical spreading equation, and estimated source levels at 10 m were used in the calculations of proxy source levels. For this analysis, data from individual piles was used (when available). When individual pile data was not available for a project, the project average was used. This approach removes the necessity for weighting project averages by the number of piles, while still including the environmental context from each included project.

Data from the East Coast were prioritized due to the differences in bathymetry and sediment between west coast sites in Washington and California, and the location at Kings Bay. For pile types for which East Coast data were not available, data collected on the west coast were averaged to approximate source levels. During the averaging process, reported data points were converted from dB values into pressure measurements, averaged, and re-converted to decibels.

C.2.1 Impact Driving

Impact driving is the primary method intended for use during the Action, due to a shallow limestone layer underneath the surface sediments at SUBASE Kings Bay. The depth of this layer varies due to prior dredging of the facility basins during construction of the existing piers and wharves. Pile types that will be installed with impact driving include 18 and 24 in. concrete piles, as well as 14 in. steel H piles and 24 and 30 in. steel pipe piles.

Sound level metrics for impact driving include RMS, Peak, and SEL metrics. Definitions of these terms and formulae for calculating them can be found in CALTRANS (2009) guidance.

C.2.1.1 Concrete Piles

Concrete piles to be driven via impact during the Action include 18 in. and 24 in. diameter piles. There are no measured data on concrete piles smaller than 24 in. from the East Coast of the U.S. Therefore, for 18 in. concrete piles, proxy source levels were determined from the CALTRANS (2012) compendium. Data were available from the west coast for 18 in. concrete piles (N=1), and these data were used as a proxy for driving of 18 in. concrete piles during the action (CALTRANS 2012).

Driving of 24 in. concrete piles has been measured in Norfolk, VA, by the U.S Navy. These data were averaged to determine a proxy value for this pile type. Source data for impact driving of concrete piles is given in Table C-2.

Table C-2. Proxy Source Level Data for Impact Driving of Concrete Piles

Pile to be driven	Proxy Pile type	Source Level								
		RMS			Peak			SEL		
		dB	Pa	Average [dB re 1 µPa rms]	dB	Pa	Average[dB re 1 µPa Peak]	dB	Pa	Average[dB re 1 µPa SEL]
16” and 18” Concrete	16" and 18" Concrete*[1,2]	171	2.51189E+11	170	183	1.58E+12	184	na	na	159
		159	39810717055		172	2.93E+11		155	2.15E+10	
		169	1.84785E+11		189	3.98E+12		159	3.98E+10	
24” Concrete	24" Concrete[3]	169	1.84785E+11	174	183	1.58E+12	184	166	1.17E+11	165
		162	63095734448		176	5.41E+11		153	1.58E+10	
	24" Concrete[4,¥]	173	3.58296E+11		183	1.66E+12		163	7.72E+10	
		175	4.64159E+11		185	2.15E+12		165	1E+11	
		177	5.95286E+11		186	2.37E+12		167	1.28E+11	
		176	5.56991E+11		185	2.22E+12		166	1.2E+11	
		176	5.17539E+11		186	2.4E+12		166	1.12E+11	

*Values are weighted project averages as analyzed in US Navy 2014; original data from CALTRANS 2012; 1 – US Navy 2014; 2- CALTRANS 2012; 3 – US Navy 2013; 4- US Navy 2015

¥ – values measured at > 10m from incident pile were normalized to 10m before calculating averages.

C.2.1.2 Steel Piles

Three types of steel piles will be installed with an impact hammer during the Action. Impact driving of steel pipe piles (24 in. and 30 in.) has both been measured in a number of locations, though not on the U.S. East Coast. For steel H piles (14 in.), measurements of impact driving are available only from west coast projects, as given in CALTRANS 2012. Calculations and source data are presented in Table C-3.

Table C-3. Proxy Source Level Data for Impact Driving of Steel Piles

Pile to be driven	Proxy Pile Type	Source Level								
		RMS			Peak			SEL		
		dB	Pa	Average	dB	Pa	Average	dB	Pa	Average
14" Steel H	14" Steel H[1]	175	4.64159E+11	178	190	4.64E+12	196	na	na	168
		178	7.35642E+11		200	2.15E+13		163	7.36E+10	
		176	5.4117E+11		193	7.36E+12		165	1E+11	
		178	7.35642E+11		194	8.58E+12		163	7.36E+10	
		178	7.35642E+11		194	8.58E+12		177	6.31E+11	
		180	1E+12		195	1E+13		170	2.15E+11	
24" Steel Pipe*	24" Steel Pipe[2]	184	1.84785E+12	190	211	1.17E+14	206	183	1.58E+12	179
		170	2.15443E+11		211	1.17E+14		181	1.17E+12	
		180	1E+12		209	8.58E+13		181	1.17E+12	
		186	2.51189E+12		207	6.31E+13		178	7.36E+11	
		184	1.84785E+12		209	8.58E+13		181	1.17E+12	
		186	2.51189E+12		207	6.31E+13		175	4.64E+11	
		194	8.57696E+12		208	7.36E+13		178	7.36E+11	
		195	1E+13		205	4.64E+13		176	5.41E+11	
		193	7.35642E+12		208	7.36E+13		179	8.58E+11	
		196	1.16591E+13		204	3.98E+13		174	3.98E+11	
	24" Steel Pipe[3]	192	6.30957E+12		209	8.58E+13		185	2.15E+12	
		189	3.98107E+12		208	7.36E+13		181	1.17E+12	
		188	3.41455E+12		204	3.98E+13		180	1E+12	
		183	1.58489E+12		199	1.85E+13		180	1E+12	
		166	1.16591E+11		183	1.58E+12		176	5.41E+11	
		178	7.35642E+11		194	8.58E+12		171	2.51E+11	
		185	2.15443E+12		202	2.93E+13		178	7.36E+11	
		182	1.35936E+12		197	1.36E+13		174	3.98E+11	
		183	1.58489E+12		200	2.15E+13		174	3.98E+11	
	24" Steel Pipe[1]	194	8.57696E+12		207	6.31E+13		178	7.36E+11	
		189	3.98107E+12		203	3.41E+13		178	7.36E+11	
		188	3.41455E+12		205	4.64E+13		173	3.41E+11	

Pile to be driven	Proxy Pile Type	Source Level								
		RMS			Peak			SEL		
		dB	Pa	Average	dB	Pa	Average	dB	Pa	Average
30" Steel Pipe*	30" Steel Pipe[4]	192	6.00387E+12	193	212	1.29E+14	209	182	1.29E+12	188
		192	5.95286E+12		213	1.5E+14		182	1.28E+12	
		192	5.97161E+12		211	1.1E+14		184	1.75E+12	
	30" Steel Pipe[2]	195	1E+13		209	8.58E+13		186	2.51E+12	
	30" Steel Pipe[1]	190	4.64159E+12		210	1E+14		177	6.31E+11	
		190	4.64159E+12		205	4.64E+13		na	na	
	30" Steel Pipe[5]	192	6.30957E+12		204	3.98E+13		189	3.98E+12	
		193	7.35642E+12		204	3.98E+13		191	5.41E+12	
		196	1.17703E+13		207	6.37E+13		196	1.18E+13	

[1]CALTRANS (2012); [2]WSDOT(2005a); [3]WSDOT(2005b); [4]WSDOT(2010b); [5]WSDOT(2005c)

* Inconsistencies in source levels given between US Navy (2014) and this analysis are due to the use of data given in the executive summary table of WSDOT 2005a and 2005b, rather than the text of the report by US Navy 2014. This analysis uses data from the reports' text due to an ambiguous metric ("RMS (peak) dB") in the executive summary table.

C.2.2 Vibratory Driving

Vibratory driving is to be used at SUBASE Kings Bay during the Action as a method of extracting piles that are intended for demolition or replacement, and to install composite piles. Piles to be extracted with vibratory methods will only be vibrated out if an initial effort to remove them with a crane fails. Vibratory extraction may be used on 18 in. and 24 in. concrete piles, 14 in. steel H piles, and 24 in. and 30 in steel pipe piles.

C.2.2.1 Concrete Piles

During the Action, both 18 in. and 24 in. concrete piles may be extracted with a vibratory pile driver. There are no current data for vibratory driving of concrete piles, either for installation or extraction. Therefore, vibratory driving of steel pipe piles was used as an estimate of source levels. To avoid pseudoreplication, when multiple measured points were available for a single pile (due to multiple sensors in the water), the mid-water column sensor measurement was used. Source data were gathered from 24" steel pipe piles, as this is the smallest steel pipe pile for which vibratory driving data are available (Table C-4).

C.2.2.2 Steel Piles

Three types of steel piles will be installed or extracted with vibratory methods during the Action. Measured source level data was available for all three pile types (14 in. steel H piles, and 24 in. and 30 in. steel pipe piles). These data are presented in Table C-4.

Table C-4. Proxy Source Level Data for Vibratory Extraction of Steel Piles

Pile to be driven	Proxy Pile Type	Source Level RMS		
		dB	Pa	Average [dB re 1µPa rms]
14" Steel H Piles	14" Steel H Pile[1]	162	6.03E+10	163
		166	1.12E+11	
		158	3.51E+10	
		163	7.17E+10	
		163	6.96E+10	
24" Steel Pipe Piles and 18" and 24" Concrete Piles	24" Steel Pipe Pile[2]	157	2.93E+10	166
	24" Steel Pipe Pile[3]	157	2.93E+10	
	24" Steel Pipe Pile[4]	160	4.64E+10	
		160	4.64E+10	
	24" Steel Pipe Pile[5]	156	2.51E+10	
		157	2.72E+10	
		158	3.17E+10	
		155	2.15E+10	
		154	1.9E+10	
		168	1.63E+11	
		163	7.36E+10	
		160	4.64E+10	
		156	2.54E+10	
		171	2.4E+11	
		166	1.12E+11	
		167	1.3E+11	
		168	1.52E+11	
		174	4.27E+11	
		170	2.31E+11	
		175	4.78E+11	
		175	4.64E+11	
		159	3.98E+10	
		160	4.64E+10	
		164	8.58E+10	
		162	6.5E+10	
		168	1.58E+11	
		169	1.74E+11	
		171	2.51E+11	
		148	7.36E+09	
		149	8.58E+09	
		147	6.77E+09	

Pile to be driven	Proxy Pile Type	Source Level RMS		
		dB	Pa	Average [dB re 1µPa rms]
30" Steel Pipe Piles	30" Steel Pipe Pile[6]	164	8.58E+10	166
		173	3.25E+11	
		162	6E+10	
	30" Steel Pipe Pile[7]	170	2.03E+11	
		163	7.43E+10	
		161	5.11E+10	
		163	7.43E+10	
	30" Steel Pipe Pile[8]	165	1E+11	
		165	1E+11	

[1]U.S. Navy (2013b); [2]WSDOT (2010a); [3] U.S. Navy (2012); [4]CALTRANS (2012); [5]U.S. Navy (2013a); [6]WSDOT (2010c); [7]WSDOT (2010d); [8]WSDOT (2011c)

C.2.2.3 Composite and Timber Piles

For composite piles (used in projects 1B and 5), no measured data on vibratory installation or extraction are available. The source level estimates for this type of pile were based on data from timber piles driven on the east coast of the U.S. (Table C-5). These data were also used to estimate source levels for the extraction of 16" timber piles during projects 1A, 1B, and 5.

Table C-5. Proxy Source Level Data for Vibratory Installation of Composite Piles

Pile to be driven	Proxy Pile Type	Source Level RMS		
		dB	Pa	Average [dB re 1µPa rms]
16 – 18 in. Composite Piles and 16" Timber Piles	12 - 16" Timber Piles[1]	142	3.13E+09	161
		142	3.01E+09	
		141	2.69E+09	
		151	1.12E+10	
		164	8.09E+10	
		162	6.31E+10	
		164	8.83E+10	
		165	1.17E+11	
		164	9E+10	

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MARINE MAMMAL MONITORING PLAN FOR WATERFRONT PILE REPAIR, REPLACEMENT, AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

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Office of Protected Resources,
National Marine Fisheries Service,
National Oceanographic and Atmospheric Administration

Prepared by:

Naval Facilities Engineering Command Southeast

For:

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ACRONYMS AND ABBREVIATIONS

EA	Environmental Assessment
ft	foot / feet
LOA	Letter of Authorization
m	meter
MMPA	Marine Mammal Protection Act
NAVFAC	Naval Facilities Engineering Command
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
POC	point of contact
Project	Waterfront Pile Repair, Replacement, and Facilities Maintenance Project
SUBASE	Naval Submarine Base
ZOI	Zone of Influence

1.0 INTRODUCTION

1.1 Purpose of the Monitoring Plan

The purpose of this Monitoring Plan is to provide protocols for marine mammal monitoring in the vicinity of the proposed repair and maintenance activities at Naval Submarine Base (SUBASE) Kings Bay, Georgia (Figure 1). Details are based on the best available science and project information. Figure 2 illustrates the specific locations of each project covered by the pending Letter of Authorization. This plan was developed to support the application for a Letter of Authorization (LOA) being submitted pursuant to the requirements of the Marine Mammal Protection Act (MMPA). Bottlenose dolphins are the only marine mammal species for which potential Level B exposures were modeled; modeling for all other marine mammals resulted in no estimated Level A or Level B incidental takes.

Marine mammal construction observation will be conducted before, during, and after pile driving activities within the zones detailed in Section 3.6, and will represent an important protective measure to reduce the likelihood of potential impacts.

1.2 Scope

The scope of this Monitoring Plan includes pile driving activities associated with waterfront pile repairs, replacement, and facilities maintenance.

1.3 Management

The Monitoring Plan will be managed by Naval Facilities Engineering Command (NAVFAC) Southeast. Marine mammal monitoring and acoustic data collection shall be carried out by private contractors supported by technical staff from NAVFAC Southeast and SUBASE Kings Bay.

1.4 Concurrent Responsibilities

Marine mammal construction observers and compliance monitors shall also read and ensure adherence to the following conditions (Attachment 1):

- *NFMS Southeast Region Marine Mammal and Sea Turtle Viewing Guidelines*
- *Sea Turtle and Smalltooth Sawfish Construction Conditions*
- *Special Provisions for Manatees*

2.0 WHARF REPAIRS AND FACILITIES MAINTENANCE

Refer to the *Draft Environmental Assessment for Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, GA* and LOA application for a full description of the Project.

2.1 Proposed Action Area

SUBASE Kings Bay is located in the southeastern corner of Georgia, approximately 8 miles north of the Georgia-Florida border, four miles inland from the Atlantic Ocean, and two miles north of the St. Mary's River along the western shore of Cumberland Sound. The installation provides berthing and support services to naval submarines and other assets.

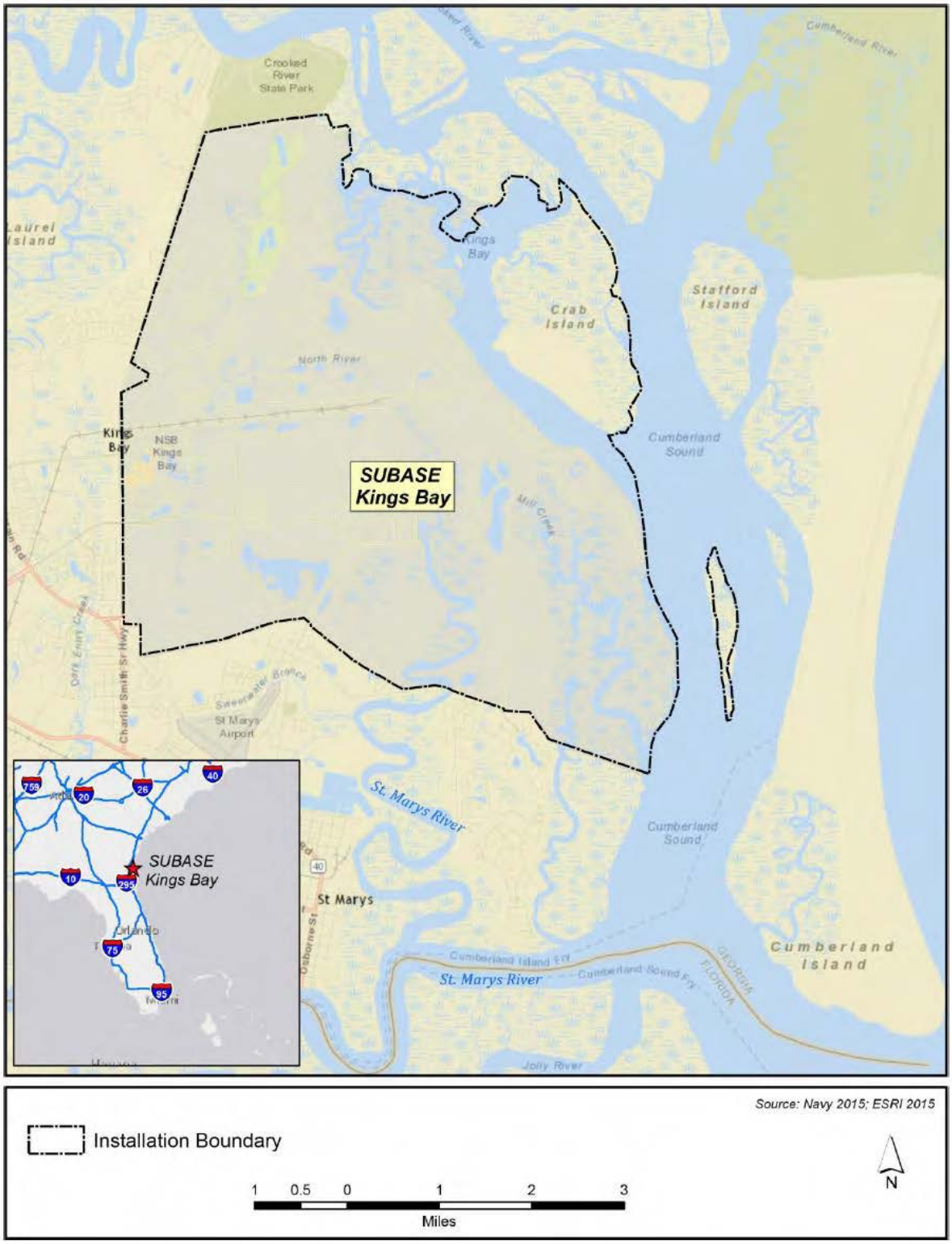

Figure 1. Regional Location – SUBASE Kings Bay, Georgia

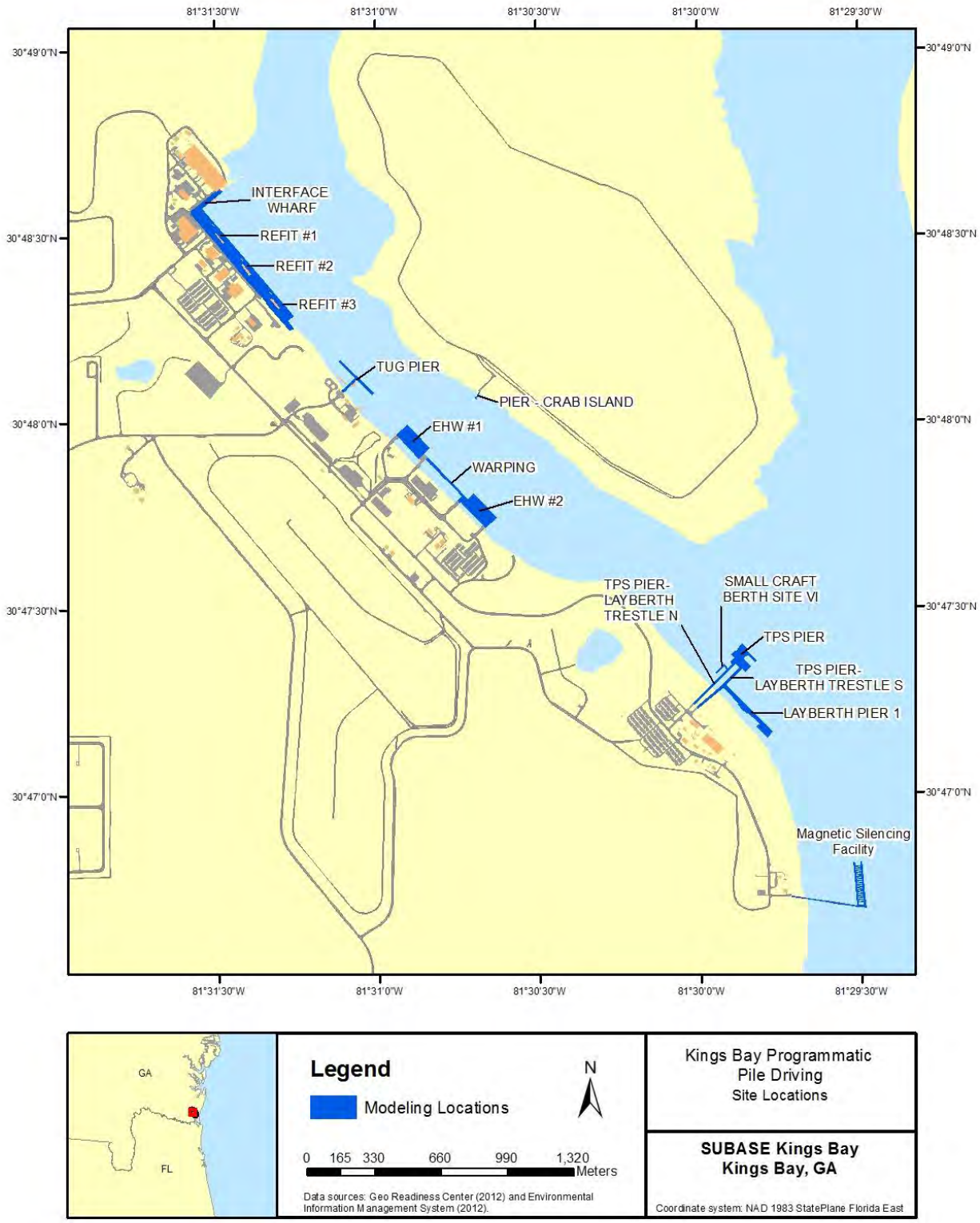

Figure 2. Repair, Maintenance, and Construction Locations

2.2 Construction Observer and Compliance Monitor Responsibilities

"Construction Observers" are posted specifically to view the shutdown zone during all in-water construction, and promptly communicate with construction operators using cell phones, radios, or other reliable means of communication if a temporary cease of activity is required. Construction observers shall have no other construction-related responsibilities, and at least one will be in place during all in-water construction.

Construction observers may be able to monitor view the entirety of some of the smaller Level B zones, allowing for supplemental application of their observations to the overall compliance monitoring effort. However, the information they collect would be considered supplemental since they have a slightly different purpose and qualification from compliance monitors.

"Compliance Monitors" are qualified individuals that will view the calculated zones of influence (ZOIs) on certain days and document potential incidental takes during active pile driving / extraction only, for the purposes of verifying compliance with the LOA.

Construction observers and compliance monitors shall record observations on sighting forms provided by the Navy (Attachment 2).

3.0 MARINE MAMMAL MONITORING

3.1 Procedures

Specific details of pile driving activities are highly variable among the projects covered by the LOA application, but all activities would occur in or adjacent to the relatively small and isolated Waterfront Restricted Area of SUBASE Kings Bay. Therefore, survey and monitoring data collected as early as 2016 and through 2022 will be applicable to ensuring the number of incidental takes authorized is not exceeded. Each project will be executed under a separate contract, and it is anticipated that a number of different companies will be involved. Therefore, projects were reviewed both individually and in the aggregate to develop a monitoring plan that would make the best use of the Navy's financial and human resources while simultaneously ensuring all compliance requirements are met.

Monitoring for each project is detailed in Section 3.6. Cumulative monitoring and dedicated bottlenose abundance surveys would inform a robust density estimate, which would in turn be extrapolated to estimate the number of "real world" incidental takes.

The following definitions and assumptions apply to this monitoring plan:

- Impact and vibratory pile installation / extraction may occur interchangeably during any given day of active driving, but would not take place simultaneously.
- "Active pile driving" may refer to installation or extraction of piles using vibratory or impact methods.
- If newer acoustic data (applicable to the pile types / conditions originally modeled) become available during the 5-year LOA period, the Navy may repeat the acoustic propagation model with the new data and adjust the compliance monitoring zone(s) accordingly. Any changes of this nature would incorporate best available science, and be

submitted to the National Marine Fisheries Service (NMFS) for review prior to implementation.

Barge operators, construction observers, and compliance monitors will complete applicable portions of the Navy's *Marine Species Awareness Training*, and a general environmental awareness briefing conducted by Navy marine resources specialists. Specific characteristics and sample photos of the marine mammal species that would most likely be observed in the project area, as well as techniques to estimate distance and document behavior, would be included in the briefing. This training is tailored to the audience and designed to improve the effectiveness of visual observations for protected species and provides information on sighting cues, visual observation tools and techniques, and sighting notification procedures.

Construction observers and compliance monitors designated by the contractor will be placed at a vantage point (e.g., from a small boat, construction barges, on shore, elevated perch [e.g. scissor lift], or any other suitable location) to observe all waters encompassed by the calculated ZOI.

3.2 Methods

It shall be the contractor's responsibility to ensure that appropriate safety measures are implemented to protect construction observers and compliance monitors. If a boat is used for shutdown or incidental take compliance monitoring, the boat will maintain minimum distances from all species (should they occur) as described in the *Viewing Guidelines*.

Construction observers and compliance monitors shall use binoculars and the naked eye to search continuously for marine mammals. If the calculated shutdown or monitoring zone is obscured by fog or poor lighting conditions, in-water construction shall not be initiated until the entire zone is visible.

The shutdown zone (reference Tables 1 through 12) shall be viewed for 15 minutes prior to in-water construction activities. If a marine mammal is observed in the shutdown zone, in-water activities shall be delayed until the animal(s) leaves the shutdown zone. Activity shall resume only after the construction observer has determined, through re-sighting or by waiting approximately 15 minutes that the animal(s) has moved outside the shutdown zone. The construction observer(s) shall notify the foreman/point of contact (POC) when construction activities can commence. Observation of the shutdown zone will continue for 30 minutes following the completion of pile driving.

3.3 Data Collection

The following information shall be recorded on sighting forms (Attachment 1) used by construction observers and compliance monitors:

- Date and time that pile driving or removal begins or ends
- Construction activities occurring during each observation period
- Weather parameters identified in the acoustic monitoring (e.g., wind, temperature, percent cloud cover, and visibility)
- Tide and sea state

If a marine mammal approaches or enters the shutdown zone, the following information will be recorded once shutdown procedures have been implemented:

- Any shutdown procedures implemented
- Species, numbers, and if possible sex and age class of the species (to estimate number of potential incidental takes)
- Behavior patterns observed, including bearing and direction of travel
- Location of the construction observer / compliance monitor, and distance from the animal(s) to the observer

During compliance monitoring, the above data shall be collected for any marine mammals observed in the designated zone.

A final MMPA compliance report shall be submitted to NMFS at the conclusion of a given pile-driving project. The information for this report comes solely from the sighting forms. Therefore, construction observers and compliance monitors must be diligent in completing the forms accurately and add any notes that may be helpful to the report's author.

Data collection forms shall be furnished to the NAVFAC Southeast POC within a mutually agreeable timeframe.

3.4 Equipment

Use of cameras is prohibited in the WRA. Construction observers and compliance monitors shall be equipped with the following:

- binoculars (7 x 50 power or greater) to ensure sufficient visual acuity while investigating sightings
- portable radios or cellular phone(s) to rapidly communicate with the appropriate construction personnel to initiate shutdown of pile driving activity if required
- data collection forms (Attachment 2)

3.5 Interagency Notification

If the contractors encounter a marine mammal that is injured, sick, or dead, the installation natural resources manager shall be notified immediately. The Navy will in turn notify the appropriate regulatory agencies.

The Navy will provide the regulatory agencies with the species or description of the animal(s), the condition of the animal (including carcass condition if the animal is dead), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

In preservation of biological materials from a dead animal, the construction observer / compliance monitor has the first responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed. Construction observers / compliance monitors shall not handle dead animals.

3.6 Project-specific Details

1A: Tug Pier

Note: A project-specific guidance document, including map illustrations of the shutdown and compliance monitoring zone(s) will be prepared and presented to the contractors at the time of the environmental awareness briefing (Section 3.1).

For the Tug Pier, one hundred and fifty-nine (159) 16-inch timber piles will be removed with a vibratory driver over 31 days. After removal, one hundred and forty-eight (148) 18-inch concrete piles and eighteen (18) 24-inch concrete piles will be installed over a total maximum of 34 days.

The Level A (injury) ZOIs for all three pile types falls within the standard shutdown zone of 50 feet (15 meters). Therefore, this zone will be in effect during all pile driving activities associated with the Tug Pier project. One hundred and twenty-four (124) potential Level B exposures were calculated for the Tug Pier project, but all were associated with the 31 days of vibratory timber extraction. Because extraction and installation may occur interchangeably on any given day, a subset of the days on which incidental takes could occur – ten (10) days of thirty-one (31) - will be monitored to ensure compliance with the LOA.

The contractor will deploy at least three (3) qualified compliance monitors to view the entirety of the 17,756 foot (5,412 meter) Level B ZOI for a minimum of ten (10) days as described in Sections 3.1-3.4. The results of the ten-day compliance monitoring effort will be extrapolated to the number of timber pile removal days to provide an estimate of the actual number of Level B exposures. Figure 4 illustrates the compliance monitoring zone and notional monitor locations; these locations are subject to change based on weather conditions and other variables.

Acoustic data will be collected during active pile driving associated with the Tug Pier project. Data will be incorporated into the Navy's source level database to enhance accuracy of propagation modeling. This effort will also provide improved proxy levels for projects on the southeast coast of the U.S. through implementation in typical bathymetric / hydrological conditions. Attachment 3 contains a sample scope of work for acoustic data collection; specific requirements for the Tug Pier project will be developed and provided to NMFS for review.

Table 1. Project 1A - Tug Pier (FY 2017)

Project	Pile Details			Action	Max. Days	Construction Observer Zone	Compliance Monitoring Zone
	Number	Size	Material				
Tug Pier[1]	159	16-inch	timber	vibratory removal	31	50 ft (15 m) daily	3 or more qualified monitors will view all waters within the 17,156 (5,412 m) zone on a minimum of 10 days over the course of the project
	148	18-inch	concrete	impact installation	30		
	18	24-inch	concrete		4		

[1]Acoustic data collection will be performed during this project

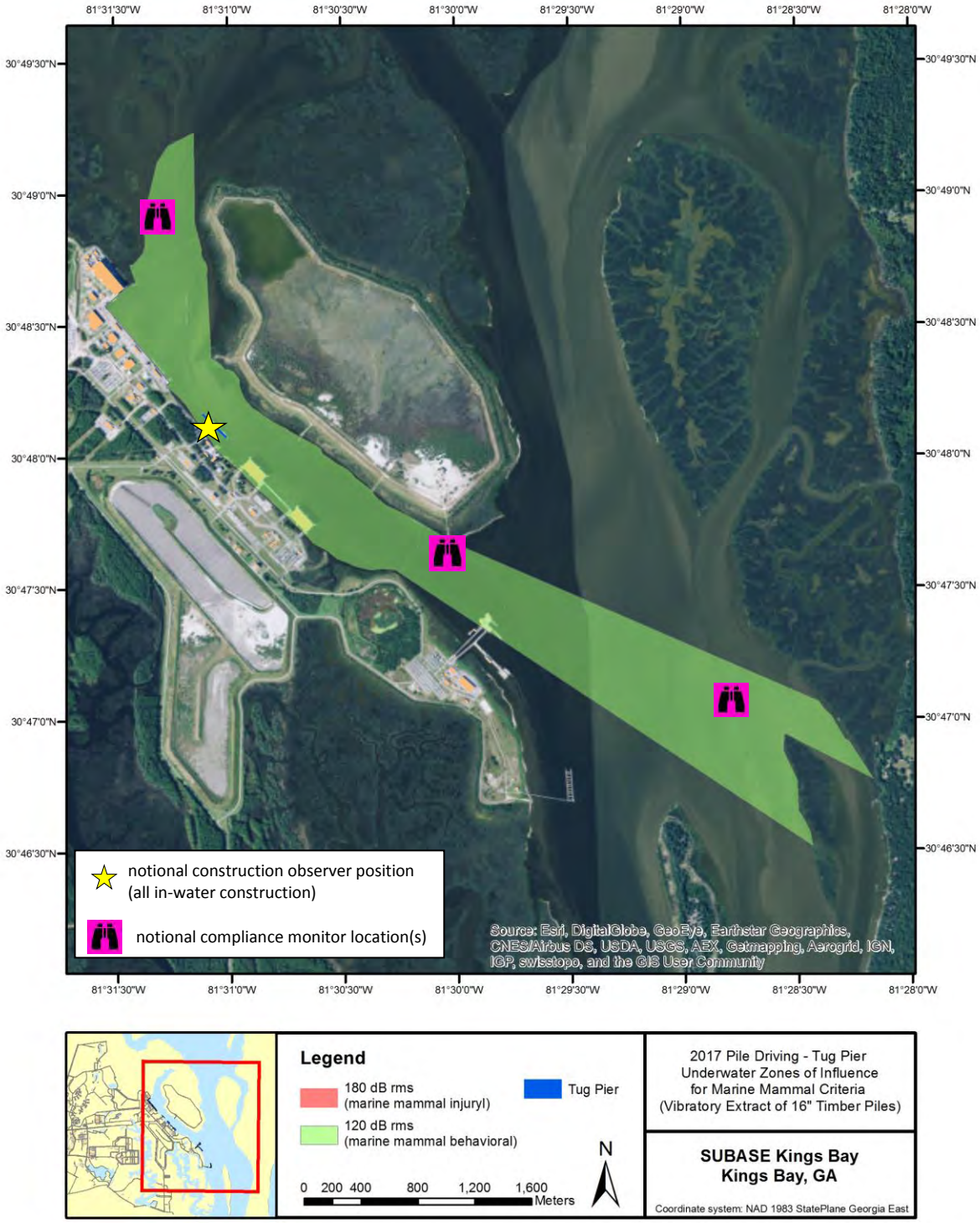

Figure 3. Project 1A – Tug Pier Compliance Monitoring Zone (FY 2017)

1B: General Access Pier

Note: A project-specific guidance document, including a map illustration of the shutdown zone will be prepared and presented to the contractors at the time of the environmental awareness briefing (Section 3.1).

For the General Access Pier, two (2) 16-inch timber piles will be removed and two (2) 16-inch composite piles will be installed; both using a vibratory hammer. The Level A (injury) ZOIs for both pile types fall within the standard shutdown zone of 50 feet (15 meters) (Table 2). Therefore, this zone will be in effect during all pile driving activities associated with the General Access Pier project.

Six (6) potential Level B exposures were calculated for the General Access Pier project. Pile removal and installation will only occur for a brief period of time over the course of a maximum of two (2) days. To maximize the efficient allocation of resources, no compliance monitoring will occur. Results of separate monitoring efforts and dedicated surveys for bottlenose dolphin occurrence will be extrapolated to estimate the actual number of incidental takes for LOA compliance purposes.

Table 2. Project 1B – General Access Pier (FY 2017)

Project	Pile Details			Action	Max. Days	Construction Observer Zone
	Number	Size	Material			
General Access Pier	2	16-inch	timber	vibratory removal	1	50 ft (15 m) daily
	2	16-inch	composite	vibratory installation	1	

2: Unspecified Minor Construction (UMC) Layberth Fender Pile Modification (P-661)

Note: A project-specific guidance document, including a map illustration of the shutdown zone will be prepared and presented to the contractors at the time of the environmental awareness briefing (Section 3.1).

For this project, fifty-five (55) 14-inch steel piles will be installed using an impact hammer over a maximum of seven (7) days. The Level A (injury) ZOI falls within the standard shutdown zone of 50 feet (15 meters). Therefore, this zone will be in effect during all pile driving activities associated with the P-661 project (Table 3). There were no Level B exposures estimated for this project, therefore monitoring of the Level B ZOI for the purposes of verifying incidental take is not required.

Acoustic data will be collected during active pile driving associated with the P-661 project. Data will be incorporated into the Navy's source level database to enhance accuracy of propagation modeling. This effort will also provide improved proxy levels for projects on the southeast coast of the U.S. Attachment 3 contains a sample scope of work for acoustic data collection; specific requirements for the UMC Layberth will be developed and provided to NMFS for review.

Table 3. Project 2 – UMC Layberth (P-661) (FY 2017)

Project	Pile Details			Action	Max. Days	Construction Observer Zone
	Number	Size	Material			
UMC Layberth Fender Pile Modification P-661 Project[1]	55	14-inch	steel	impact installation	7	50 ft (15 m) daily

[1]Acoustic data collection will be performed during this project

3A: Explosive Handling Wharf (EHW) #2 & Capstans

Note: A project-specific guidance document, including a map illustration of the shutdown and compliance monitoring zones will be prepared and presented to the contractors at the time of the environmental awareness briefing (Section 3.1).

For the EHW-2 project, in-water pile driving is planned to occur in two phases. During the first phase (FY 2017), two (2) 24-inch steel piles will be removed using a vibratory hammer and replaced by two (2) piles of the same size and material using an impact hammer over a maximum of two (2) days. While the Level A (injury) ZOI falls within the standard shutdown zone of 50 feet (15 meters) for vibratory removal, the calculated ZOI extends out to 150 feet (50 meters) for impact installation (Table 4).

During the second phase (FY 2022), three (3) 24-inch concrete piles will be removed using a vibratory hammer and replaced in-kind using an impact hammer over a maximum of two (2) days; and ten (10) 24-inch steel piles will be removed and replaced using the same methodology over seven (7) days. While the Level A (injury) ZOI falls within the standard shutdown zone of 50 feet (15 meters) for vibratory removal and impact installation of concrete piles, it was estimated to extend out to 150 feet (50 meters) for impact installation of the steel piles. As stated for the first phase (FY 2017) above, the shutdown zone will be extended from the standard area to 150 feet (50 meters) during impact driving of steel piles (Table 4)

During the first phase (FY 2017) of the EHW-2 project, a total of five (5) potential Level B exposures were calculated for the (maximum) two days of removal and installation. To maximize the efficient allocation of resources, no compliance monitoring will occur. Results of separate monitoring efforts and dedicated surveys for bottlenose dolphin occurrence will be extrapolated to estimate the actual number of incidental takes for LOA compliance purposes.

During the second (FY 2022) phase of the project, a total of sixteen (16) potential Level B exposures were calculated for vibratory removal of the piles (concrete and steel), and four (4) for impact installation. The Level B range for vibratory removal of concrete and steel piles was calculated to 38,351 feet (11,659 meters).

Because extraction and installation may occur interchangeably on any given day, a subset of the days on which incidental takes could occur – three (3) days of nine (9) - will be monitored to

ensure compliance with the LOA. The contractor will deploy at least three (3) qualified compliance monitors to view the entirety of the 38,351 foot (11,659 meters) Level B ZOI for a minimum of three (3) days as described in Sections 3.1-3.4. The results of the three-day compliance monitoring effort will be extrapolated to the total number of pile driving days to provide an estimate of the actual number of Level B exposures. Figure 5 illustrates the modeled ZOI and notional compliance monitor locations; these locations are subject to change based on weather conditions and other variables.

Table 4. Project 3A – EHW-2 (FY 2017 / 2022)

Project	Pile Details			Action	Max. Days	Construction Observer Zone	Compliance Monitoring Zone
	Number	Size	Material				
Explosive Handling Wharf #2 Pier w/Capstans	2	24-inch	steel	vibratory removal	2 (2017)	50 ft (15 m) daily	3 or more qualified monitors will view all waters within the 38,351 (11,659 m) zone on a minimum of 3 days during the second phase (FY 2022) of the project
	2	24-inch	steel	impact installation		150 ft (50 m) daily	
	3	24-inch	concrete	vibratory removal	2 (2022)	50 ft (15 m) daily	
	3	24-inch	concrete	impact installation			
	10	24-inch	steel	vibratory removal	7 (2022)	50 ft (15 m) daily	
	10	24-inch	steel	impact installation		150 ft (50 m) daily	

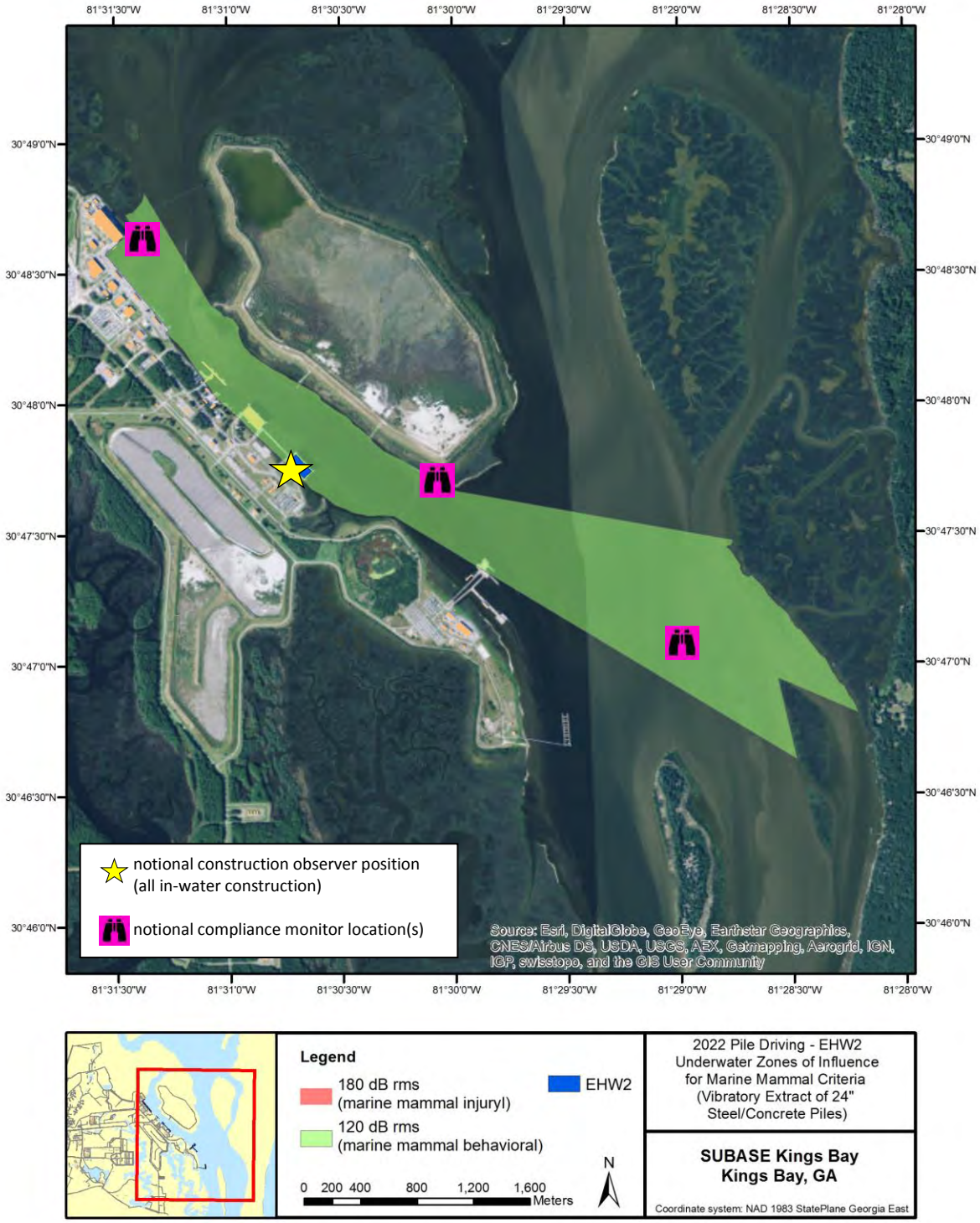

Figure 4. Project 3A – EHW-2 Compliance Monitoring Zone (FY 2022)

3B: (Dry Dock) Interface Wharf

Note: A project-specific guidance document, including a map illustrating the shutdown and compliance monitoring zones will be prepared and presented to the contractors at the time of the environmental awareness briefing (Section 3.1).

For the Interface Wharf, ninety-nine (99) 14-inch steel H piles will be removed with a vibratory driver; and replaced with the same number of 14-inch steel H piles with an impact hammer over fifteen (15) days. The Level A (injury) ZOIs for both removal and installation fall within the standard shutdown zone of 50 feet (15 meters) (Table 5). Therefore, this zone will be in effect during all pile driving activities associated with the Interface Wharf project.

A total of twenty-one (21) potential Level B exposures were calculated for vibratory removal only. Because extraction and installation may occur interchangeably on any given day, a subset of the days on which incidental takes could occur – five (5) days of fifteen (15) - will be monitored to ensure compliance with the LOA. The contractor will deploy at least three (3) qualified compliance monitors to view the entirety of the 24,132 foot (7,356 meter) Level B ZOI for a minimum of five (5) days as described in Sections 3.1-3.4 (Table 5). The results of the five-day compliance monitoring effort will be extrapolated to the total number of pile driving days to provide an estimate of the actual number of Level B exposures. Figure 6 illustrates the modeled ZOI and notional compliance monitor locations; these locations are subject to change based on weather conditions and other variables.

Table 5. Project 3B – (Dry Dock) Interface Wharf (FY 2021)

Project	Pile Details			Action	Max. Days	Construction Observer Zone	Compliance Monitoring Zone
	Number	Size	Material				
(Dry Dock) Interface Wharf	99	14-inch	steel	vibratory removal	15	50 ft (15 m) daily	3 or more qualified monitors will view all waters within the 24,132 ft (7,356 m) zone on a minimum of 5 days
	99	14-inch	steel	impact installation			

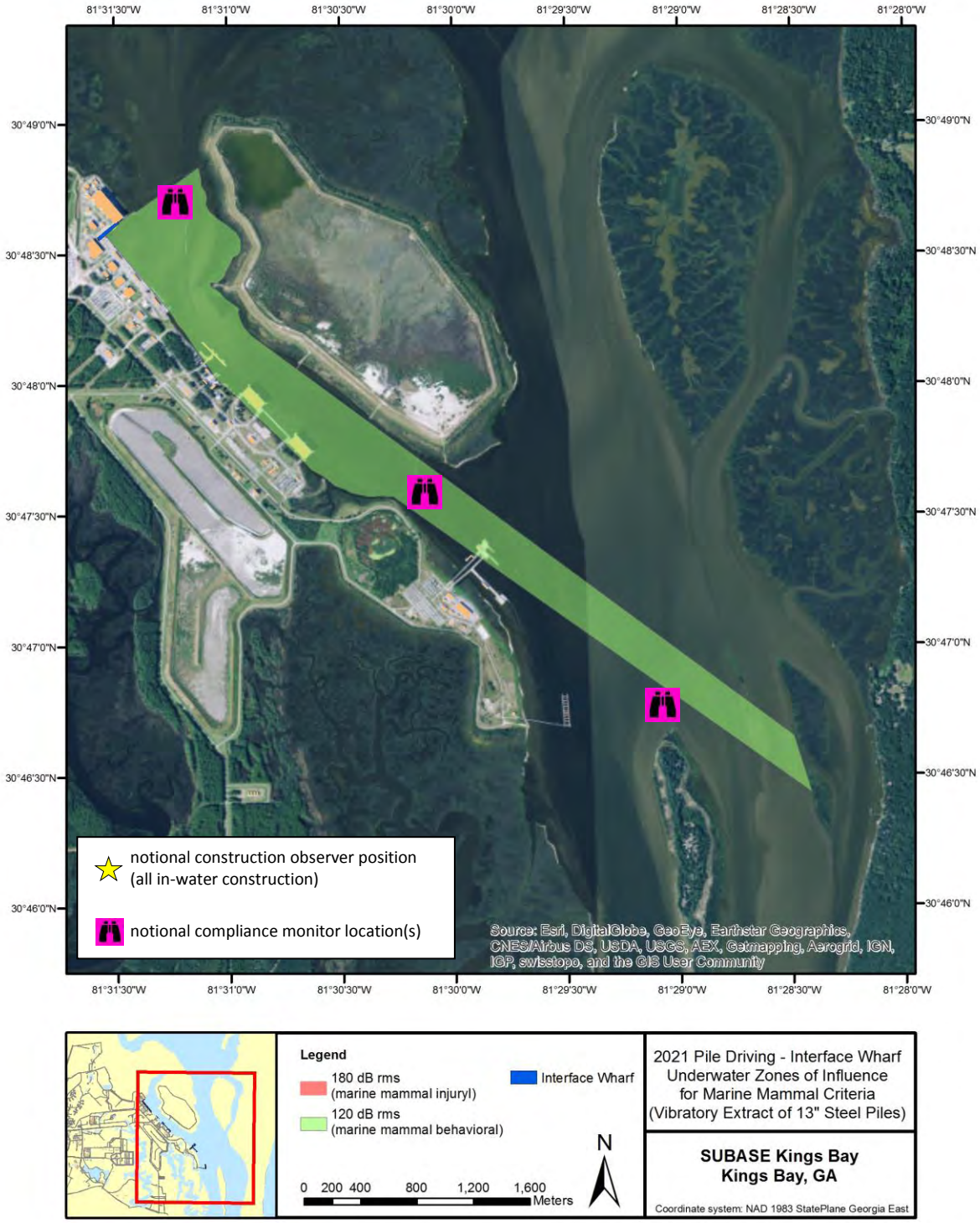

Figure 5. Project 3B – (Dry Dock) Interface Wharf Compliance Monitoring Zone (FY 2021)

3C, 3D, and 3E: Refit Wharves #1, #2, and #3

Note: A project-specific guidance document, including a map illustrating the shutdown and compliance monitoring zones will be prepared and presented to the contractors at the time of the environmental awareness briefing (Section 3.1).

For each of the Refit Wharf #1, #2, and #3 projects, six (6) 30-inch steel piles will be removed with a vibratory driver, and replaced with six (6) 24-inch steel piles using an impact hammer, over the course of six (6) days. This represents a total of eighteen (18) 30-inch steel piles being removed and eighteen (18) 24-inch steel piles being installed over the course of eighteen (18) total days between FY 2017 – 2018. While the Level A (injury) ZOI falls within the standard shutdown zone of 50 feet (15 meters) for vibratory removal, the calculated ZOI extends out to 150 feet (50 meters) for impact installation (Table 6).

A total of nineteen (19) potential Level B incidental takes were calculated for all three Refit Wharf projects. Extraction and installation may occur interchangeably on any given day, and would involve only a small number of piles. Therefore, incidental take compliance monitoring would occur during all active pile extraction / installation, but within the smaller impact Level B ZOIs only. The number of marine mammals observed would be extrapolated to the larger vibratory Level B ZOIs (Figures 7, 8, and 9) to estimate the number of actual Level B exposures for all pile driving.

The contractor will deploy at least two (2) qualified compliance monitors to view the entirety of the 3,280 foot (1,000 meter) Level B ZOI on all pile driving days (max. 6 days for each wharf) as described in Sections 3.1-3.4 (Table 6). The results of the compliance monitoring effort will be extrapolated to the total number of pile driving days to provide an estimate of the actual number of Level B exposures. Figures 7, 8, and 9 illustrate the ZOIs and notional compliance monitor locations; these locations are subject to change based on weather conditions and other variables.

Table 6. Projects 3C (FY 2018), 3D (FY 2017), and 3E (FY 2018) Refit Wharves #1, #2, and #3

Project	Pile Details			Action	Max. Days	Construction Observer Zone	Compliance Monitoring Zone
	Number	Size	Material				
Refit Wharf #1	6	30-inch	steel	vibratory removal	6	50 ft (15 m) daily	2 or more qualified monitors will view all waters within the 3,280 ft (1,000 m) ZOI on all pile driving days (max. 6 days at each wharf)
	6	24-inch	steel	impact installation		150 ft (50 m) daily	
Refit Wharf #2	6	30-inch	steel	vibratory removal	6	50 ft (15 m) daily	
	6	24-inch	steel	impact installation		150 ft (50 m) daily	
Refit Wharf #3	6	30-inch	steel	vibratory removal	6	50 ft (15 m) daily	
	6	24-inch	steel	impact installation		150 ft (50 m) daily	

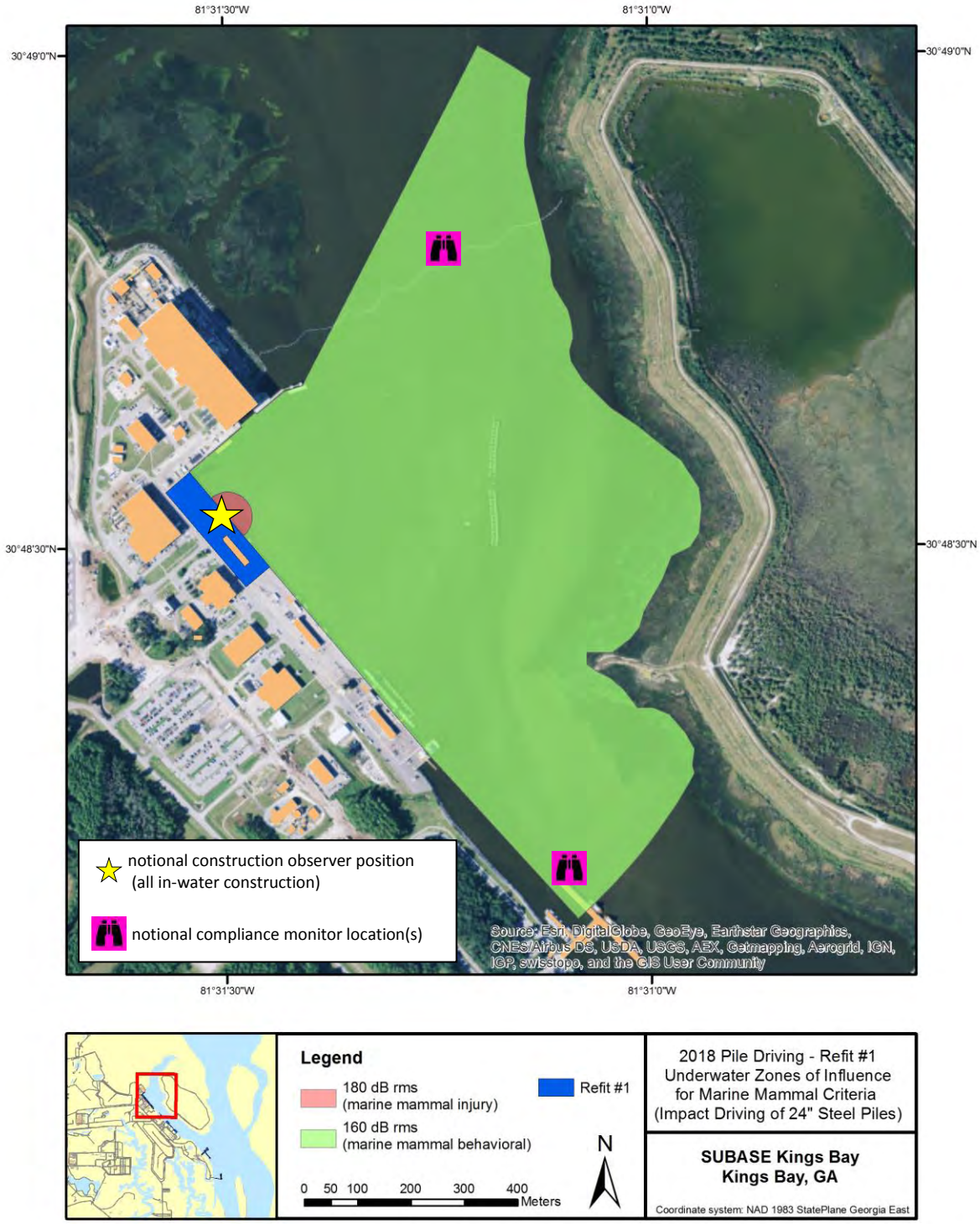

Figure 6. Project 3C – Refit Wharf #1 Compliance Monitoring Zone (FY 2018)

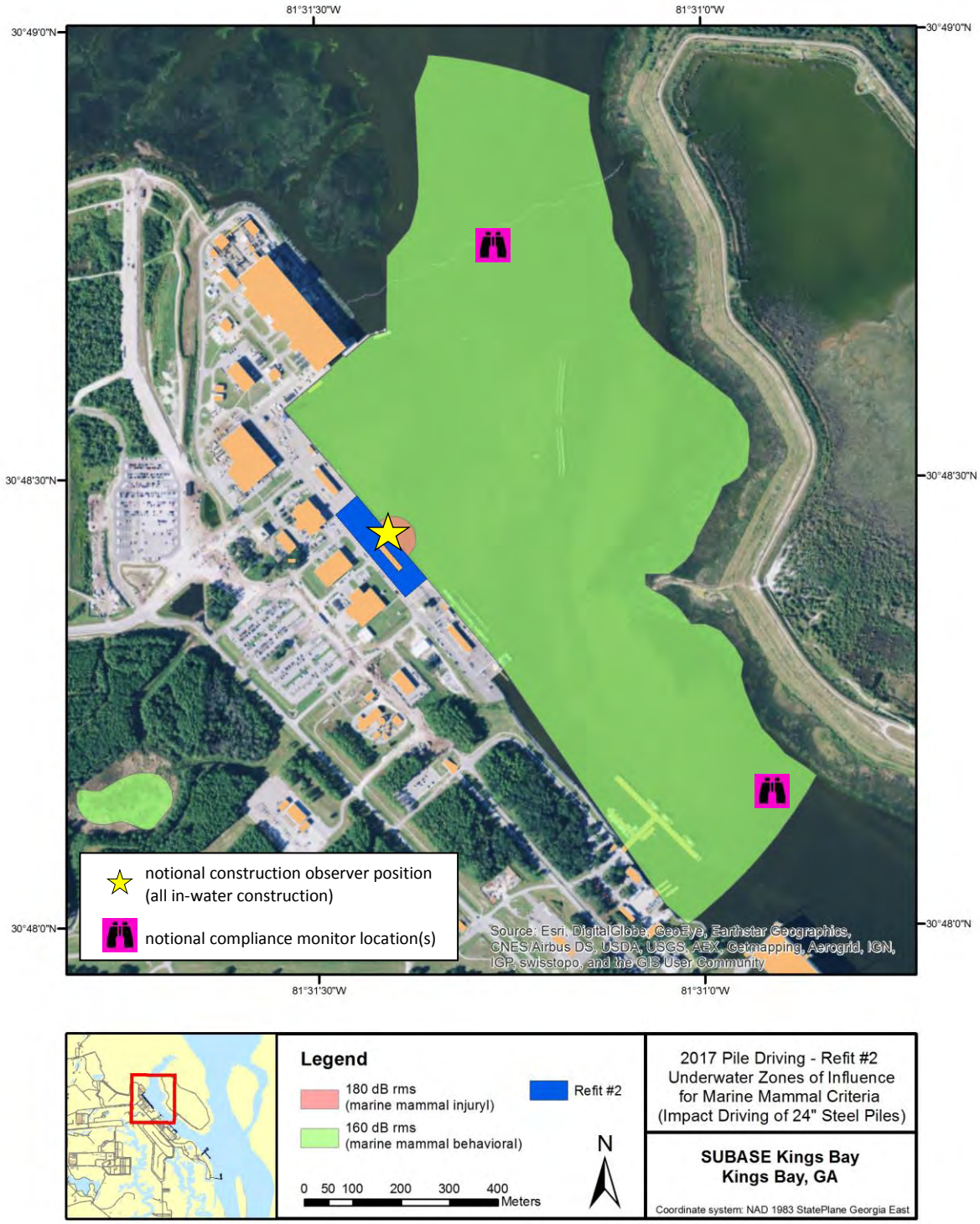

Figure 7. Project 3D – Refit Wharf #2 Compliance Monitoring Zone (FY 2017)

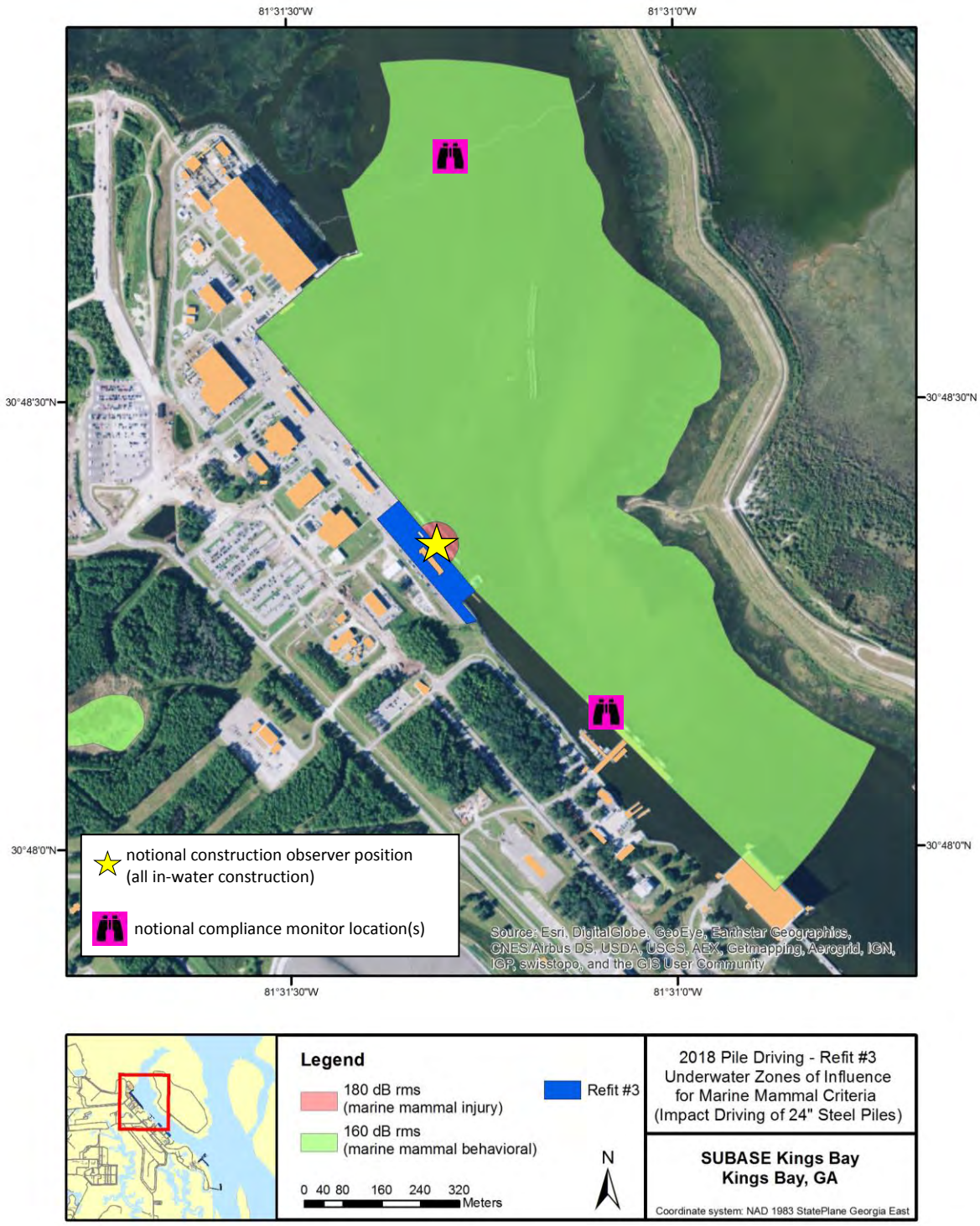

Figure 8. Project 3E – Refit Wharf #3 Compliance Monitoring Zone (FY 2018)

3F: Warping Wharf with Capstan

Note: A project-specific guidance document, including a map illustrating the shutdown and compliance monitoring zones will be prepared and presented to the contractors at the time of the environmental awareness briefing (Section 3.1).

For this project, eight (8) 30-inch steel piles will be removed using a vibratory driver, and replaced with eight (8) piles of the same size using an impact hammer over a total of four (4) days. While the Level A (injury) ZOI falls within the standard shutdown zone of 50 feet (15 meters) for vibratory removal, the calculated ZOI extends out to 250 feet (75 meters) for impact installation (Table 7).

A total of eight (8) potential incidental takes were calculated for vibratory removal, and four (4) for impact installation. Because extraction and installation may occur interchangeably on any given day, a subset of the days on which incidental takes could occur – two (2) days of four (4) - will be monitored to ensure compliance with the LOA. The contractor will deploy at least three (3) qualified compliance monitors to view the entirety of the 38,251 foot (11,659 meter) Level B ZOI for a minimum of two (2) days as described in Sections 3.1-3.4 (Table 7). The results of the two-day compliance monitoring effort will be extrapolated to the total number of pile driving days to provide an estimate of the actual number of Level B exposures. Figure 10 illustrates the modeled ZOI and notional compliance monitor locations; these locations are subject to change based on weather conditions and other variables.

Table 7. Project 3F – Warping Wharf with Capstan (FY 2021)

Project	Pile Details			Action	Max. Days	Construction Observer Zone	Compliance Monitoring Zone
	Number	Size	Material				
Warping Wharf with Capstan	8	30-inch	steel	vibratory removal	4	50 ft (15 m) daily	3 or more qualified monitors will view all waters within the 38,251 ft (11,659 m) zone on a minimum of 2 days
	8	30-inch	steel	impact installation		250 ft (75 m) daily	

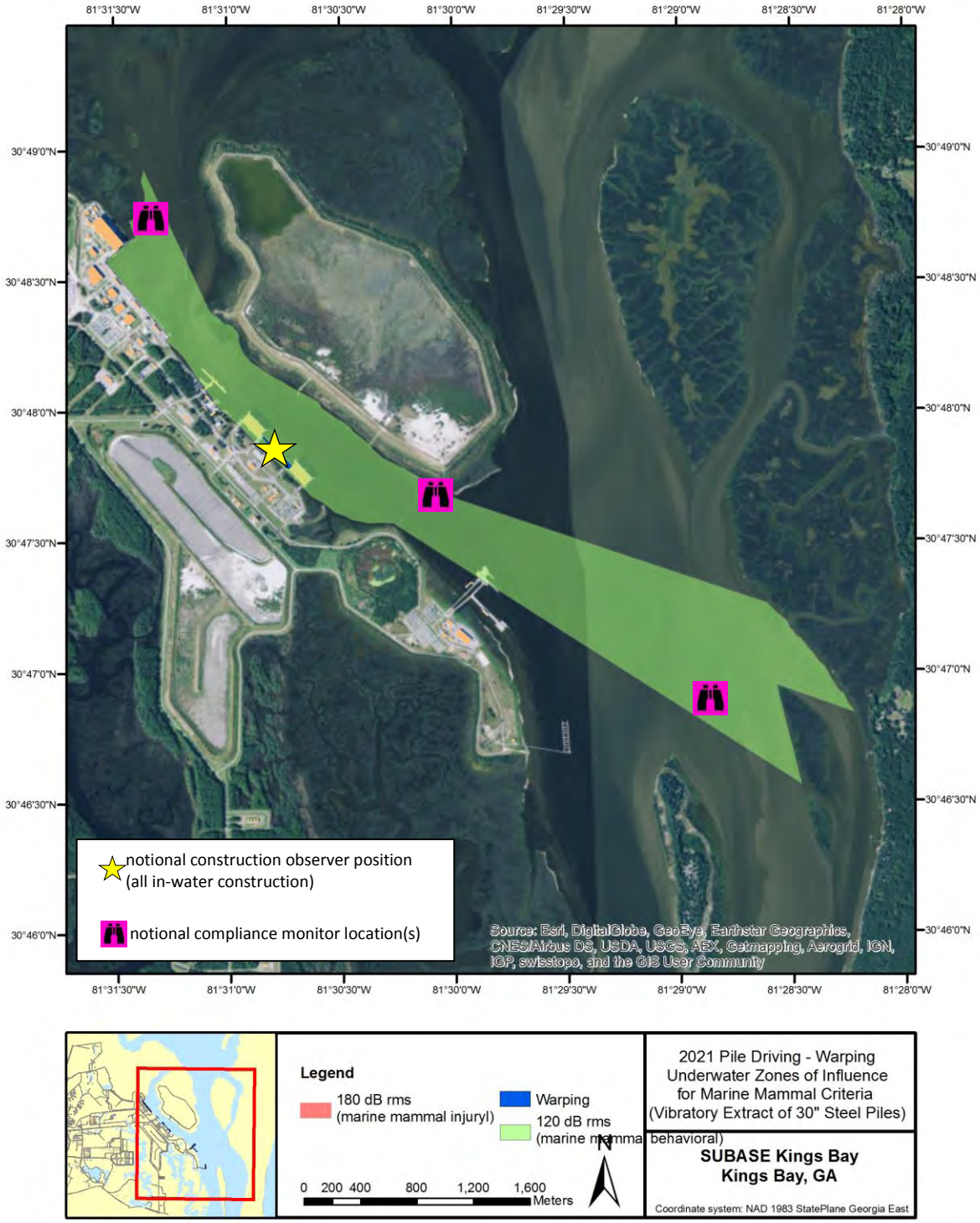

Figure 9. Project 3F – Warping Wharf with Capstans Compliance Monitoring Zone (FY 2021)

3G: Tug Pier

Note: A project-specific guidance document, including a map illustrating the shutdown and compliance monitoring zones will be prepared and presented to the contractors at the time of the environmental awareness briefing (Section 3.1).

For the FY 2022 Tug Pier project, seventy-seven (77) 14-inch steel piles will be removed with a vibratory driver and replaced with the same number / size of piles using an impact hammer over a total of sixteen (16) days. The Level A (injury) ZOI for removal and installation falls within the standard shutdown zone of 50 feet (15 meters) (Table 8). A total of thirty-two (32) potential incidental Level B exposures were calculated for this project, but all were associated with vibratory removal.

Because extraction and installation may occur interchangeably on any given day, a subset of the days on which incidental takes could occur – four (4) days of sixteen (16) - will be monitored to ensure compliance with the LOA. The contractor will deploy at least three (3) qualified compliance monitors to view the entirety of the 24,134 foot (7,356 meter) Level B ZOI for a minimum of four (4) days as described in Sections 3.1-3.4. The results of the four-day compliance monitoring effort will be extrapolated to the total number of pile removal days to provide an estimate of the actual number of Level B exposures. Figure 11 illustrates the compliance monitoring zone and notional monitor locations; these locations are subject to change based on weather conditions and other variables.

Table 8. Project 3G – Tug Pier (FY 2022)

Project	Pile Details			Action	Max. Days	Construction Observer Zone	Compliance Monitoring Zone
	Number	Size	Material				
Tug Pier	77	14-inch	steel	vibratory removal	16	50 ft (15 m) daily	3 or more qualified monitors will view all waters within the 24,1341 ft (7,356 m) zone on a minimum of 4 days
	77	14-inch	steel	impact installation			

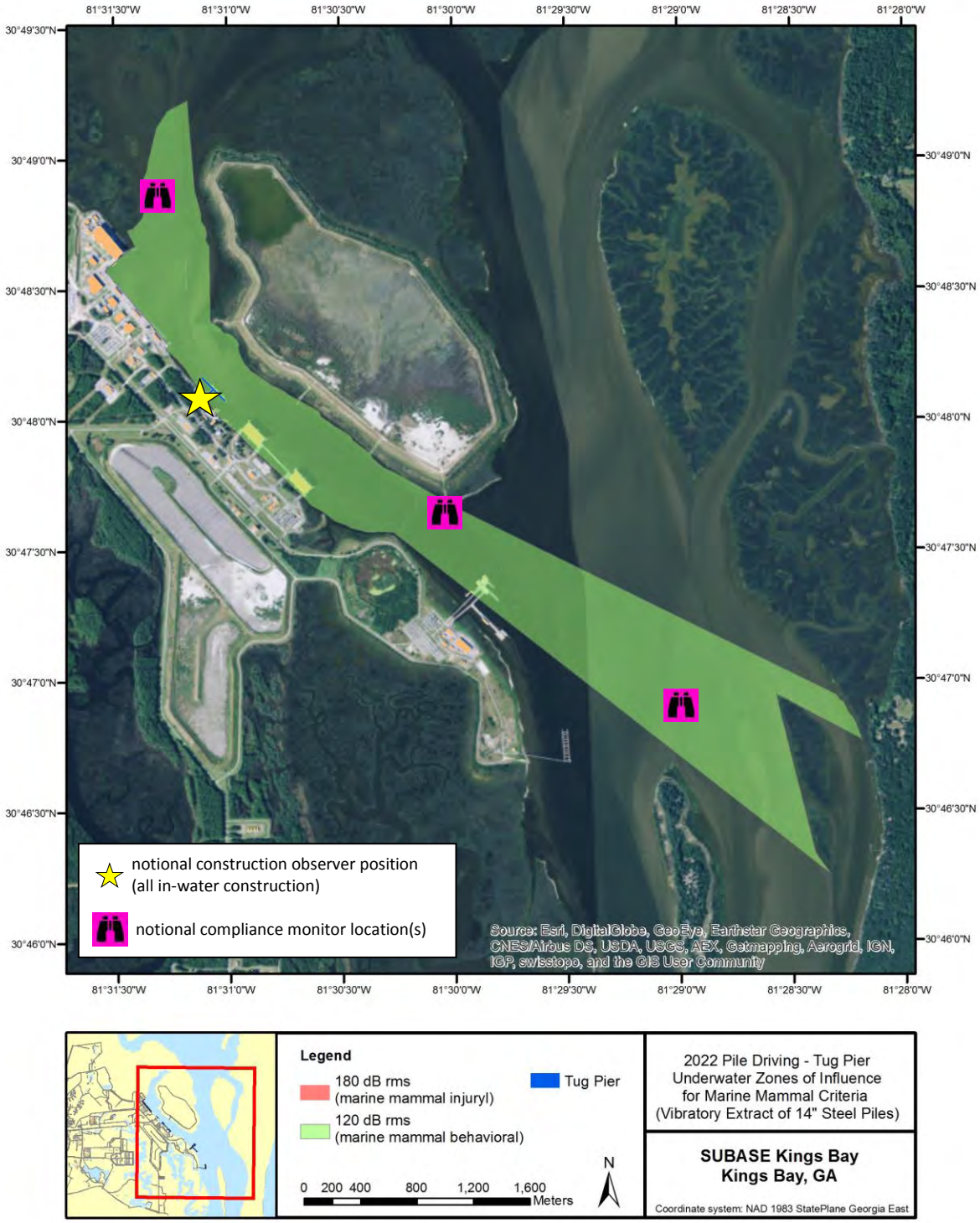

Figure 10. Project 3G – Tug Pier Compliance Monitoring Zone (FY 2022)

4A: Transit Protection System (TPS) Pier

Note: A project-specific guidance document, including a map illustrating the shutdown and compliance monitoring zones will be prepared and presented to the contractors at the time of the environmental awareness briefing (Section 3.1).

For the TPS Pier project, one hundred and twenty-one (121) 24-inch concrete piles will be removed with a vibratory driver over eight (8) days. This will be followed by impact installation of one hundred and sixty-five (165) 24-inch concrete piles and fifty (50) 18-inch concrete piles over a total of seventy-two (72) days. During both removal and installation, the Level A (injury) ZOI falls within the standard shutdown zone of 50 feet (15 meters) (Table 9).

A total of sixty-four (64) potential Level B exposures were calculated for this project. However, all were associated with vibratory removal, which is expected to require no more than eight days in total. Because extraction and installation may occur interchangeably on any given day, eight (8) days will be monitored to ensure compliance with the LOA. The contractor will deploy at least four (4) qualified compliance monitors to view the entirety of the 38,351 foot (11,659 meter) Level B ZOI for a minimum of eight (8) days as described in Sections 3.1-3.4. Figure 12 illustrates the compliance monitoring zone and notional monitor locations; these locations are subject to change based on weather conditions and other variables.

Acoustic data will be collected during active pile driving associated with the New Facility project. Data will be incorporated into the Navy's source level database to enhance accuracy of propagation modeling. This effort will also provide improved proxy levels for projects on the southeast coast of the U.S. through implementation in typical bathymetric / hydrological conditions. Attachment 3 contains a sample scope of work for acoustic data collection; specific requirements for the TPS Pier project will be developed and provided to NMFS for review.

Table 9. Project 4A – New Facility – TPS (FY 2020)

Project	Pile Details			Action	Max. Days	Construction Observer Zone	Compliance Monitoring Zone
	Number	Size	Material				
New Pier – TPS Headquarters / Operational Support Facility[1]	165	24-inch	concrete	impact installation	55	50 ft (15 m) daily	4 or more qualified monitors will view all waters within the 38,351 ft (11,659 m) zone on a minimum of 8 days
	50	18-inch	concrete	impact installation	17		
	24	24-inch	concrete	vibratory removal	8		

[1]Acoustic data collection will be performed during this project

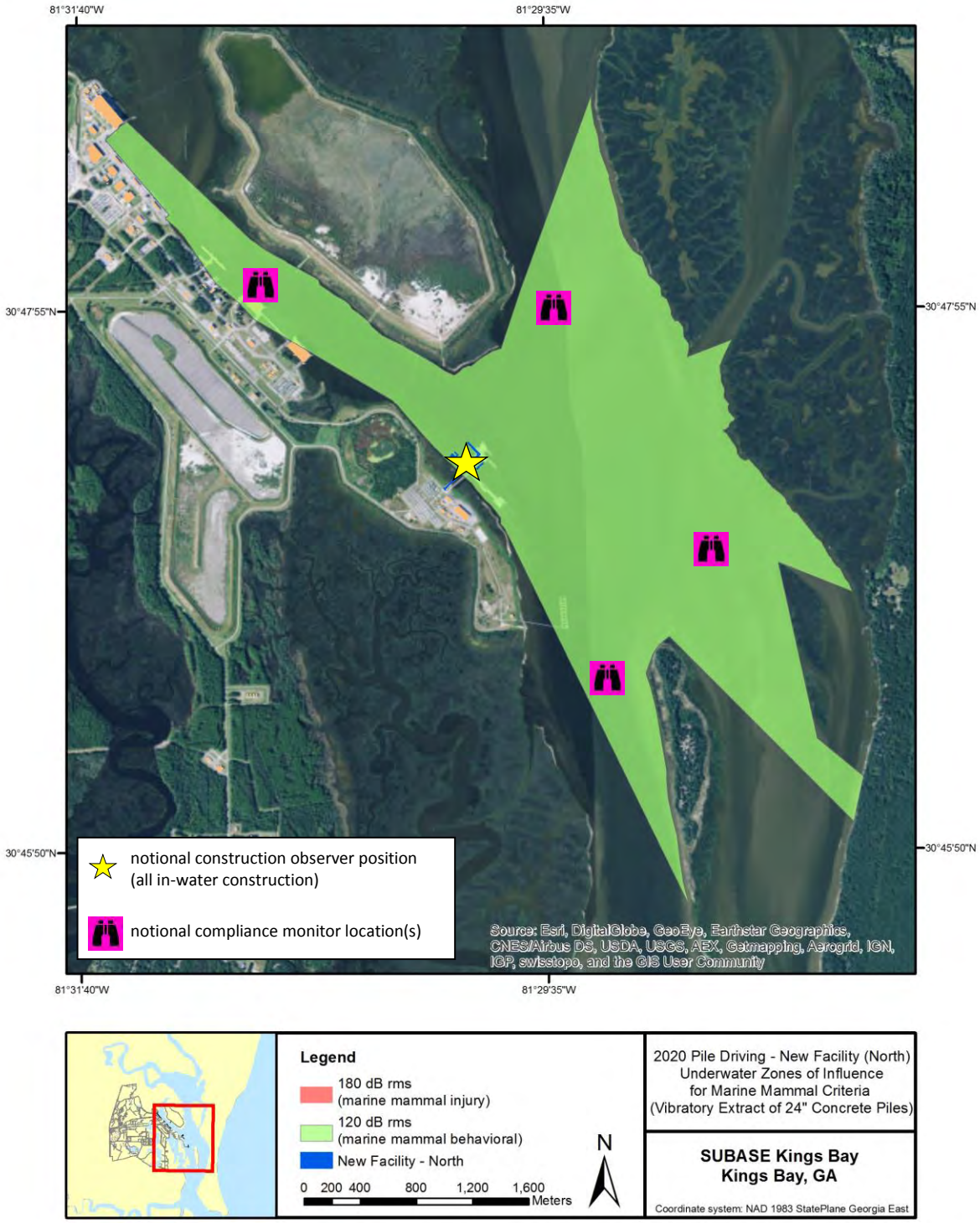

Figure 11. Project 4A – New Facility (TPS) Compliance Monitoring Zone (FY 2020)

4B: Small Craft Berth Site VI

Note: A project-specific guidance document, including a map illustrating the shutdown and compliance monitoring zones will be prepared and presented to the contractors at the time of the environmental awareness briefing (Section 3.1).

For this project, thirty (30) 24-inch steel piles will be removed with a vibratory driver followed by impact installation of the same number / size of steel piles over the course of eight (8) days. While the Level A (injury) ZOI falls within the standard shutdown zone of 50 feet (15 meters) for vibratory removal, the calculated ZOI extends out to 150 feet (50 meters) for impact installation (Table 10).

A total of forty (40) potential Level B exposures were calculated for this project, of which thirty-two (32) were associated with vibratory removal and eight (8) with impact installation. Because extraction and installation may occur interchangeably on any given day, a subset of the days on which incidental takes could occur – three (3) days of eight (8) - will be monitored to ensure compliance with the LOA. The contractor will be directed to deploy at least four (4) qualified monitors to observe all waters encompassed by the 38,251 foot (11,659 meter) Level B ZOI for a minimum of three (3) days as specified in Sections 3.1-3.4.

The results of the three-day compliance monitoring effort will be extrapolated to the total number of pile driving days to provide an estimate of the actual number of Level B exposures. Figure 13 illustrates the compliance monitoring zone and notional monitor locations; these locations are subject to change based on weather conditions and other variables.

Table 10. Project 4B – Small Craft Berth Site VI (FY 2020)

Project	Pile Details			Action	Max. Days	Construction Observer Zone	Compliance Monitoring Zone
	Number	Size	Material				
Small Craft Berth Site VI	30	24-inch	steel	impact installation	8	150 ft (50 m) daily	4 or more qualified monitors will view all waters within the 38,351 ft (11,659 m) zone on a minimum of 3 days
	30	24-inch	steel	vibratory removal		50 ft (15 m) daily	

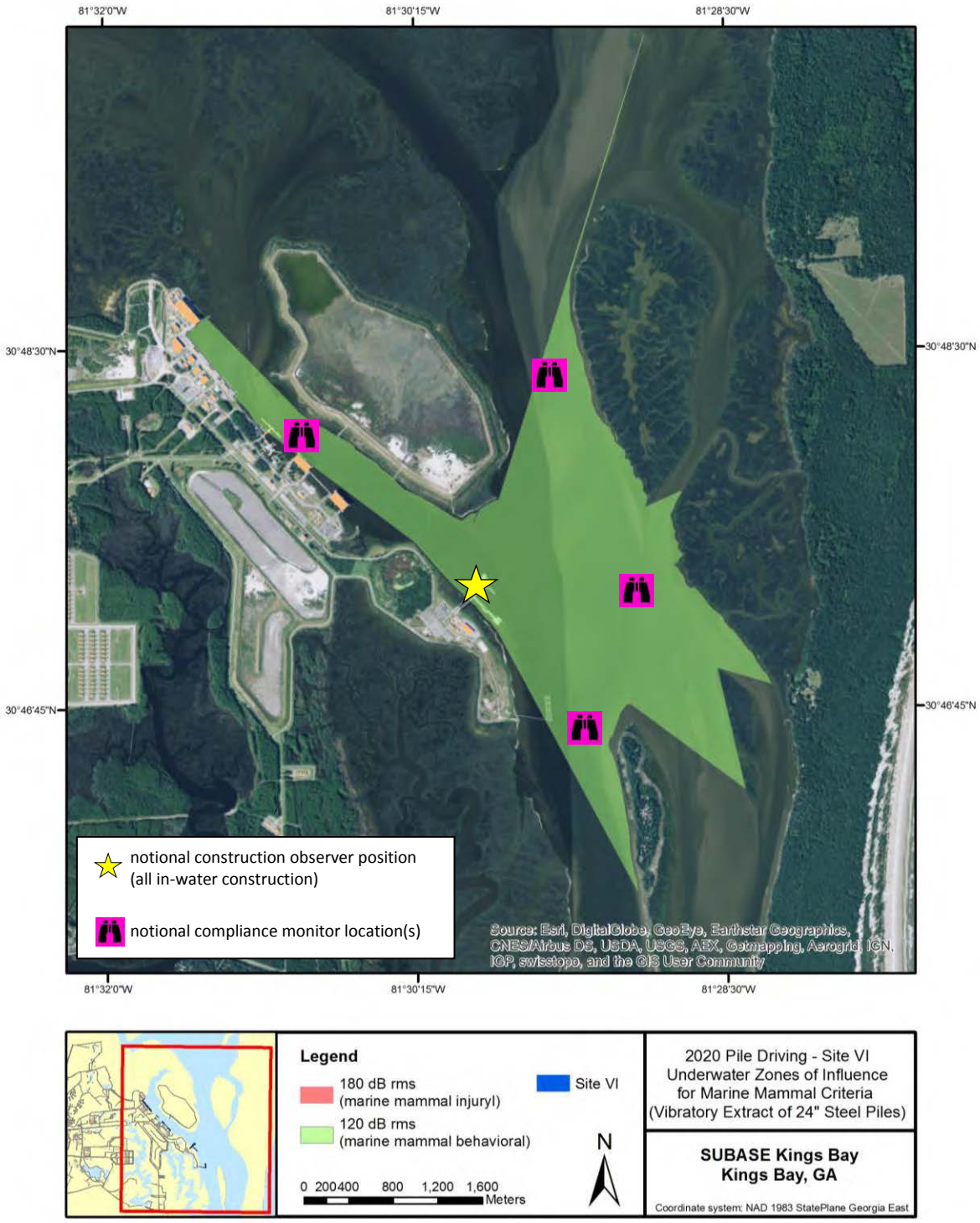

Figure 12. Project 4A – Small Craft Berth Site VI Compliance Monitoring Zone (FY 2020)

5: Magnetic Silencing Facility (MSF)

Note: A project-specific guidance document, including a map illustrating the shutdown and compliance monitoring zones will be prepared and presented to the contractors at the time of the environmental awareness briefing (Section 3.1).

For this project, eighteen (18) 16-inch timber piles will be removed with a vibratory driver followed by vibratory installation of eighteen (18) 18-inch composite piles over a total of six (6) days. The Level A (injury) ZOI falls within the standard shutdown zone of 50 feet (15 meters) for both removal and installation (Table 11). Therefore, this zone will be in effect during all pile driving activities associated with the Magnetic Silencing Facility project.

A total of thirty-six (36) potential Level B exposures were calculated for the project. In order to maximize the efficient allocation of resources, the contractor will be directed to deploy at least four (4) qualified compliance monitors to view the 17,756 foot (5,412 meter) Level B ZOI for three (3) of the six (6) projected days of active driving. The results of the three-day compliance monitoring effort will be extrapolated to the number of active driving days to provide an estimate of the actual number of Level B exposures. Figure 14 illustrates the modeled ZOI and notional compliance monitor locations; these locations are subject to change based on weather conditions and other variables.

Table 11. Project 5 – MSF Repairs (FY 2017)

Project	Pile Details			Action	Max. Days	Construction Observer Zone	Compliance Monitoring Zone
	Number	Size	Material				
Magnetic Silencing Facility (RF-14-1710 TRIREFAC Waterfront Facilities Repair)	18	18-inch	composite	vibratory installation	6	50 ft (15 m) daily	4 or more qualified monitors will view all waters within the 17,756 ft (5,412 m) zone on a minimum of 3 days
	18	18-inch	timber	vibratory removal			

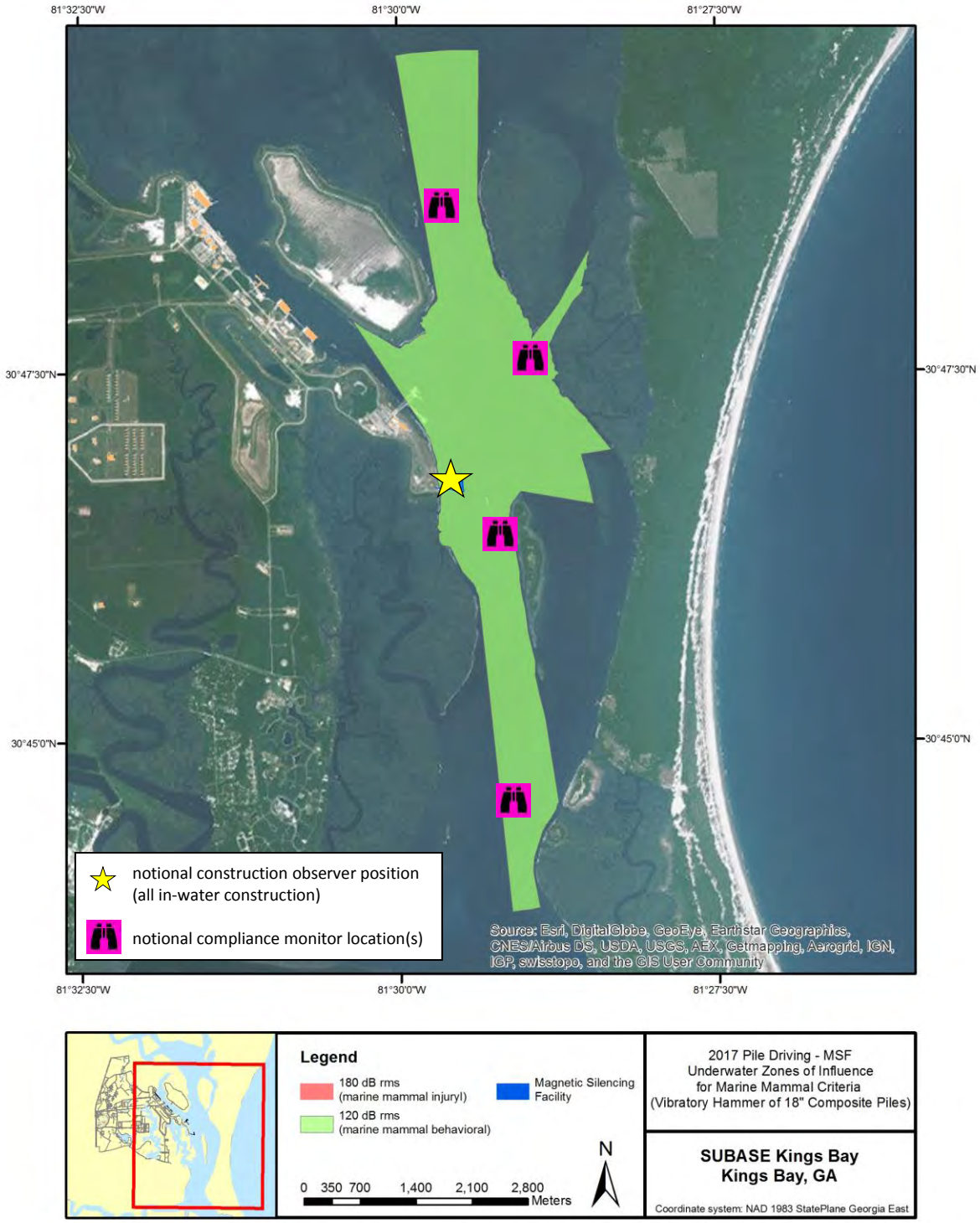

Figure 13. Project 5 – MSF Compliance Monitoring Zone (FY 2017)

6A, 6B: Transit Protection Pier and North Trestle Pier Demolition

Note: A project-specific guidance documents, including maps illustrating the shutdown and compliance monitoring zones will be prepared and presented to the contractors at the time of the environmental awareness briefing (Section 3.1).

For the two demolition projects, a total of seven hundred and seventy (770) 24-inch concrete piles will be removed using a vibratory driver over the course of forty-seven (47) days. The Level A (injury) ZOI falls within the standard shutdown zone of 50 feet (15 meters) for both projects and will therefore be in effect during all pile driving activities (Table 12).

A total of four hundred and seventy (470) potential Level B exposures were calculated for both demolition projects. In order to maximize the efficient allocation of resources, the contractor will be directed to deploy at least five (5) qualified monitors to view the 38,251 foot (11,659 meter) Level B ZOI for twelve (12) of the forty-seven (47) projected days of active driving. The results of the twelve-day compliance monitoring effort will be extrapolated to the number of active driving days to provide an estimate of the actual number of Level B exposures. Figure 15 illustrates the modeled ZOI and notional compliance monitor locations; these locations are subject to change based on weather conditions and other variables.

Table 12. Projects 6A and 6B – Demolition of TPS Pier and North Trestle (FY 2022)

Project	Pile Details			Action	Max. Days	Construction Observer Zone	Compliance Monitoring Zone
	Number	Size	Material				
TPS Pier Demolition	649	24-inch	concrete	vibratory removal	41	50 ft (15 m) daily	5 or more qualified monitors will view all waters within the 38,251 ft (11,659 m) zone on a minimum of 12 days
North Trestle Demolition	121	24-inch	concrete	vibratory removal	6		

[1]Acoustic data collection will be performed during this project

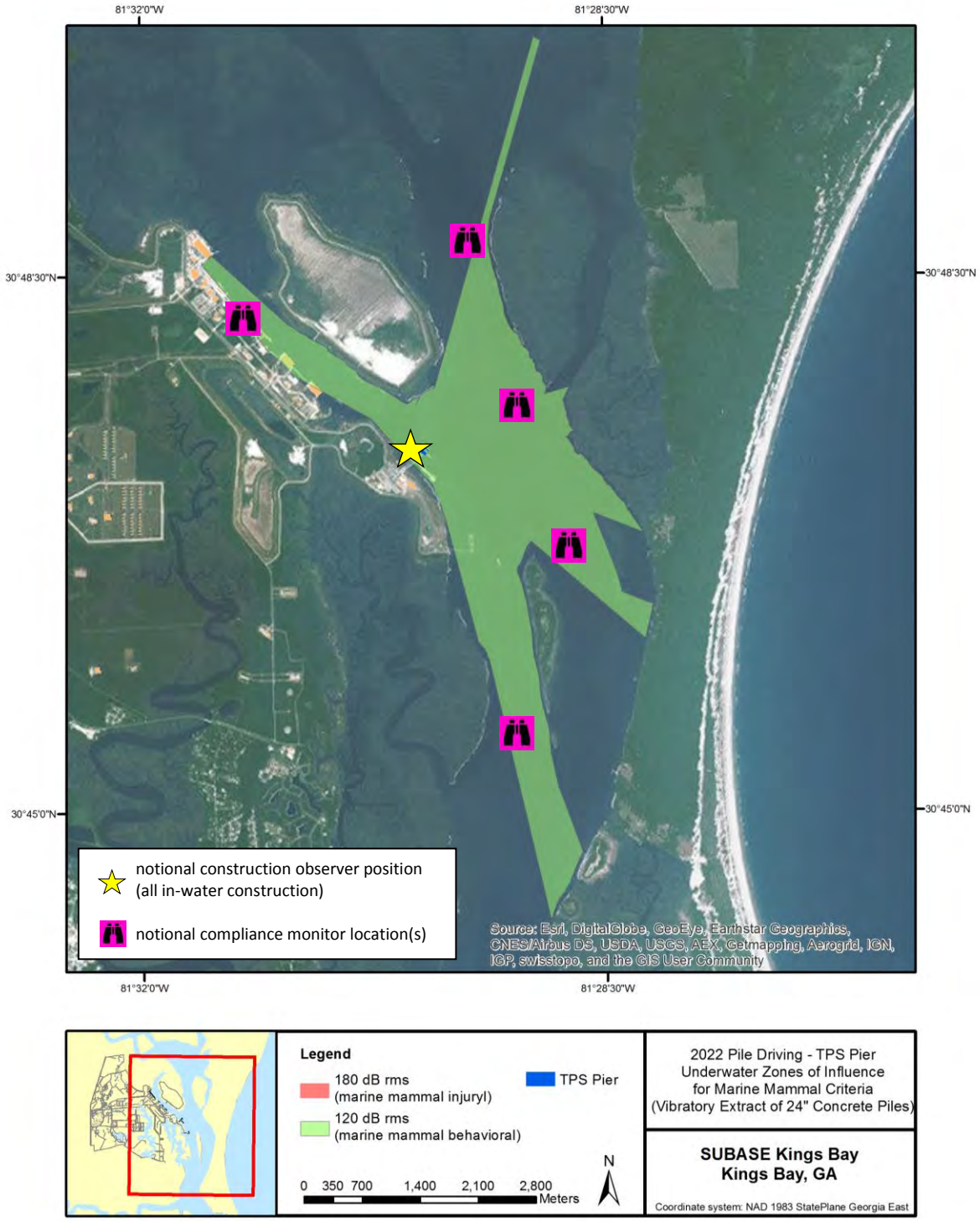

Figure 14. Projects 6A and 6B – TPS Pier and North Trestle Compliance Monitoring Zone (FY 2022)

4.0 REPORTING

Monitoring reports will be provided to NMFS in accordance with permit requirements and timelines.

5.0 BOTTLENOSE DOLPHIN SURVEYS

Subject to the availability of federal funding appropriations by the U.S. Congress for this purpose, additional work will be performed to describe the spatial and temporal distributions of bottlenose dolphins and their densities in Kings Bay and areas of Cumberland Sound that may be affected by pile driving noise. Surveys will be performed as soon as practicable.

6.0 ACOUSTIC DATA COLLECTION

Acoustic data collection will be performed during pile driving associated with the Tug Pier, UMC Layberth, and TPS Pier projects. Data will be incorporated into the Navy's source level database to enhance accuracy of propagation modeling. This effort will also provide improved proxy source levels for projects on the southeast coast of the U.S. through implementation in typical bathymetric / hydrologic conditions.

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Attachment 1

Construction Conditions for Protected Marine Species

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Southeast Region Marine Mammal & Sea Turtle Viewing Guidelines

Limit your viewing time.

- Prolonged exposure to one or more vessels increases the likelihood that marine mammals will be disturbed.
- Viewing periods of greater than 1/2 hour should be undertaken only if you are absolutely sure that you are not causing disturbance or any changes in behavior.
- Since individual animals' reactions will vary, carefully observe all animals and leave the vicinity if you see signs of disturbance.
- Your vessel may not be the only vessel in the day that approaches the same animal(s); please be aware of cumulative impacts.

Travel in a predictable manner.

- Marine mammals appear to be less disturbed by vessels that are traveling in a predictable manner.
- The departure from a viewing area has as much potential to disturb animals as the approach.
- If a marine mammal or sea turtle approaches, put your engine in neutral and allow the animal to pass.
- Never pursue of follow marine wildlife.
- Never attempt to herd, chase, or separate groups of marine mammals or females from their young.
- Avoid excessive speed or sudden changes in speed or direction in the vicinity of animals.

If you need to move around marine wildlife, do so from behind (i.e., never approach head-on).

- Vessels that wish to position themselves so that the animals would pass them, should do so in a manner that stays fully clear of the animal's path.

Be aware that marine mammals may surface in unpredictable locations.

- Breaching and flipper slapping whales may endanger people and/or vessels.

Be on the look-out for seals.

- As their populations expand, seals are being found in southeastern states with increasing regularity, especially in North Carolina.
- Viewing or approaching seals hauled out on land should be done without the animal's awareness of your presence.
- Avoid detection by sight, smell, or sound (e.g., by staying hidden behind natural cover and approaching viewing areas quietly by avoiding conversation and noisy movements).
- Pups are often left alone when the mother is feeding. *They are not abandoned and should be left alone.*

Marine mammals are more likely to be disturbed when more than one boat is near them.

- Avoid approaching the animals when another vessel is near.
- Always leave marine mammals an "escape route."
- When several vessels are in an area, communication between operators will help ensure that you do not cause disturbance.

Marine mammals have sensitive hearing and many species communicate by vocalizing underwater.

- Underwater sound produced by a vessel's engines and propellers can disturb these animals.

Cautiously move away from the animals if you observe any of the following behaviors:

- Rapid changes in direction or swimming speed.
- Erratic swimming patterns.
- Escape tactics such as prolonged diving, underwater exhalation, underwater course changes, or rapid swimming at the surface.
- Tail slapping or lateral tail swishing at the surface.
- Female attempting to shield a calf with her body or by her movements.

Even if approached by a marine mammal or sea turtle:

- Do not touch or swim with the animals.

Never feed or attempt to feed marine mammals or sea turtles.

- It can alter their natural behavior, make them dependent on handouts, and can be harmful to their health.
- Marine mammals, like all wild animals, may bite and inflict injuries to people who try to feed them.

Note: NMFS regulations at 50 CFR § 216.3 strictly prohibit feeding or attempting to feed a marine mammal in the wild.

Close approaches by humans to marine mammals may cause them to lose their natural wariness and become aggressive towards people. They are also vulnerable to injury or death from entanglement in fishing gear or boat strikes. NMFS strongly encourages people to follow the guidelines presented here while spending time on or near the water.

Please review these guidelines and make the "Code of Conduct" personal practice. Bring binoculars along on a viewing excursion to assure a good view from the recommended viewing distances. Together we can assure marine mammal viewing will be as rewarding as it is today for many generations to come.

Special Provisions for Manatee

The following conditions are intended as a minimum to protect this species and its habitat during any activities that are in close proximity to the known locations of this species on this project.

1. The permittee agrees that all personnel associated with the project will be advised that there are civil and criminal penalties for harming, harassing or killing manatees, which are protected under the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972. The permittee and contractor will be held responsible for any manatee harmed, harassed, or killed as a result of construction activities.

2. All on-site project personnel are responsible for observing water-related activities for the presence of manatees. All construction and activities in open water will cease upon sighting of manatees within 100 feet of the project area. Construction activities will not resume until the manatees have left the project area for at least thirty minutes.

3. A trained spotter provided by the Contractor, shall be onsite for sightings of manatees during the construction of the project. Personnel designated by the Contractor shall receive training by the Georgia Department of Natural Resources, Coastal Resources Division, Brunswick, Georgia. The contact person for the Georgia Department of Natural Resources is Clay George at 912-262-3336.

4. Siltation barriers will be made of material in which manatees cannot become entangled, are properly secured, and are regularly monitored to avoid manatee entrapment. Barriers must not block manatee entry to or exit from essential habitat.

5. All vessels associated with the project will operate at “no wake/idle” speeds at all times while in the construction area. All vessels will follow routes of deep water whenever possible.

6. Propellers on all boats 21 feet or less in length shall be equipped with propeller guard systems, approved by the Project Manager, designed to prevent harm to manatees.

7. Extreme care will be taken in lowering equipment or materials, including, but not limited to piles, sheet piles, casings for drilled shaft construction, spuds, pile templates, anchors, etc., below the water surface and into the stream bed; taking any precaution not to harm any manatee(s) that may have entered the construction area undetected. All such equipment or materials will be lowered at the lowest possible speed.

8. Prior to initiation of construction, the permittee shall install at least two (2) temporary manatee awareness construction signs in locations clearly visible from the navigation channel (Attachment A). The signs shall be displayed and maintained throughout construction and shall be removed by the permittee upon completion of construction. Placement of all signs shall be as approved by the Georgia Department of Natural

Resources, Coastal Resources Division, Brunswick, Georgia. The contact person for the Georgia Department of Natural Resources is Clay George at 912-262-3336.

9. All temporary construction materials will be removed upon completion of the work, and salt marsh areas will be restored. No construction debris or trash will be discarded in the water.

10. Any dead manatee(s) found in the project area must be secured to a stable object to prevent the carcass from being moved by the current. The Contractor shall immediately notify the Government Project Manager who in turn will notify the Environmental Office at 912 573-4678. The Environmental Office will notify:

a. the U. S. Fish and Wildlife Service, Coastal Sub-Office at 912-832-8739 and,
b. the GDNR, Nongame Conservation Section at 912-262-3336.

11. The Contractor shall immediately report to the Government Project Manager any incident (e.g. collisions, injuries and mortalities) which occurs that causes harm or could be detrimental to the continued existence of the manatee along the project corridor. The Government Project Manager will in turn notify the Environmental Office at 912 573-4678. The Environmental Office will notify:

a. the U. S. Fish and Wildlife Service, Coastal Sub-Office at 912-832-8739 and,
b. the GDNR, Nongame Conservation Section at 912-262-3336 or,
800-2-SAVE-ME.

12. In the event of injury or mortality of a manatee, all aquatic activity in the project area must cease pending section 7 consultation under the Endangered Species Act with the U. S. Fish and Wildlife Service and the lead Federal agency.

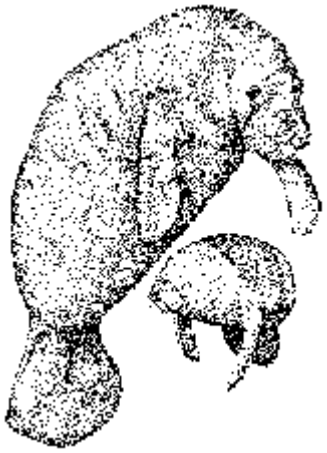
13. The Contractor shall keep a log detailing sightings, collisions, or injury to manatees, which have occurred during the contract period. Following project completion, the log and a report summarizing the any incidents and / or sightings of manatees will be submitted to the Government Project Manager and Environmental Office.

14. The Environmental office will submit above mentioned log to:

a. the U. S. Fish and Wildlife Service, 4980 Wildlife Drive, NE, Townsend, Georgia 31331 and,
b. the GDNR, Nongame Conservation Section, One Conservation Way, Brunswick, Georgia 31520

Attachment A

MARINE FACILITY
MANATEE SIGNS
PLACEMENT PROCEDURES



The West Indian manatee (*Trichechus manatus*) is an endangered species throughout its range. Manatees are protected at the Federal level by the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972, as amended. Protection measures such as these signs are necessary to increase boater awareness. The increased level of Georgia coastal development and associated marinas and boat traffic will increase the probability of negative impacts to the seasonal manatee population. Manatees inhabit Georgia waters from March through November. The main threat to manatee populations is human related boat/barge collisions. Raising boater awareness and educating the public is necessary for manatee conservation in Georgia waters and has been proven effective.

The informational/educational display sign, "Manatee Habitat", is intended to increase boater awareness of manatees that are present in Georgia waters. This sign informs boaters of the potential threat boats pose to the animals and how to help decrease negative impacts caused by those vessels. Although the placement of these signs is mandatory and required by permit, they are informative and non-regulatory in nature.

<u>Procedure for Approval of Sign Installation</u>:

1. The applicant should forward a project site plan, including the proposed location for the permanent signs to: Manatee Sign Approval, Nongame Conservation Section, Department of Natural Resources, One Conservation Way, Brunswick, Georgia 31520. The applicant should also include a chart indicating the location of the facility in relation to waterways, location within a

given county (specify county name), Contact person with phone number, and the Permit and/or Lease number associated with the project

2. The Nongame Conservation Section of the Georgia Department of Natural Resources (GDNR) will review the proposed sign placement site plan and will respond to the applicant within 30 days. If the proposed location is unacceptable, guidance on an alternate site will be provided. The contact person should notify the Nongame Conservation Section when sign placement has been completed (912-264-7218). A photograph(s) of the posted manatee signage at your facility must be submitted with the required permit compliance form to the Marsh and Shore Regulatory Program of the Coastal Resources Division/Georgia Department of Natural Resources.

3. If during a site visit, approved signs, and their locations are found not to be in compliance with the instructions given in this document, relocation or addition of signs will be required. Annual site visits will be conducted to document sign placement and condition. All signs locations will be recorded in the GDNR manatee database.

Approved Sign Suppliers:

The signs are available through the companies listed below and may also be available from other local suppliers throughout the state. Permit/lease holders, marinas, and boat docking/launching facilities should contact sign companies directly to obtain pricing information and arrange for shipping and billing.

Approved Suppliers of Manatee Signs:

Grafix, Inc.
455 Montgomery Street
Post Office Box 1028
Savannah, Georgia 31402
Voice: 912-691-1117
Fax: 912-232-3845

Image Sign Company
785 King George Blvd., Bldg. 3
Savannah, Georgia 31419
Voice: 912-961-1444
Fax: 912-961-1499

Doug Bean Signs, Inc.
160 Dean Forest Rd
Savannah, Georgia 31408
Voice: 912-964-1900
Fax: 912-964-2900

Fendig Signs
411 Arnold Rd
Saint Simons Island, Georgia 31522

Good & Associates
Saint Simons Island, Georgia
(912) 638-7664

Temporary Construction Signs

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006
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Attachment 2

Marine Species Observation / Monitoring Form

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Project name: _____ Lead observer: _____ _____ Page _____ of _____

Project location : _____ Lead observer contact info: _____ Date: _____

Effort Info				Sighting Info*				
Event	Time of Event (start and end)	Observer*	Visibility Info (e.g. wind, glare, swell)	Species	Distance to Animal (from Observer)	# of Animals Group Size (min/max/best) # of Calves	Animal Movement Relative to Pile Driving Equipment/ Behavior Code	Behavior Change/ Response to Activity/ Other Comments
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ / ___ calves	toward or away parallel none Behavior Code: _____	
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ / ___ calves	toward or away parallel none Behavior Code: _____	
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ / ___ calves	toward or away parallel none Behavior Code: _____	
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ / ___ calves	toward or away parallel none Behavior Code: _____	
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ / ___ calves	toward or away parallel none Behavior Code: _____	
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ / ___ calves	toward or away parallel none Behavior Code: _____	
Start Monitoring – End Monitoring Soft Start – Vibratory – Impact Sighting – Delay – Shutdown	: :				yds	/ / ___ calves	toward or away parallel none Behavior Code: _____	

*Note location of observer and any protected marine species sightings with date/time on project map

Sighting Form revised October 22, 2015

NAVFAC SOUTHEAST POCs: Jered Jackson, Email at jered.jackson@navy.mil or Phone at 904-542-6308; and Taura Huxley-Nelson, Email at taura.a.huxley1@navy.mil or Phone at 904-542-6307

Sighting Codes

(Sighting cue & Behavior Codes)

Behavior codes

Code	Behavior	Definition
BR	Breaching	Leaps clear of water
CD	Change Direction	Suddenly changes direction of travel
CH	Chuff	Makes loud, forceful exhalation of air at surface
DI	Dive	Forward dives below surface
DE	Dead	Shows decomposition or is confirmed as dead by investigation
DS	Disorientation	An individual displaying multiple behaviors that have no clear direction or purpose
FI	Fight	Agonistic interactions between two or more individuals
FO	Foraging	Confirmed by food seen in mouth
MI	Milling	Moving slowly at surface, changing direction often, not moving in any particular direction
PL	Play	Behavior that does not seem to be directed towards a particular goal; may involve one, two or more individuals
PO	Porpoising	Moving rapidly with body breaking surface of water
SL	Slap	Vigorously slaps surface of water with body, flippers, tail etc.
SP	Spyhopping	Rises vertically in the water to "look" above the water
SW	Swimming	General progress in a direction. Note general direction of travel when last seen [Example: “SW (N)” for swimming north]
TR	Traveling	Traveling in an obvious direction. Note direction of travel when last seen [Example: “TR (N)” for traveling north]
UN	Unknown	Behavior of animal undetermined, does not fit into another behavior

NAVFAC SOUTHEAST POCs: Jered Jackson, Email at jered.jackson@navy.mil or Phone at 904-542-6308; and Taura Huxley-Nelson, Email at taura.a.huxley1@navy.mil or Phone at 904-542-6307

Attachment 3

Sample Acoustic Data Collection Scope of Work

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SCOPE OF WORK

Pile Driving Noise Measurement at Atlantic Fleet Naval Ports

I. STATEMENT OF WORK

The purpose of this Task Order is to initiate a data collection effort to measure underwater and airborne noise associated with pile driving activities to be used as future inputs to acoustic propagation models and marine species take calculations. The goal of the project is to have representative source level estimates for east coast marine environment and naval ports, expand our dataset to include pile types and methods commonly used out east, and collect the data in manner similar to recommendations set forth in the Caltrans Guidance Manual.

A. Services Required:

Task 1. Pile Driving Noise Measurement, Analysis, and Reporting –

a.) Kickoff meeting via phone conference to discuss specifics about project location and logistics. This meeting will occur at least 45 days prior to the expected data collection start date. Equipment and supplies for acoustic measurements will be procured, assembled, calibrated, and verified before shipping to the project location.

b.) The contractor will send one Senior Acoustic Consultant and one Staff Consultant to travel to the project location and collect pile driving noise data to estimate airborne and underwater source levels at a specified Navy port or pier side location along the U.S. East coast. Monitoring would include two underwater positions and one airborne monitoring position. These exact positions would be determined in the field during consultation with Navy personnel. Each monitoring event is envisioned to include two days of travel and up to 3 days of onsite monitoring.

c.) The Contractor would provide all measurement and recording equipment to conduct this task. It is assumed that a work platform (existing structure, work barge or boat and driver) will be provided by the Navy or their Contractor so that these measurements can be made. In addition, it is assumed that line and weights for hydrophones, as well as special safety gear such as lifejackets would be provided. In addition, security issues regarding access to the measurement locations would be arranged by the Navy.

d.) The intention is to gather data on sound levels representative of Navy pile driving activities in Atlantic Fleet naval port and Pier side locations. Underwater sound monitoring would include the measurement of peak sound pressures, root-mean-square sound pressure levels (RMS) and sound exposure levels (SEL) of impact pile driving pulses. Typical ambient levels would be measured during lulls in the pile installation and reported in terms of RMS sound pressure levels. Frequency spectra in narrow-band or 1/3rd octave bands would be provided for pile driving sounds.

e.) The methods and equipment used in the hydro-acoustic monitoring would follow recommendations set forth in the Caltrans Guidance Manual. The underwater acoustic recordings or measured data would be analyzed to provide peak, RMS and SEL sound pressure levels along with narrow or 1/3rd octave band frequency spectra. The airborne acoustic data would be provided in both unweighted and A-weighted RMS sound pressures and also include 1/3rd octave band sound pressure levels. The Leq for each measured pile driving event (in unweighted and A-weighted format) would also be provided.

f.) The contractor will analyze results and provide a draft and final site specific technical report with a summary of the average source level values to use in the Navy's future acoustic modeling efforts within 75 days of completion of the monitoring.

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The contractor should assume a project location in Norfolk, VA for cost estimation purposes. Assume travel from Petaluma, CA to Norfolk, VA for two persons, leaving on Monday and return on Friday, with three days in the field with one rental car.

Option Tasks 2 - 6. The contractor will complete the work specified in Task 1 at a new specified Atlantic Fleet Navy port or pier side location, for each exercised option.

Option Task 7. The contractor will provide a Comprehensive Report including all site specific reports and summaries into one easy to reference report. The contractor will provide a TOC for review by the NTR prior to a Draft and Final report submission.

B. Completion Schedule:

The Contractors shall adhere to the following schedule, unless otherwise approved by the NTR.

Event	
Kickoff meeting	30 days prior to field data collection
Draft Site Specific Technical Report	45 days after field data collection
Final Site Specific Technical Report	75 days after field data collection
TOC for Comprehensive Report	TBD
Draft Comprehensive Report	TBD
Final Comprehensive Report	TBD

Period of performance would be till Sept 30th 2014

C. Deliverables:

Deliverables will be made by express mail and/or by electronic delivery. Check with the NTR prior to shipping for specific delivery instructions.

The Navy and Marine Corps standard desktop computing software is Microsoft Office. Final Reports and other text documents shall be provided in Microsoft Word 2007 format and Portable Document Format (PDF) readable with Adobe Acrobat 9 unless other mutually agreeable formats are determined. Adobe PDF files should include a complete linked table of contents and all mention of tables or figures within the text of the report should be linked directly to the referenced table or figure. Spreadsheet files shall be provided in Microsoft Excel format. Database files shall be provided in Microsoft Access format, unless specified otherwise, as approved by the NTR. All text, spreadsheet, and database files shall be delivered on CD-ROM in Joliet File System format, DVD or other electronic media as approved by the NTR. All GIS files and associated data shall be delivered in electronic format. All vector (point, line, or polygon) spatial (GIS) data must be delivered in ESRI shapefile format (.shp). Raster spatial data, including aerial photography, satellite imagery, and digital raster graphics, shall be submitted in Tagged Image Format (TIF) or in file format approved by the NTR. Grid or cell-based digital raster spatial data shall be submitted in either ArcInfo Grid format or ASCII Grid format. All spatial data shall be unprojected. The vertical reference elevation is Mean Sea Level (MLLW for bathymetry) with the relevant control data provided. Spatial data and metadata shall be submitted together on CD ROM.

III. GENERAL INFORMATION

A. Meetings:

A Kick-off meeting may be held via teleconference. Additional progress updates will be conducted as necessary via teleconference. Additional meetings are not anticipated to be frequent, but may be required between major milestones or when challenges arise. The Contractor will be

SAMPLE

responsible for sending meeting minutes to the NTR and USFF POCs after all scheduled meetings summarizing what was discussed/decided in said meetings.

B. Navy Technical Representative:

TBD

C. Contract Administration:

The Contractor shall receive direction on all elements of this contract from Ms. Kimberly Pryor, Contract Specialist (CS). Correspondence should be addressed as follows:

TBD

D. Contractor's Evaluation:

Upon completion of this contract, the NTR will prepare an evaluation of the Contractor's performance under this contract. The completed evaluation will be retained in the Contractor's file at NAVFAC Atlantic for review and consideration by future selection boards.

E. Payment:

Upon approval by the NTR, payment will be authorized on a monthly basis (as requested) to the Contractor. Payment authorization by the NTR shall be based solely on the percentage of the entire project completed within the period for which the Government is billed. An up-to-date status report that clearly indicates the actual work performed during the specific billing period must accompany each billing statement before payment is authorized by the NTR.

Additional details pending

G. Release of Information:

US Navy shall retain rights to access all digital files, hard-copy products, and related materials and information (including all data collected during the contracted field work and associated analysis products) for the purposes of environmental planning and regulatory compliance requirements. The primary researchers shall retain rights to unrestricted analysis and publication of data and results without requirement of authorization from the NTR.

H. Quality of Work:

The Contractor will be responsible for the professional and technical accuracy in addition to the coordination of all work or services rendered. The products submitted by the Contractor will represent the best solutions possible and will be reviewed by the Navy for compliance with government requirements and criteria. The contractor, at no additional cost to the government, will correct errors and/or deficiencies in the final product resulting from the Contractor's performance that are designated within three months of final product delivery and that can be corrected by the Contractor within 24 man-hours.

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APPENDIX C
BIOLOGICAL EVALUATION (NMFS)

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV22/345
19 Nov 15

Mr. David Bernhart
National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701-5511

SUBJECT: INFORMAL SECTION 7 CONSULTATION REGARDING WATERFRONT PILE REPAIR, REPLACEMENT, AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Navy proposes to repair several waterfront structures at Naval Submarine Base (SUBASE) Kings Bay and construct a new pier to support Transit Protection System (TPS) functions. These repairs, upgrades, and new construction would (1) address critical damage and mission and safety requirements, (2) where damage is less advanced, limit further deterioration and increase the useful life of the structures, and/or (3) upgrade infrastructure to meet the requirements of new submarine technology. The Proposed Action would occur in fiscal years (FY) 2017 through 2022.

The Navy has prepared a consultation package in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) to assess the potential effects on threatened and endangered species and their critical habitats from activities associated with the proposed repair and modification activities at SUBASE Kings Bay.

The Navy identified all federally-listed species and designated critical habitats that may occur in the Action Area and, through NEPA analysis, determined that the Proposed Action may affect Atlantic sturgeon, shortnose sturgeon, green sea turtles, hawksbill sea turtles, Kemp's ridley sea turtles, leatherback sea turtles, and loggerhead sea turtles. No critical habitat for these species is located within the Action Area.

The analysis of the potential effects of the Proposed Action contained in the enclosed biological evaluation (BE) is based on a review of the proposed activities, current and historical distribution and occurrence data for each species, best management practices, and protective measures. The BE is being provided to the National Marine Fisheries Service to initiate informal section 7 consultation on potential effects and seek concurrence on "may affect, but not likely to adversely affect" conclusions for the species under its jurisdiction.

A separate BE has been prepared and submitted to the U.S. Fish and Wildlife Service to address the potential effects of the Proposed Action on species under that agency's jurisdiction, including avian species and the West Indian manatee. Additionally, an application for a letter of

authorization has been submitted to NMFS for Level B takes of marine mammals under its jurisdiction, and an EFH assessment has been submitted to the NMFS Division of Habitat Protection.

We respectfully request your concurrence with our conclusions no later than June 8, 2016. If you have any questions or need additional information in support of this request, please contact Ms. Taura Huxley-Nelson, Natural Resources Specialist, at commercial (904) 542-6307 or email: taura.a.huxley1@navy.mil.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the
Commanding Officer

Enclosure: Biological Evaluation for Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, Georgia

BIOLOGICAL EVALUATION FOR WATERFRONT PILE REPAIR, REPLACEMENT, AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

Submitted to:

National Marine Fisheries Service
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701-5511

Prepared by:

Naval Facilities Engineering Command, Southeast
Box 30, Building 903
NAS Jacksonville, FL 32212-0030

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List of Acronyms

BE	Biological Evaluation
BMP	best management practice
°C	degrees Celsius
CFR	Code of Federal Regulations
dB	decibel
DOD	Department of Defense
DPS	Distinct Population Segment
ESA	Endangered Species Act
°F	degrees Fahrenheit
FAC	facility (reference number)
FR	Federal Register
ft.	foot / feet
FY	fiscal year
H	height
HDPE	high density polyethylene
Hz	Hertz
in. or ”	inch
kHz	kiloHertz
km	kilometer
km^2	square kilometer
m	meter
MHW	mean high water
MLLW	mean lower low water
MSF	Magnetic Silencing Facility
µPa	microPascal
NAVSTA	Naval Station
NLAA	not likely to adversely affect
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration
POC	point of contact
ppm	parts per million
PSU	practical salinity unit
PTS	permanent threshold shift
r	radius
rms	root mean square
SAFMC	South Atlantic Fishery Management Council
sec	second
SEL	sound exposure level
SSBN	Trident ballistic missile submarine

List of Acronyms (*continued*)

SSGN	guided missile submarine
SSP	steel king pile / sheet pile system
St.	Saint (e.g., St. John's River)
SUBASE	Naval Submarine Base
U.S.	United States
USFWS	United States Fish and Wildlife Service
W	width
ZOI	zone of influence

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1. Introduction

Naval Submarine Base (SUBASE) Kings Bay is the United States (U.S.) Department of the Navy's (Navy's) East Coast home port for ballistic missile nuclear submarines supporting the Trident II (D-5) missile. SUBASE Kings Bay efficiently and effectively manages, maintains, and operates Trident ballistic missile (SSBN) and guided missile (SSGN) submarines, Trident II D-5 and Tomahawk Land Attack Missiles and systems, and infrastructure and quality of life facilities and programs.

A study of SUBASE Kings Bay water-based support facilities found the conditions varied widely from good to seriously deteriorated (Navy 2010). Continuous monitoring of these conditions by SUBASE Kings Bay logistical support staff confirm the advanced deterioration and critical nature of some issues that pose operational and safety risks. Additionally, other areas of initial deterioration were identified which require remedy in order to maintain the useful life of existing structures. Damage observed includes deteriorated concrete piles, pile caps, and deck components (cracked, spalled, delaminated, exposed/corroded internal reinforcing steel structures); marine pest (wood borer) damage on wooden piles; broken or unmaintained moorings fittings; and corrosion on steel piles and pile caps.

The purpose of the Proposed Action is to maintain the structural integrity of the in-water pile-supported structures across the installation's waterfront. This action would be accomplished by repairing damaged and aged piles and installing new piles, and ensuring compliance with the current revisions to Department of Defense (DOD) and Navy security directives. The Proposed Action is needed because the in-water pile-supported structures and associated infrastructure are deteriorating and do not provide adequate and stable mooring facilities for ships and submarines, and do not comply with current DOD and Navy security directives.

This Biological Evaluation (BE) provides the information necessary to support consultation as required under section 7 of the Endangered Species Act (ESA) (50 Code of Federal Regulations [CFR] sections 402.12 to 402.14). It is the intent of this BE to establish a basis upon which the National Marine Fisheries Service (NMFS) may concur with the Navy's effects conclusions. The determinations of effects were based on an evaluation of available scientific data and literature and on information collected for the *Draft Environmental Assessment for Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, Georgia* (in preparation). A separate BE has been prepared to address the Proposed Action's effects on listed aquatic and terrestrial species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS).

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2. Project Description

2.1 Project Location

SUBASE Kings Bay is located in the southeastern corner of Georgia, eight miles north of the Georgia-Florida border, approximately four miles inland from the Atlantic Ocean, and approximately two miles north of St. Mary's, Georgia, along the western shore of Cumberland Sound (Figure 2-1). The approximate 16,000-acre installation provides berthing and support services to naval submarines and other assets. The entirety of SUBASE Kings Bay, including the land areas and adjacent water areas along Kings Bay and Cumberland Sound between Marianna Creek to the north and Mill Creek to the south, is restricted from general public access.

2.2 Proposed Action

To ensure the Navy can continue its mission of supporting the Fleet Ballistic Missile System and Trident Submarine Program, the Navy proposes to repair (including direct repairs and repairs by replacement) in-water structures at SUBASE Kings Bay, and construct a new Transit Protection System (TPS) Headquarters/Operational Support Facility pier adjacent to the existing Layberth Pier. These repairs, upgrades, and new construction would 1) address critical damage and mission and safety requirements, 2) limit further deterioration and increase the useful life of the structures, and/or 3) upgrade infrastructure to meet requirements of new submarine technology.

The Proposed Action would occur 2017 through 2022 and is comprised of six distinct projects. Of those six projects, Projects 1, 3, 4, and 6, are comprised of multiple smaller projects. A summary of the six proposed projects is provided in Table 2-1, and details pile removal and installation requirements associated with each. Figure 2-2 and Figure 2-3 illustrate the general locations of the proposed projects.

2.2.1 Project 1: Port Operations Waterfront Facilities Repair

In order to maintain the waterfront infrastructure and security required to carry out homeport and refit services to SSBN and SSGN submarines, repairs to the Port Operations Waterfront Facilities are required. Under the Project, structural concrete and steel repairs and corrosion protection is needed on the following waterfront facilities:

- Tug Pier Facility [FAC] #5926 (Project 1A)
- General Access Pier Crab Island FAC #5888 (Project 1B)

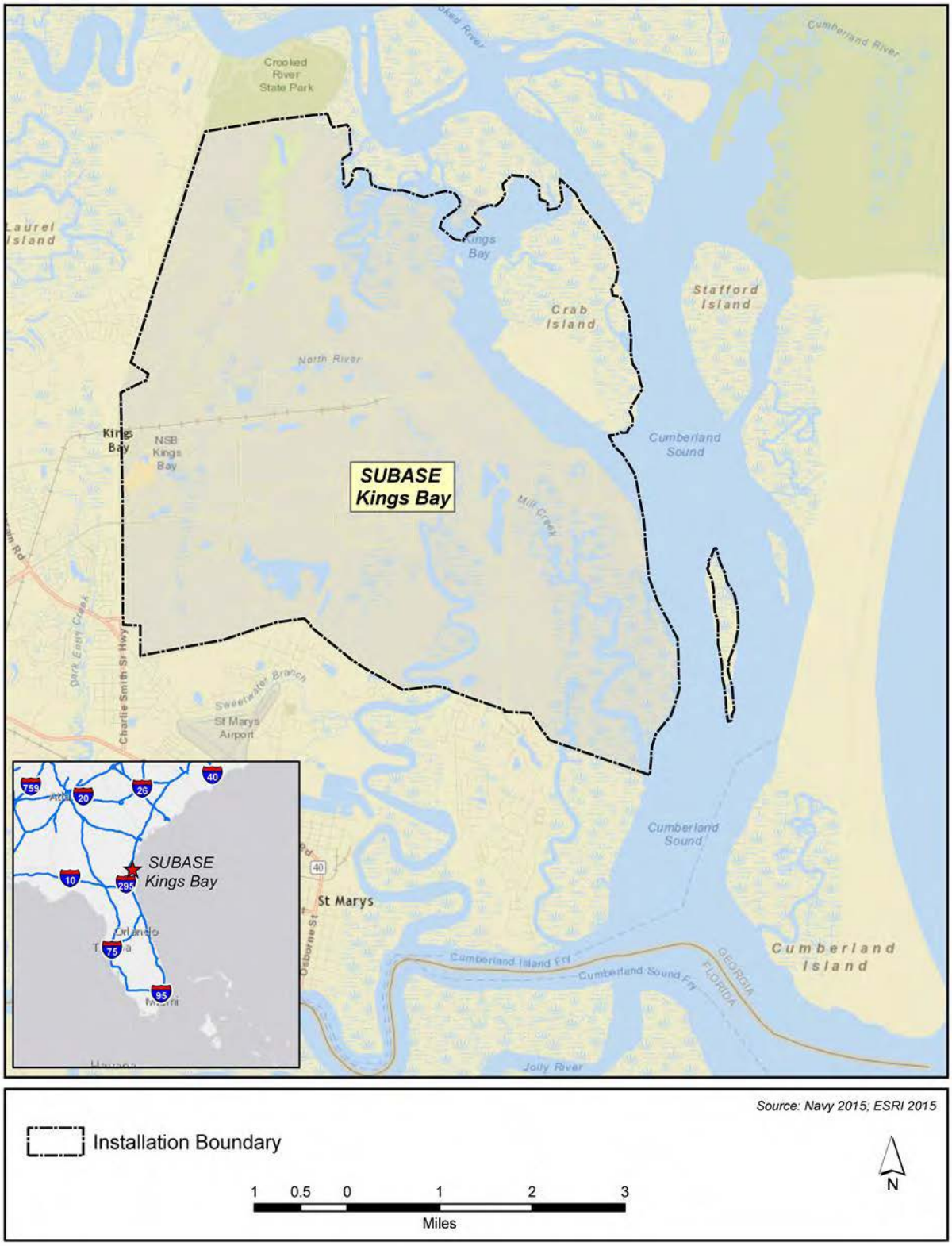

Figure 2-1. Naval Submarine Base Kings Bay Location Map

Table 2-1. Summary of Proposed Waterfront Repairs and Security-Related Upgrades

Primary Description		Project	Map ID	Description	Facility Number (FAC)	Projected Start (FY)
Ref #	Title					
1	Port Operations Waterfront Facilities Repairs	Tug Pier	1A	Repair concrete structural piles, pile caps, utility cover grates, headwall, mooring support and hardware, and deck undersides; replace wooden fender piles with concrete piles; and modify the fender system on the south side of access pier.	5926	2017
		General Access Pier Crab Island	1B	Install new guide piles, and repair brow and handrails.	5888	2017
2	Unspecified Minor Construction Layberth Fender Pile Modification P661 Project		2	Install additional fender piles to shorten the distance between existing piles and provide the required support for hydro-pneumatic fenders.	5976	2017
3	Waterfront Pile Repair and Replacement / Maintenance Program	Explosive Handling Wharf #2 Pier w/Capstans	3A	Repair high-density polyethylene (HDPE) fender pile wraps, sacrificial anodes attached to the steel fender piles, steel safety ladders and treated timber bracing; repair or replace various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings and two steel guide pipe piles on the diver's float.	5109	2017 / 2022
		(Dry Dock) Interface Wharf	3B	Replace timber fender bearing strips and wales, repair concrete deck, bullrail, edge beams, and mooring foundations; and repair, paint and recoat cathodic protection on the steel H Pile fender system and sheet pile.	5995	2021
		Refit Wharf #1	3C	Replace various pile caps, piles, and the outboard edge beam; and repair, clean, and paint several mooring fittings.	5909	2018
		Refit Wharf #2	3D	Replace or repair various pile caps, piles, outboard edge beams, and mooring foundations; and reattach underdeck lighting conduit and clean and repaint various mooring fittings.	5910	2017
		Refit Wharf #3	3E	Replace or repair various pile caps, piles, the outboard edge beams, and mooring foundations; and clean and repaint various mooring fittings.	5916	2018
		Warping Wharf w/Capstan	3F	Repair HDPE fender pile wraps; replace or repair various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings.	5877	2021
		Tug Pier	3G	Replace timber fender piles with guide piles and small boat access floats; paint mooring fittings; and repair concrete pile caps, concrete piles, concrete underdeck, and storm drain.	5926	2022
4	Transit Protection System (TPS) P617 Off-shore Supply Vessel (OSV) Berthing Project	New Pier - TPS Headquarters / Operational Support Facility	4A	Construct new pier to serve TPS Headquarters/Operational Support Facility functions. The new TPS pier would be provided with full hotel service capability including power; potable water; fire protection; sewage connections; Ship Overboard Drainage (SOD) collection; fuel; and telephone, cable, and Local Area Network (LAN) services.	n/a	2020
		Small Craft Berth Site VI	4B	Modifies the existing berthing pier on the north trestle at Site VI to comply with current DOD and Navy security directives. The pier and floating berthing slips would be provided with full hotel service capability. The berthing pier would consist of a pile supported reinforced concrete structure with floating sections. This project includes the installation of two-5,000 gallon above ground storage tanks and provides two associated truck off-loading connections and fuel dispensing units.	5936	2020

Table 2-1. (*continued*) Summary of Proposed Waterfront Repairs and Security-Related Upgrades

Primary Description		Project	Map ID	Description	Facility Number (FAC)	Projected Start (FY)
Ref #	Title					
5	Magnetic Silent Facility with Cranes (RM14-1710 TRIREFFAC Waterfront Facilities Repair)		5	Replace timber fender piles, restraining chains, aluminum utility tray, and concrete pile utility guide bracket; and repair wooden hand rails and the cracked concrete deck underside.	5980	2017
6	Demolition of the Transit Protection System Pier and Layberth North Trestle	TPS Pier Demolition	6A	Remove the tip of the existing TPS pier.	5934	2022
		North Trestle Demolition	6B	Demolish North Layberth Trestle.	5977	2022

Table 2-2. Summary of Proposed Pile Removal and Installation Requirements

Primary Description		Project	Map ID	FAC #	Fiscal Year[1]	Depth (feet)	Pile Description	Total # of Piles		Method		Strikes per Pile[2]	In-water Work Days[3]
Ref #	Title							Install	Remove	Install	Remove		
1	Port Operations Waterfront Facilities Repairs	Tug Pier	1A	5926	2017	24	18-inch square concrete	148	n/a	impact	n/a	60	30
							24-inch square concrete	18		impact	n/a	70	4
							16-inch timber round	n/a	159	n/a	vibratory	n/a	31
		General Access Pier Crab Island	1B	5888	2017	15	16-inch composite round	2	n/a	vibratory	n/a	n/a	1
							16-inch timber round	n/a	2	n/a	vibratory	n/a	1
2	Unspecified Minor Construction Layberth Fender Pile Modification P661 Project		2	5976	2017	46	14-inch steel H	55	n/a	impact	n/a	80	7
3	Waterfront Pile Repair and Replacement / Maintenance Program	Explosive Handling Wharf #2 Pier w/Capstans	3A	5109	2017	46	24-inch steel round	2	2	impact	vibratory	70	2
					2022	46	24-inch concrete square	3	3	impact	vibratory	75	2
					2022	46	24-inch steel round	10	10	impact	vibratory	70	7
		(Dry Dock) Interface Wharf	3B	5995	2021	46	14-inch steel H	99	99	impact	vibratory	60	15
		Refit Wharf #1	3C	5909	2018	46	24-inch steel round	6	n/a	impact	n/a	70	1
							30-inch steel round	n/a	6	n/a	vibratory	n/a	1
		Refit Wharf #2	3D	5910	2017	46	24-inch steel round	6	n/a	impact	n/a	70	1
							30-inch steel round	n/a	6	n/a	vibratory	n/a	1
		Refit Wharf #3	3E	5916	2018	46	24-inch steel round	6	n/a	impact	n/a	70	1
							30-inch steel round	n/a	6	n/a	vibratory	n/a	1
		Warping Wharf w/Capstan	3F	5877	2021	46	30-inch steel round	8	8	impact	vibratory	70	4
		Tug Pier	3G	5926	2022	30	14-inch steel H	77	77	impact	vibratory	60	16

[1]Projected fiscal year during which in-water construction will start; [2]For impact driving only, the estimated maximum number of strikes required to drive each pile; actual number of strikes per pile may be lower, [3]Estimated maximum total number of days of active pile driving

Table 2-2. (*continued*) Summary of Proposed Pile Removal and Installation Requirements

Primary Description		Project	Map ID	FAC #	Fiscal Year[1]	Depth (feet)	Pile Description	Total # of Piles		Method		Strikes per Pile[2]	In-water Work Days[3]
Ref #	Title							Install	Remove	Install	Remove		
4	Transit Protection System (TPS) P617 Off-shore Supply Vessel (OSV) Berthing Project	New TPS Pier	4A	n/a	2020	35	24-inch concrete square	165	n/a	impact	n/a	200	55
							18-inch concrete square	50	n/a	impact	n/a	80	17
							24-inch concrete square	n/a	121	n/a	vibratory	n/a	8
		Small Craft Berth Site VI	4B	5936	2020	35	24-inch steel round	30	30	impact	vibratory	100	8
5	Magnetic Silent Facility with Cranes (RM14-1710 Trident Refit Facility Waterfront Facilities Repair)		5	5980	2017	46	18-inch composite round	18	n/a	vibratory	n/a	n/a	3
							16-inch timber round	n/a	18	n/a	vibratory	n/a	3
6	Demolition of the Transit Protection System Pier and Layberth North Trestle	TPS Pier Demolition	6A	5934	2022	46	24-inch concrete square	0	649	n/a	vibratory	n/a	41
		Layberth North Pier Demolition	6B	5977	2022	46	24-inch concrete square	0	121	n/a	vibratory	n/a	6

[1]Projected fiscal year during which in-water construction will start; [2]For impact driving only, the estimated maximum number of strikes required to drive each pile; actual number of strikes per pile may be lower, [3]Estimated maximum total number of days of active pile driving

Figure 2-2. General Locations of the Proposed Projects

Figure 2-3. Existing Layberth Pier in Site VI and Modifications for Projects 4 and 6

2.2.1.1 1A: Tug Pier Repair

The existing Tug Pier is currently operating in a generally dilapidated and unsafe condition. Although several timber piles appear to have recently been replaced, extensive marine borer damage[1] has caused significant loss of pile integrity near the low tide level on 53 older timber fender piles along the inboard (center) side of the pier head and the pier approach. Deterioration and cracking, such as spalling[2], delamination, and corrosion of internal reinforcing steel are occurring on six concrete piles, 23 concrete pile caps, and 20 square feet of concrete deck underside. Forty-four mooring fittings show areas of coating loss and surface corrosion.

Under the Project, the Tug Pier concrete structural piles, pile caps[3], headwall, and deck undersides would be repaired. Concrete would be removed to expose the corroded steel reinforcing bars in areas where the concrete has already cracked and spalled, the steel would be repaired or replaced, and the overlying concrete restored. Wooden fender[4] piles would be replaced with concrete piles. The steel reinforcing bars and utility cover grates would be replaced as needed. The fender system on the south side of the access pier would be modified with floats on guide piles to allow mooring of smaller vessels. The concrete base support structures on mooring hardware would be repaired and the mooring hardware would be repainted. All broken and cracked wooden fenders piles and wooden fender piles with wooden guide piles would be replaced with concrete piles

Repairing the Tug Pier would require the installation of 148 new 18-inch square concrete piles, the installation of 18, 24-inch square concrete piles, and the removal of 159 existing 16-inch wood fender piles. The piles would be removed with a vibratory hammer. The concrete piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that five to 16 piles would be removed or installed per day or up to 65 days of in-water work. In-water work is scheduled to begin in Fiscal Year (FY) 17.

2.2.1.2 1B: Crab Island Access Pier Repairs

The Access Pier at Crab Island was impacted by tropical storms in 2012 and the wooden guide piles are damaged. New fiberglass re-enforced plastic composite guide piles with HDPE jackets would be installed at the Access Pier, and the gangplank and handrails would be repaired. Repairing the Access Pier at Crab Island would require the installation of two, 16-inch round composite piles and the vibratory removal of two wooden guide piles. Extraction and installation would both be performed using a vibratory hammer. It is anticipated that an average of two piles would be installed or removed per day for approximately two days of in-water work. In-water work is scheduled to begin in FY17.

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[1] Marine borers bore into and eat submerged wood; infestation results in piles becoming riddled and eventually collapsing.

[2] Spalling/delamination are the separation and breaking away of layers or small pieces of concrete.

[3] Pile caps transmit the load from the structure to the pile group.

[4] Fenders protect the submarine and shore facility from damage due to contact between the two during berthing and mooring.

2.2.2 Project 2: Unspecified Minor Construction Layberth Fender Pile Modification (P661)

The Layberth Pier serves the critical functions of weapons loading and unloading, resupply, and maintenance activities for allied vessels visiting SUBASE Kings Bay. The Pier is currently designated as a site for loading Tomahawk missiles in the event weapons loading operations are underway in one of the Explosive Handling Wharves. The loss of the use of this pier would significantly impact SUBASE Kings Bay's ability to berth SSBNs, SSGNs, and foreign vessels. The existing Layberth fenders are currently installed on 5-foot centers (i.e., center of pile to center of pile), and the gaps between the fender piles are too wide to adequately support the hydro-pneumatic fenders. Hydro-pneumatic fenders are designed to provide a high level of energy absorption with linear distribution load distribution making them highly effective to protect both a berthing vessel and the fender system.

The Unspecified Minor Construction (UMC) Layberth Fender Pile Modification P661 would provide berthing for the Submarine Group 10 SSGN homeported at SUBASE Kings Bay, berthing for visiting vessels, and overflow berthing for Tridents homeported at SUBASE Kings Bay. By reducing the distance between existing piles by installing additional piles, the pier would provide necessary structural support required for the installation and operation of an upgraded Yokahama pneumatic fender, which is necessary to safely moor submarines.

Upgrading the Layberth pier would require the installation of 55 new 14-inch steel H-piles. No existing piles would need to be removed. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of eight piles would be installed per day for approximately seven days of in-water work. In-water work is scheduled to begin in FY17.

2.2.3 Project 3: Waterfront Repair and Replacement Maintenance Program

The Waterfront Pile Repair and Replacement Maintenance Program consist of repairing and/or replacing structurally unsound piles along the waterfront restricted area (WRA). This project includes multiple individual projects as follows:

- Project 3A: Explosives Handling Wharf #2, Pier with Capstans, FAC #5109
- Project 3B: (Dry Dock) Interface Wharf, FAC #5995
- Project 3C: Refit Wharf #1, FAC #5909
- Project 3D: Refit Wharf #2, FAC #5910
- Project 3E: Refit Wharf #3, FAC #5916
- Project 3F: Warping Wharf with Capstan, FAC #5877
- Project 3G: Tug Pier, FAC #5926

2.2.3.1 3A: Explosives Handling Wharf #2 Pier with Capstans

The Explosive Handling Wharves at SUBASE Kings Bay serve as covered deep water facilities for the loading and off-loading of munitions and other heavy objects onto submarines. Without this facility in operational condition, the secondary loading location would be the only place for such actions to take place. In the event of a mechanical failure or any other event causing the secondary location to be disabled, munitions or heavy supplies could not be loaded or unloaded from the submarines.

Explosives Handling Wharf #2 displays significant deterioration of a non-rated cleat mooring fitting on the diver's float, various high-density polyethylene (HDPE) fender pile wraps, sacrificial anodes attached to the steel fender piles, steel safety ladders and treated timber bracing; damaged reinforced concrete on various pile caps, piles, and mooring foundations. Likewise, mooring fittings and two steel guide pipe piles on the diver's float require cleaning and repainting.

Upgrading Explosives Handling Wharf #2 would require the installation of two new 24-inches round steel piles and the removal of two guide piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated two piles would be installed or removed per day for approximately two days of in-water work.

Additional future repair projects at this location may include the installation of three, 24-inch square concrete and ten, 24-inch round steel piles and the removal of three dolphin piles and ten fender piles. The piles would be removed and installed as described in the above paragraph. For the second phase, it is anticipated that three to eight piles would be removed or installed per day or up to nine days of in-water work. The in-water work is scheduled to begin in FY22.

2.2.3.2 3B: (Dry Dock) Interface Wharf

The Interface Wharf serves as a loading and unloading for the submarine fleet as well as a service and storage wharf for non-dry-dock repairs and maintenance. Without this facility in operational condition, other refit wharves or the dry dock would have to be used to complete such tasks.

The existing Interface Wharf is increasingly deteriorating. Marine borer damage and subsequent peeling and rot are documented on 96 timber fender piles at and below mean high water (MHW). Fifteen linear feet of timber wale at the curb elevation has impact and rot damage. Spalled concrete occurs at one location on the bullrail corner, on one mooring foundation, on one location on the deck at the handrail attachment, and on two linear feet of the beam seat on the east side of the dry dock gate. All steel fender piles show areas of surface corrosion within and immediately above the tidal zone. (Visual examination and ultrasonic thickness testing indicates the steel piles have up to 0.25-inch of rust scale; the actual loss of steel is less than 0.125-inch loss of actual steel thickness.)

Under the Project, the timber fender bearing strips and wales would be replaced, and the concrete deck, bullrail, edge beams, and mooring foundations would be repaired. Additionally, the steel H Pile fender system would be repaired and painted. Cathodic protection would be recoated on the steel H Pile fender system and sheet pile.

Repairing the Interface Wharf would require the installation of 99 new 14-inch steel H-piles and removal of 99 existing 14-inch steel H-piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of 14 piles would be removed or installed per day for approximately 15 days of in-water work. The in-water work is scheduled to begin in FY21.

2.2.3.3 3C: Refit Wharf 1

Refit Wharfs 1, 2, and 3 provide storage and maintenance services to Trident Submarines and others as requested, including incremental overhaul, modernization, and repair support. All three Refit Wharfs are in disrepair and present a safety risk to the personnel and heavy equipment utilizing the pier; in certain areas, it is recommended that vehicles, mobile cranes, storage and any other heavy loads be prohibited

from within the areas supported by deteriorated pile cap locations to limit the possibility of further damage or structural failures. Without the wharves in operational condition, submarines would need to be docked at other locations for repairs, reducing the operational efficiency of Kings Bay maintenance mission, extending the length of vessel docking times, and creating congestion with other vessels already in port.

Refit Wharf 1 displays damaged steel beams supporting the outboard access walkway; damaged reinforced concrete on various pile caps, piles, and the outboard edge beam. Likewise, several mooring fittings require repair, cleaning, and painting.

Repairing Refit Wharf 1 would require the installation of six, 24-inch round steel guide piles and the removal of six existing 30-inch fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of six piles would be removed or installed per day for approximately two days of in-water work. The in-water work is scheduled to begin in FY18.

2.2.3.4 3D: Refit Wharf 2

Refit Wharf 2 displays broken steel beams supporting the outboard access walkway and damaged reinforced concrete on various pile caps, piles, outboard edge beams, and mooring foundations. Additionally, some of the underdeck lighting conduit is detached and various mooring fittings require cleaning and repainting.

Repairing Refit Wharf 2 would require the installation of six, 24-inch round steel guide piles and the removal of six existing 30-inch fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of six piles would be removed or installed per day for approximately two days of in-water work. The in-water work is scheduled to begin in FY17.

2.2.3.5 3E: Refit Wharf 3

Refit Wharf 3 displays broken steel beams supporting the outboard access walkway and damaged reinforced concrete on various pile caps, piles, the outboard edge beams, and mooring foundations. Likewise, the mooring fittings require cleaning and painting.

Repairing Refit Wharf 3 would require the installation of six, 24-inch round steel guide piles and the removal of six, 30-inch fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of six piles would be removed or installed per day for approximately two days of in-water work. The in-water work is scheduled to begin in FY18.

2.2.3.6 3F: Warping Wharf with Capstan

The Warping Wharf serves as a non-covered extension of the inboard leg of the Explosives Handling Wharfs used for aligning submarines prior to berthing in the covered facilities. This facility provides for quick transfer from one Explosives Handling Wharf to the other, as well as protection for the submarines as there is a continuous barrier beside the submarine and attached capstans during docking. The Warping Wharf also functions as a berthing facility for Fleet Ballistic Cargo Ships.

Deterioration at the Warping Wharf includes various degraded HDPE fender pile wraps and damaged reinforced concrete on various pile caps, piles, and mooring foundations. Likewise, the mooring fittings require cleaning and painting.

Repairing the Warping Wharf would require the installation of eight, 30-inch round steel piles and the removal of eight existing fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of five piles would be removed or installed per day for approximately four days of in-water work. The in-water start work is scheduled to begin in FY21.

2.2.3.7 3G: Tug Pier

Although this location is also discussed in Project 1A, additional future repair projects at this location may include the installation of 77 new 14-inch steel H-piles and removal of 77 existing steel fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of 10 piles would be removed or installed per day for approximately 16 days of in-water work. The in-water work is scheduled to begin in FY22.

2.2.4 Project 4: Transit Protection System Off-Shore Supply Vessel Berthing Modification Project

This project includes the construction of an onshore TPS Headquarters/Operational Support Facility, the construction of a new pier associated with TPS functions, and the modification of the existing berthing pier on the north trestle at Site VI to comply with current DOD and Navy security directives.

2.2.4.1 4A: New Facility

The new TPS pier would be provided with full hotel service capability including power, potable water, fire protection, wastewater, Ship Overboard Drainage (SOD) collection, fuel, and telecommunications (i.e., telephone, cable, and Local Area Network [LAN] services). The construction of the new pier would require the installation of 165 new 24-inch square concrete piles and 50 new 18-inch square concrete piles. Approximately 121 piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated 16 to 22 piles would be removed and three to 12 piles would be installed per day for approximately 80 days of in-water work. The in-water work is scheduled to begin in FY20.

2.2.4.2 4B: Small Craft Berth Site VI (P617)

The existing berthing pier on the north trestle at Site VI would be relocated to align with the new pier associated with the proposed TPS Headquarters/Operational Facility and modified to accommodate two offshore supply vessel s (OSVs); two, 87-foot Coast Guard Cutters (CGC); six, 33-foot long Screening Vessels (SVs); and six, 72-foot long SVs in accordance with current DOD and Navy security directives. The berthing pier would consist of a pile-supported, reinforced concrete structure including floating sections to berth the smaller craft. Two, 5,000 gallon horizontal, protected above-ground storage tanks and two associated truck off-loading connections (one for each tank) and fuel dispensing units for refueling the U.S. Coast Guard escort vessels would be installed.

As with the new pier described as Project 4A, the floating berthing slips would be provided with full hotel services. Drainage water from the piers would be collected, run through oil-water separators, and then

disposed through existing sewage connections. The modification of the small craft berthing site associated with the TPS Pier and Headquarters Facility would require the installation of 30 new 24-inch round steel piles and the removal of 30 existing piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of eight piles would be installed or removed per day for approximately eight days of in-water work. The in-water work is scheduled to begin in FY20.

2.2.5 Project 5: RM14-1710 TRIREFFAC Waterfront Facilities Repair, Magnetic Silencing Facility with Cranes

The Magnetic Silencing Facility (MSF) serves as a degaussing (process of decreasing or eliminating a remnant magnetic field) station for Trident Submarines. During normal oceanic operations ships and submarines naturally build up a magnetic signature, which can be visible and exploitable by enemy craft as well as damaging to sensitive equipment aboard the ship. The earth's magnetic fields between the North and South Poles are being crossed routinely at sea, and while either traversing these natural fields or lying dormant for extended periods of time during scheduled maintenance, a vessel's magnetic signature changes. To minimize the level of permanent magnetism, the MSF treatment slip is the first structure vessels encounter on their way into or out of SUBASE Kings Bay facilities.

The MSF at Kings Bay is in a deteriorated condition. Deterioration includes a broken 5-linear foot aluminum utility tray, one fender system restraining chain, and one utility guide bracket. Marine borer damage is occurring on one timber fender pile at and below MLW. The concrete underdeck has a 6-linear foot crack (0.125-inch wide).

The Project would replace the MSF and MSF trestle timber fender piles, restraining chains, aluminum utility tray, and concrete pile utility guide bracket. Wooden hand rails and the cracked concrete deck underside would be repaired. Repairing the MSF and MSF trestle would require the installation of 18 new 18-inch round composite piles. The fiberglass re-enforced plastic composite piles would be driven by a vibratory hammer. It is anticipated that an average of six piles would be installed per day for approximately three days of in-water work. The in-water work is scheduled to begin in FY17.

2.2.6 Project 6: Demolition Project using Restoration Modernization Funds: TPS Pier and North Trestle

As part of this project, the existing TPS Pier and the North Trestle would be demolished. The North Trestle and TPS Pier were designed to meet the short-term need to moor a floating dry dock and med-moor (moor using a bow anchor and stern lines to attach to the dock) a submarine tender for Poseidon Class submarines. This project includes the following components:

- Project 6A: Demolition of the TPS Pier (FAC #5934)
- Project 6B: Demolition of the North Trestle (FAC #5977)

2.2.6.1 6A: Demolition of the TPS Pier

Demolition of the TPS pier would require the vibratory removal of 649 existing 24-inch square concrete piles. It is anticipated that an average of 16 piles would be removed per day for approximately 41 days of in-water work. The in-water work is scheduled to begin in FY22.

2.2.6.2 6B: Demolition of the North Trestle

The trestle was intended as an interim fix during the transition to the newer Ohio Class submarines as the Poseidon Class submarines were decommissioned. The facility is obsolete, in poor condition, and cannot meet any current or future mission needs cost effectively. Demolition of the Layberth North trestle would require the removal of 121 existing 24-inch square concrete piles. The piles would be removed with a vibratory hammer. It is anticipated that an average of 20 piles would be removed per day for approximately six days of in-water work.

2.3.1 Best Management Practices

2.3.1.1 General Construction Best Management Practices

1) All work shall adhere to performance requirements of the Clean Water Act, Section 404 permit and Section 401 Water Quality Certification. No in-water work shall begin until after issuance of regulatory authorizations.
2) The construction contractor is responsible for preparation of an Environmental Protection Plan. The plan shall be submitted and implemented prior to the commencement of any construction activities and is a binding component of the overall contract. The plan shall identify construction elements and recognize spill sources at the site. The plan shall outline BMPs, responsive actions in the event of a spill or release, and notification and reporting procedures. The plan shall also outline contractor management elements such as personnel responsibilities, project site security, site inspections, and training.
3) No petroleum products, lime, chemicals, or other toxic or harmful materials shall be allowed to enter surface waters.
4) Washwater resulting from washdown of equipment or work areas shall be contained for proper disposal, and shall not be discharged unless authorized.
5) Equipment that enters surface waters shall be maintained to prevent any visible sheen from petroleum products.
6) No oil, fuels, or chemicals shall be discharged to surface waters, or onto land where there is a potential for re-entry into surface waters shall occur. Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. shall be checked regularly for leaks, and be maintained and stored properly to prevent spills.
7) No cleaning solvents or chemicals used for tools or equipment cleaning shall be discharged to ground or surface waters.
8) Construction materials shall not be stored where high tides, wave action, or upland runoff could cause materials to enter surface waters.
9) Barge operations shall be restricted to tidal elevations adequate to prevent grounding of a barge.

2.3.1.2 Pile Removal and Installation Best Management Practices

1) A containment boom surrounding the work area shall be used during creosote-treated pile removal to contain and collect any floating debris and sheen. The boom may be lined with oil-absorbing material to absorb released creosote.
2) Oil-absorbent materials shall be used in the event of a spill if any oil product is observed in the water.
3) All creosote-treated material and associated sediments shall be disposed of in a landfill that meets Georgia environmental standards.
4) Removed piles and associated sediments (if any) shall be contained on a barge. If a barge is not utilized, piles and sediments may be stored in a containment area near the construction site.
5) Pilings that break or are already broken below the waterline may be removed by wrapping the piles with a cable or chain and pulling them directly from the sediment with a crane. If this is not possible, they shall be removed with a clamshell bucket. To minimize disturbance to bottom sediments and splintering of piling, the contractor shall use the minimum size bucket required to pull out piling based on pile depth and substrate. The clam shell bucket shall be emptied of piling and debris on a contained barge before it is lowered into the water. If the bucket contains only sediment, the bucket shall remain closed and be lowered to the mud line and opened to redeposit the sediment. In some cases (depending on access, location, etc.), piles may be cut below the mud line and the resulting hole backfilled with clean sediment.
6) Any floating debris generated during installation shall be retrieved. Any debris in a containment boom shall be removed by the end of the work day or when the boom is removed, whichever occurs first. Retrieved debris shall be disposed of at an upland disposal site.
7) Whenever activities that generate sawdust, drill tailings, or wood chips from treated timbers are conducted, tarps or other containment material shall be used to prevent debris from entering the water.
8) If excavation around piles to be replaced is necessary, hand tools or a siphon dredge shall be used to excavate around piles to be replaced.
9) Soft starts are performed at the beginning of impact pile driving. During a soft start, an initial set of strikes from the impact hammer at reduced energy are performed before it is able to be operated at full power and speed. The energy reduction of an individual hammer cannot be quantified because they vary by individual drivers. Also, the number of strikes will vary at reduced energy because raising the hammer at less than full power and then releasing it results in the hammer “bouncing” as it strikes the pile resulting in multiple “strikes”. Initiating impact pile driving at a lower power may allow fish, marine mammals, and other wildlife an opportunity to move away from the immediate vicinity of the activity, thereby reducing the likelihood of exposure to sound levels that could cause further behavioral disturbance or injury.
10) All in-water construction activities shall occur during daylight hours (one hour post sunrise to one hour prior to sunset). Construction activities on land could occur between 6:00 AM and 10:00 PM during any time of the year.

2.3.2 Additional Minimization Measures for Protected Marine Species

The following minimization measures shall be implemented during pile driving to avoid protected marine species exposure to injurious noise levels generated from impact pile driving and to reduce to the lowest extent practicable exposure to behavioral disturbance noise levels.

2.3.2.1 Coordination

The Navy shall conduct a pre-construction briefing with the contractor. During the briefing, key personnel working in the Action Area shall receive information on how to identify and monitor for marine species.

2.3.2.2 Standard Conditions

The contractor shall adhere to all requirements of the following (full text included in Appendix A):

- *Sea Turtle and Smalltooth Sawfish Construction Conditions*
- *Southeast Regional Marine Mammal and Sea Turtle Viewing Guidelines*

Although West Indian manatees are not under NMFS' jurisdiction, implementation of the *Special Provisions for Manatees* (e.g., use of propeller guards, observing slow speeds, and proper deployment and monitoring of siltation barriers) may provide additional benefit to sea turtles and protected fish.

2.3.2.3 Visual Monitoring and Shutdown Procedures

Marine species observers ("observers") shall be stationed and implement shutdown of in-water work in accordance with the *Sea Turtle and Smalltooth Sawfish Construction Conditions* and *Southeast Regional Marine Mammal and Sea Turtle Viewing Guidelines*. The observers shall be designated by the contractor, placed at the best vantage point(s) practicable to monitor for protected species and shall have no other construction related tasks while conducting monitoring.

The observer(s) will monitor waters within the 50-foot shutdown zone for protected sea turtles and fish before and during pile removal and installation. The observer(s) will be placed at a vantage point (e.g., from a small boat, construction barges, on shore, elevated perch, or any other suitable location) suitable for monitoring the farthest extent of the shutdown zone. It shall be the contractor's responsibility to ensure that appropriate safety measures are implemented to protect observers. If a boat is used for monitoring, the boat will maintain minimum distances from all species (should they occur) as described in the *Viewing Guidelines*.

During all observation periods, observers would use binoculars and the naked eye to search continuously for ESA-listed species. If the shutdown zone is obscured by fog or poor lighting conditions, pile driving will not be initiated until the entire shutdown zone is visible.

The shutdown zone will be monitored for 15 minutes prior to in-water construction/demolition activities. If a protected species is observed in the shutdown zone, in-water activities shall be delayed until the animal(s) leaves the shutdown zone. Activity would resume only after the observer has determined, through re-sighting or by waiting approximately 15 minutes that the animal(s) has moved outside the shutdown zone. The observer(s) will notify the monitoring coordinator/construction foreman/point of contact (POC) when construction activities can commence.

2.3.2.4 Activity Monitoring

If a protected species approaches or enters the 50-foot shutdown zone during any in-water work, activity will be halted and delayed until either the animal has voluntarily left and been visually confirmed beyond the shutdown zone or 15 minutes have passed without re-detection of the animal.

2.3.2.5 Data Collection

The following information will be collected on sighting forms used by observers:

- Date and time that pile driving or removal begins or ends
- Construction activities occurring during each observation period
- Weather parameters identified in the acoustic monitoring (e.g., wind, temperature, percent cloud cover, and visibility)
- Tide and sea state

If a protected species approaches or enters the shutdown zone, the following information will be recorded once shutdown procedures have been implemented:

- Species, numbers, and if possible sex and age class of the species
- Behavior patterns observed, including bearing and direction of travel
- Location of the observer and distance from the animal(s) to the observer

If possible, photographs of the animal(s) will be taken and forwarded to the Naval Facilities Engineering Command, Southeast Environmental point of contact.

Data collection forms shall be furnished to the Environmental point of contact within a mutually agreeable timeframe.

2.3.2.6 Interagency Notification

If the Navy encounters an injured, sick, or dead protected marine species, NMFS will be notified immediately. Such sightings will be called into the NMFS Stranding Coordinator for the Southeast. The Navy will provide NMFS with information such as the species or description of the animal(s), the condition of the animal (including carcass condition if the animal is dead), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

In preservation of biological materials from a dead animal, the observer has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed. Observers should not handle dead animals.

2.3.2.7 Reporting

Monitoring reports will be provided to NMFS in accordance with timelines established during the consultation process.

3. Description of Endangered and Threatened Species

A total of seven endangered or threatened species under the jurisdiction of NMFS have the potential to occur in the Action Area. A discussion of each species and their known or potential occurrence within the Action Area is presented below. No critical habitat for any of the seven species has been designated within the vicinity of the Proposed Action.

3.1 Fish

Two ESA-listed fish, the Atlantic sturgeon and the shortnose sturgeon, may occur in the area of the Proposed Action. Critical habitat has not been designated for either species.

3.1.1 Atlantic Sturgeon

Based on telemetry tracking data, Atlantic sturgeon from the New York Bight, Chesapeake Bay, Carolina, and South Atlantic DPSs could occur in the vicinity of the Action Area (Peterson, pers. comm. 2015a). In waters off the southeastern U.S., spawning adults migrate upriver during the summer months. After spawning in freshwater in the late summer and fall, adults migrate back into estuarine and marine waters (Kahn, pers. comm. 2015). The Navy has funded a project to tag Atlantic and shortnose sturgeon in the St. Marys River (eight Atlantic sturgeon and two shortnose sturgeon have been tagged) and to place and monitor sturgeon tag detectors in the St. Marys River, estuary, and Cumberland Sound. Information to date indicates that sturgeon tagged in the St. Marys River remain in the St. Marys River main stem, well upstream of SUBASE Kings Bay. An Atlantic sturgeon tagged in the Altamaha River was detected once, but only at one of four receivers in Cumberland Sound (Peterson, D. personal communication, 18 March 2015). Although the data are temporally limited at this time, the best available data indicate that use of the waters off SUBASE Kings Bay may be limited.

Numbers of Atlantic sturgeon in the South Atlantic DPS are low compared to historic levels. Currently there are several hundred to a few thousand adult Atlantic sturgeon spawning annually in the Altahama River – the closest major breeding territory (Wilcox, pers. comm. 2013). The St. Marys River population size of Atlantic sturgeon has never been assessed; however, it is possible that a spawning population may exist in the river.

3.1.2 Shortnose Sturgeon

The shortnose sturgeon was listed as endangered under the Endangered Species Preservation Act of 1966, which predated the ESA; this species remains listed as endangered under the ESA throughout its range along the Atlantic coast (NMFS 1998).

The historical range of shortnose sturgeon extended from New Brunswick, Canada to as far south as the St. Johns River in Florida. According to the most recent Biological Assessment of shortnose sturgeon by NMFS (2010b), the Altamaha River in Georgia contains the southern-most known viable spawning population. The presence of shortnose sturgeon has been documented in the Satilla River and St Marys River in Georgia, and the St Johns River in Florida, but these populations are thought to be small and spawning in the rivers has not been confirmed (NMFS 2010).

In June and July 2014, two shortnose sturgeon were captured in the St. Mary's River using gill nets and tagged with acoustic telemetry transmitters. In addition, a telemetry receiver array consisting of 14 receivers was deployed throughout the lower St. Marys River from approximately river kilometer (rkm) 0-42 and within Cumberland Sound to track the movements of these fish. Based on data downloaded from

receivers through 14 December 2014, all detections of the two shortnose sturgeon tagged in the St. Marys River were obtained from receivers at or above rkm 18 (upriver of the waterfront downtown area of the city of St. Marys). Detections of these fish were mainly concentrated around the area of the 95 highway bridge. Neither of the tagged shortnose sturgeon left the St. Mary's River during the six months following their tagging and subsequent release (Peterson, pers. comm. 2015b).

3.2 Sea Turtles

Five ESA-listed sea turtles have the potential to occur in the Action Area: green, hawksbill, Kemp's ridley, leatherback, and loggerhead sea turtles. There is no sea turtle nesting habitat in the Action Area. Critical habitat has been designated for green, hawksbill, leatherback, and loggerhead sea turtles, but none is found in the Action Area.

3.2.1 Green Sea Turtle

Most green sea turtle sightings north of Florida are of juveniles and occur during late spring to early fall (Burke et al. 1992; Epperly et al. 1995; Lazell 1980). Nesting typically occurs on the Atlantic coast of southern Florida; however, nests have also been reported from the Florida panhandle, Georgia, Alabama, South Carolina, North Carolina, and Texas (NMFS and USFWS 2007a; The State of the World's Sea Turtles Team 2011). In the vicinity of the Proposed Action, green sea turtles in very small numbers. The closest location is Cumberland Island where four nests were documented in 2015 (STNMS 2015). No nests have been documented in the Action Area.

3.2.2 Hawksbill Sea Turtle

Hawksbill sea turtles are rare north of Florida (Lee and Palmer, 1981; Keinath et al. 1991; Parker 1995; Plotkin 1995; USFWS 2001), but small hawksbills have stranded as far north as Cape Cod, Massachusetts (NMFS 2006). Virtually all hawksbill nesting is restricted south of latitudes 25°N, and has not been reported north of Cape Canaveral National Seashore, Florida (Meylan and Redlow 2006). Hawksbill occurrence in the Action Area is possible but not likely.

3.2.3 Kemp's Ridley Sea Turtle

Kemp's ridley sea turtles have been documented foraging and migrating seasonally through Georgia's coastal waters. Satellite telemetry data suggest that sea turtles migrate south in October and November from Georgia and northern Florida to the waters south of Cape Canaveral - and return to their summer foraging grounds in March and April. Therefore, higher densities of Kemp's ridley sea turtles in Georgia can be expected between April and October (Morreale and Standora 2005). In recent years, nesting females have been seen as far north as Georgia and North Carolina. At this time it cannot be determined if these nests represent a permanent range expansion/shift, or if they simply represent seasonal variation or eccentric individuals. No nests have been documented in the Action Area.

3.2.4 Leatherback Sea Turtle

The leatherback sea turtle is the most oceanic and wide-ranging of sea turtles, undertaking extensive migrations of thousands of kilometers (Morreale et al. 1996; Hughes et al. 1998). Individuals migrate northward along the southeast coast of the U.S. from late winter through early spring. By April and May, leatherbacks begin to occur in larger numbers off the coasts of Georgia and the Carolinas (NMFS 1995, 2000).

Aerial surveys off the southeastern U.S. coast indicate that leatherback sea turtles occur in these waters throughout the year, with peak abundance in summer (Turtle Expert Working Group 2007). In spring, leatherback sea turtles appear to be concentrated near the coast, while other times of the year they are spread out as far as the Gulf Stream. As with green sea turtles, the closest nesting location is Cumberland Island where two leatherback nests were documented in 2015 (STNMS 2015).

3.2.5 Loggerhead Sea Turtle

Individual loggerheads occurring in the Action Area would most likely belong to the Northwest Atlantic Ocean DPS, which is currently classified as threatened under the ESA. Within the DPS there are at least five demographically independent loggerhead sea turtle nesting groups or subpopulations of the Northwest Atlantic Ocean.

In the southeastern United States, nesting season for loggerheads takes place from May through October (FWC 2007), and they nest regularly on Georgia's barrier islands (GADNR 2015). During 2015, 570 loggerhead nests were documented at Cumberland Island (STNMS 2015).

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4. Environmental Baseline

4.1 Water Quality

Marine water quality at SUBASE Kings Bay reflects a mixing of ocean waters via tidal exchange through Cumberland Sound and freshwater inputs from rivers and tributaries (e.g., Crooked River, St. Mary's River, North River), and to a lesser extent stormwater outfalls.

Marine waters at the base experience substantial diurnal tidal fluctuations with measured currents capable of entraining and transporting coarse sands and small pebbles (Luey and Morris 2008). Fine-grained material is readily transported and either deposited in deepwater areas of the channel (Pinckard and Morris 2005, 2006) or transported toward the mouth of the estuary on ebb tides. The large tidal range and strong currents result in tidally mixed waters that are refreshed on a daily basis.

Water pollutants in the Action Area are typical of many industrial waterfronts with elevated levels of chromium, copper, and lead documented during 2015 sampling (Navy 2015).

In the past year, the nearest publicly-reporting data collection buoy (Fernandina Beach, approximately eight miles south of SUBASE Kings Bay) reported average water temperatures ranging from a low of 54 °F in February 2014 to a high of 85 °F in August 2014 (Figure 4-1) (NOAA 2015).

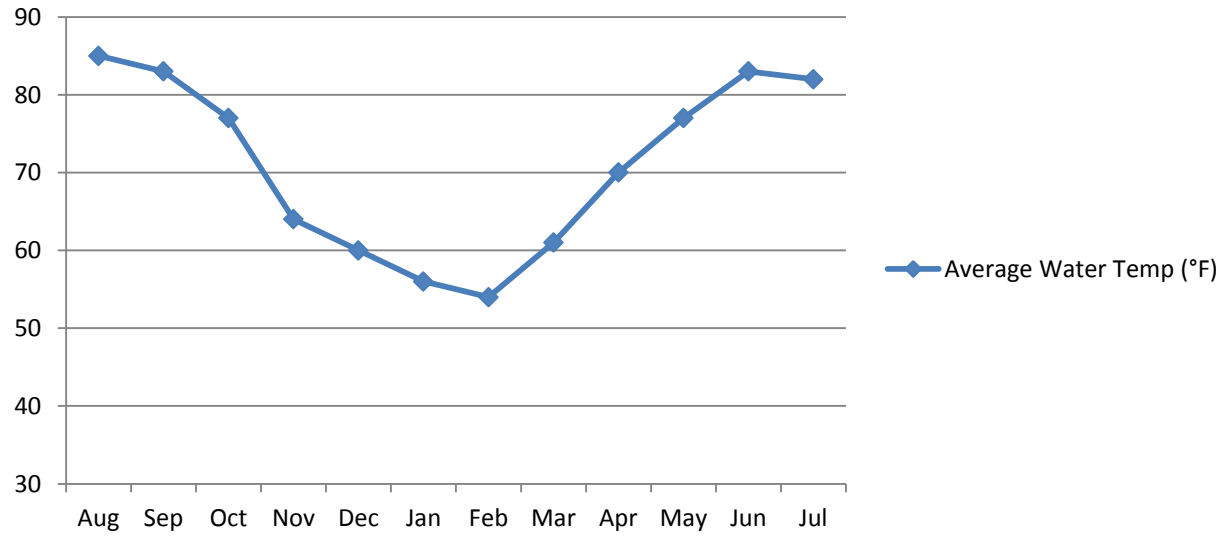

Figure 4-1. Average Temperatures (2014 / 2015)

4.2 Bathymetry and Sediments

The Kings Bay submarine channel is regularly maintenance-dredged and has fairly uniform depths of -45 feet mean lower low water (MLLW) (Figure 4-2). The submarine channel is depositional with fine-grained sediment, accumulation of organic matter, and reduced DO (Pinckard and Morris 2005, 2006). Benthic invertebrate communities within the channel are characterized as moderately to highly degraded due to the presence of low DO or methane bubbles indicative of anoxic conditions and presence of only opportunistic early succession organisms (e.g., species capable of quickly colonizing disturbed sites).

Channel maintenance results in a relatively narrow intertidal zone along most of the shoreline. The north end of Kings Bay is not dredged beyond the turning basin and abruptly transitions to shallow subtidal and intertidal habitat, with fine sands predominant in the channel and finer-grained silts and clays in marsh creeks. Shallow subtidal and intertidal habitat areas also occur along the northwestern and southwestern shoreline of Crab Island, and along the southern shoreline of the base between the south end of the developed waterfront area and the Magnetic Silencing Facility. These areas have a predominance of fine sands in more exposed locations (i.e., close to open channel) and silts and clays in more protected locations.

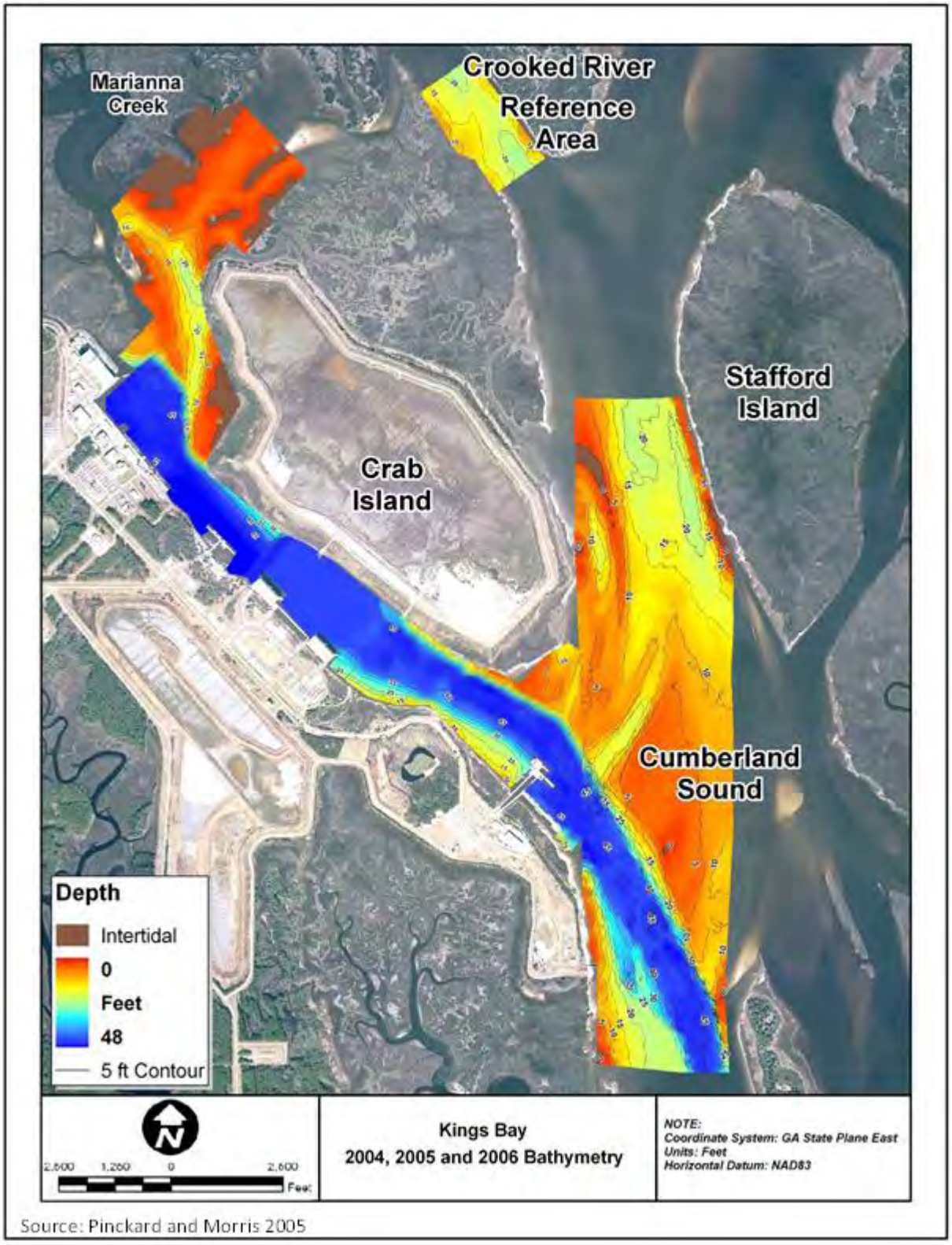

Figure 4-2. Bathymetry Adjacent to SUBASE Kings Bay

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5. Analysis of Potential Effects

5.1 Fish

Based on historical data and current tracking studies (Section 3.1), the potential for Atlantic or shortnose sturgeon to occur in the Action Area is low. However, should individual fish occur in the vicinity during in-water construction, they may be exposed to the stressors described below.

5.1.1 Temporary Resuspension of Sediments

Temporary resuspension of bottom sediments would affect water quality during vessel operations, removal of old piles, and installation of new piles. Resuspended sediments would increase turbidity and reduce dissolved oxygen periodically during in-water construction activities. The overall level of sediment disturbance associated with the Proposed Action would be significantly lower than that of maintenance dredging in the channel that occurs every couple of years, and resuspended sediments are expected to dissipate within a few hours (NMFS 2009).

In addition, as a sturgeon's typical method of foraging involves disturbing and resuspending bottom sediments in search of invertebrates such as isopods, crustaceans, worms, and mollusks, and since they do not rely on their sight to find prey, sturgeon are unlikely to be adversely affected by sediments resuspension as a result of construction activities related to the Proposed Action. Therefore, direct effects to sturgeon from changes in water quality are expected to be minimal.

5.1.2 Vessel Strikes

Sturgeon have been shown to be susceptible to vessel strikes (Brown and Murphy 2010; Balazik et al. 2012). Construction activities under the Proposed Action would require the use of barges and support vessels which could potentially collide with or cause short-term behavioral changes in sturgeon present in the area. However, barges and support vessels would move at slow speeds which would minimize chances for collision. Any behavioral changes due to encounters with vessels would not be expected to result in prolonged stress or compromise the fitness of individuals or populations.

5.1.3 Underwater Noise

Activities under the Proposed Action will result in increased underwater noise levels in SUBASE Kings Bay, due primarily to the installation and removal of support piles. Some noise will also be generated by support vessels, small boat traffic, and barge-mounted equipment, such as generators. Appendix B described fundamental principles of acoustics in detail.

5.1.3.1 Sound Exposure Criteria and Thresholds

Sound level criteria for fish were determined by NMFS in 2005. In 2008, the fish criteria were reviewed and revised following a multi-agency (including NMFS and USFWS) agreement (FHWG 2008); they are now referred to as the "Interim Criteria" (Table 5-1).

Table 5-1. Injury and Behavioral Thresholds for Fish

Functional Hearing Group	Impact Pile Driving (re 1µPa)		Vibratory Extraction (re 1µPa)	
	Injury Threshold	Behavioral Threshold	Injury Threshold	Behavioral Threshold
Fish (≥ 2 grams)	187 dB (re 1µPa^2*sec) cumulative SEL	150 dB rms	n/a	150 dB rms
Fish (< 2 grams)[1]	183 dB (re 1µPa^2*sec) cumulative SEL			
Fish (all sizes)	206 dB peak			

[1]Atlantic and shortnose sturgeon < 2 grams are not expected to occur in the Action Area based on upriver spawning locations (USFWS 1984, Balazik et al. 2012a)

Noise levels produced by pile driving are greatly influenced by factors including pile type, driving method, and the physical environment in which the activity takes place. A number of studies have examined sound pressure levels recorded from underwater pile driving projects in California and Washington, and a few studies have recently been conducted on the U.S. East Coast at a number of naval installations. Data are generally concentrated on steel pipe piles of a range of diameters, but other pile types have also been measured. These data were used to determine source level values for modeling the pile driving activities associated with the Proposed Action.

While some pile types are well-represented in the existing data, other types have been measured only infrequently. There were therefore a few different methods for determining the proxy source levels for modeling for the Proposed Action. The full methodology and source data are given in Appendix C. Data from the east coast were prioritized due to the differences in bathymetry and sediment between west coast sites in Washington and California, and the location at Kings Bay.

For composite piles (used in Projects 1B and 5), no measured data are available. The source level estimates for this type of pile were based on data from timber piles driven on the east coast of the United States.

Tables 5-2 and 5-3 summarize the proxy source levels and rationale used to model sound propagation for each pile type, as well as the projects associated with that pile type.

Table 5-2. Vibratory Installation Underwater Sound Pressure Levels* Expected Based on Similar In-Situ Monitored Construction Activities

Pile Type	Projects	Model Proxy	Proxy Source Level[1] [dB rms]
18-inch concrete	1A	24-inch steel pipe	166
24-inch concrete	3A, 4A, 6A, 6B	24-inch steel pipe	166
16 – 18-inch composite	1B, 5	12 – 16-inch timber piles	160
14-inch steel H	2, 3B, 3G	14-inch steel H	163
24-inch steel pipe	3A, 3D, 3C, 3E, 4B	24-inch steel pipe	166
30-inch steel pipe	3F	30-inch Steel Pipe	166

*Note that Peak and SEL metrics are not measured for vibratory driving. [1]See Appendix C for full reference list and source data.

Table 5-3. Impact Installation Underwater Sound Pressure Levels Expected Based on Similar In-Situ Monitored Construction Activities

Pile Type	Projects	Model Proxy	Proxy Source Level[1]		
			dB rms	dB Peak	dB SEL
18-inch concrete	1A, 4A	18-inch concrete	170	184	159
24-inch concrete	1A, 3A, 4A	24-inch concrete	174	184	165
14-inch steel H	2,3B, 3G	18-inch steel pipe	178	196	168
24-inch steel pipe	3A, 3C, 3D, 3E, 4B	24-inch steel pipe	190	206	179
30-inch steel pipe	3F	30-inch steel pipe	193	209	188

[1]See Appendix C for full reference list and source data.

5.1.3.2 Underwater Sound Propagation

Pile driving can generate underwater noise that may result in disturbance to sturgeon within the vicinity of the Proposed Action. Modeling sound propagation is useful in evaluating noise levels to determine which fish may be exposed at a given distance from the pile driving activity. The decrease in acoustic intensity as a sound wave propagates outward from a source is known as transmission loss (TL).

The formula for transmission loss is:

$$TL = B * log_{10}\left(\frac{R_1}{R_2}\right) + C * R_1, \text{ where:}$$

B = logarithmic (predominantly spreading) loss
C = linear (scattering and absorption) loss
R_1 = range from source in meters
R_2 = range from driven pile to original measurement location (generally 10 m)

The amount of linear loss (C) is proportional to the frequency of a sound. Due to the low frequencies of sound generated by impact and vibratory pile driving, this factor was assumed to be zero for all calculations in this assessment and transmission loss was calculated using only logarithmic spreading. Therefore, using practical spreading (B=15), the revised formula for transmission loss is $TL = 15 \log_{10} (R_1/10)$.

5.1.3.3 Calculated Zones of Influence

The practical spreading loss model discussed above was used to calculate the propagation of pile driving sound in and around the individual project locations within the Action Area. No sound mitigation methods (bubble curtains, cofferdams, etc.) are proposed and therefore no attenuation was included in the acoustic model. All projects are assumed to happen independently, with only one pile driving rig operating at any given time. No simultaneous driving of multiple piles was modeled.

The waters of SUBASE Kings Bay do not represent open water conditions (free field) and sounds will attenuate as it contacts land or other solid obstacles. As a result, the distances calculated may not actually be attained at the Action Area. The actual distances to the behavioral disturbance thresholds for impact and vibratory pile driving are likely to be shorter than those calculated due to the irregular contour of the waterfront and the maximum fetch (farthest distance sound waves travel without obstruction [i.e., line of sight]) at the Action Area. Table 5-4 details the range to effect for pile driving noise. Maps of the zones of influence (ZOIs) associated with each of the projects under the Proposed Action are presented in Appendix D.

Table 5-4. Modeled Zones of Influence for Fish Noise Thresholds

Project	Map ID	FAC #	Fiscal Year[1]	Pile Description	Behavioral Threshold (150 dB re 1µPa rms)				Injury Threshold (Impact Only)					
					Vibratory		Impact		All Sizes (206 dB Peak)		>2 grams (187 dB SEL)		<2 grams[1] (183 dB SEL)	
					Distance (m)	Area (km^2)	Distance (m)	Area (km^2)	Distance (m)	Area (km^2)	Distance (m)	Area (km^2)	Distance (m)	Area (km^2)
Tug Pier	1A	5926	2017	18-inch square concrete	-----	-----	215.4	0.1115	0.3	0	13.2	0.0006	24.4	0.0019
				24-inch square concrete	-----	-----	398.1	0.2853	0.3	0	36.8	0.0042	68.0	0.0145
				16-inch timber round	54.1	0.0092	-----	-----	-----	-----	-----	-----	-----	-----
General Access Pier Crab Island	1B	5888	2017	16-inch composite round	54.1	0.0078	-----	-----	-----	-----	-----	-----	-----	-----
				16-inch timber round	54.1	0.0078	-----	-----	-----	-----	-----	-----	-----	-----
Unspecified Minor Construction Layberth Fender Pile Modification P661 Project	2	5976	2017	14-inch steel H	-----	-----	735.6	1.0072	2.2	0	40.2	0.0051	74.3	0.0168
Explosive Handling Wharf #2 Pier w/Capstans	3A	5109	2017	24-inch steel round	116.6	0.0406	4641.6	3.6093	13.6	0.0006	107.3	0.0352	198.3	0.0976
			2022	24-inch concrete square	116.6	0.0406	398.1	0.3184	0.3	0	12.6	0.0005	23.3	0.0017
			2022	24-inch steel round	116.6	0.0406	4641.6	3.6399	13.6	0.0006	270.5	0.1640	499.8	0.4536
(Dry Dock) Interface Wharf	3B	5995	2021	14-inch steel H	73.6	0.0088	735.6	0.5093	2.2	0	48.2	0.0038	89.0	0.0127
Refit Wharf #1	3C	5909	2018	24-inch steel round	-----	-----	4641.6	2.5614	13.6	0.0006	223.3	0.0632	412.6	0.1853
				30-inch steel round	116.6	0.0213	-----	-----	-----	-----	-----	-----	-----	-----
Refit Wharf #2	3D	5910	2017	24-inch steel round	116.6	0.0214	4641.6	2.7441	13.6	0.0006	223.3	0.0784	412.6	0.2603
				30-inch steel round	116.6	0.0214	-----	-----	-----	-----	-----	-----	-----	-----
Refit Wharf #3	3E	5916	2018	24-inch steel round	-----	-----	4641.6	3.0728	13.6	0.0003	223.3	0.0813	412.6	0.2735
				30-inch steel round	116.6	0.0214	-----	-----	-----	-----	-----	-----	-----	-----

dB = decibel; rms = root-mean-square; µPa = micro Pascal; n/a = not applicable; Practical spreading loss (15 log, or 4.5 dB per doubling of distance) used for calculations; sound pressure levels used for calculations are given in Tables 5-2 and 5-3; [1]Atlantic and shortnose sturgeon < 2 grams are not expected to occur in the Action Area based on upriver spawning locations (USFWS 1984, Balazik et al. 2012a)

Table 5-4. (*continued*) Modeled Zones of Influence for Fish Noise Thresholds

Project	Map ID	FAC #	Fiscal Year[1]	Pile Description	Behavioral Threshold (150 dB re 1µPa rms)				Injury Threshold (Impact Only)					
					Vibratory		Impact		All Sizes (206 dB Peak)		>2 grams (187 dB SEL)		<2 grams[1] (183 dB SEL)	
					Distance (m)	Area (km^2)	Distance (m)	Area (km^2)	Distance (m)	Area (km^2)	Distance (m)	Area (km^2)	Distance (m)	Area (km^2)
Warping Wharf w/Capstan	3F	5877	2021	30-inch steel round	116.6	0.035	7356.4	3.4758	21.5	0.0015	313.4	0.1935	579.0	0.5188
Tug Pier	3G	5926	2022	14-inch steel H	73.6	0.017	735.6	0.6016	2.2	0	38.5	0.0046	71.1	0.0159
New TPS Pier	4A	n/a	2020	18-inch concrete square	-----	-----	215.4	0.1430	0.3	0.281	13.2	0.0005	24.4	0.0019
				24-inch concrete square	116.6	0.0427	398.1	0.3956	0.3	0.281	61.2	0.0117	100.0	0.0314
Small Craft Berth Site VI	4B	5936	2020	24-inch steel round	116.6	0.0425	4641.6	6.789	13.6	0.0006	343.1	0.2607	634.0	0.7759
Magnetic Silent Facility with Cranes (RM14-1710 Trident Refit Facility Waterfront Facilities Repair)	5	5980	2017	18-inch composite round	54.1	0.0092	-----	-----	-----	-----	-----	-----	-----	-----
				16-inch timber round	54.1	0.0092	-----	-----	-----	-----	-----	-----	-----	-----
TPS Pier Demolition	6A	5934	2022	24-inch concrete square	116.6	0.0427	-----	-----	-----	-----	-----	-----	-----	-----
Layberth North Pier Demolition	6B	5977	2022	24-inch concrete square	116.6	0.0427	-----	-----	-----	-----	-----	-----	-----	-----

dB = decibel; rms = root-mean-square; µPa = micro Pascal; n/a = not applicable; Practical spreading loss (15 log, or 4.5 dB per doubling of distance) used for calculations; sound pressure levels used for calculations are given in Tables 5-2 and 5-3; [1]Atlantic and shortnose sturgeon < 2 grams are not expected to occur in the Action Area based on upriver spawning locations (USFWS 1984, Balazik et al. 2012a)

5.1.3.4 Behavioral Effects from Pile Driving Noise

Impacts to Atlantic or shortnose sturgeon from pile driving and extraction are expected to result primarily from acoustic pathways. As such, the degree of effect is related to the received level and duration of the sound exposure, which are in turn influenced by the distance between the animal and the source. The farther away from the source, the less intense the exposure will be. The substrate and depth of the habitat affect the sound propagation properties of the environment. Shallow environments are typically more structurally complex, which leads to rapid sound attenuation. In addition, substrates that are soft (e.g., sand), such as those in the waters off SUBASE Kings Bay, will absorb and attenuate the sound more readily than hard substrates (e.g., rock) which may reflect the acoustic wave. Soft porous substrates will also likely require less time to drive the pile, and possibly less forceful equipment, which would ultimately decrease the intensity of the sound. Based on the relatively small size of the zones in which noise may reach or exceed the established injury thresholds for fish (Table 5-4), effects are expected to be limited those associated with temporary behavioral changes.

Behavioral impacts to sturgeon could occur, but the type and severity of these effects are difficult to define due to individual differences in response and limited studies addressing the behavioral effects of sounds on fish. The behavioral responses most likely to occur during the Proposed Action are habituation and temporary avoidance (Ridgway et al. 1997; Finneran et al. 2003; Wartzok et al. 2003). Due to the relatively short duration of time required to drive or remove an individual pile, potential behavioral disturbances are anticipated to be intermittent and brief.

Pile driving of all types produces particle motions that may be perceptible to fishes' lateral line, likely resulting in some degree of avoidance behavior for fish that are both close to the pile being driven and deeper in the water column. Individual fish moving through the area may change course to avoid the ensonified area. Many of the projects may result in the ensonification of portions of Kings Bay or Cumberland Sound. However, given that the ensonified area would be effective only temporarily on any given day, disturbance of individual Atlantic or shortnose sturgeon would be considered insignificant. As explained by NMFS (2012, 2014), it is unlikely minor changes in behavior would preclude these species from completing any normal behaviors such as resting, foraging, or migrating or that the fitness of any individuals will be affected. Further, there is not expected to be an increase in energy expenditure that has any detectable effect on the physiology of individual Atlantic or shortnose sturgeon or any future effect on growth, reproduction, or general health.

5.1.4 Effects to Prey Species and Forage Habitat

Pile installation and removal, installation of in-water and shoreline structures, and temporary displacement of habitats for construction may remove or disturb prey and localized forage habitat for sturgeon, including infaunal and bottom-dwelling invertebrates such as polychaete worms, crustaceans, mollusks, and other benthic prey types (Newell et al. 1998). Removal of prey items during temporary disturbance from repair and construction activities would constitute a short-term impact.

Foraging habitat in the Action Area is of relatively low value as a result of ongoing anthropogenic disturbance. In general, minor disruptions or removal of small portions of benthic habitat that may result from the Proposed Action are expected to have minimal impacts on the overall availability of suitable foraging habitat for both Atlantic and shortnose sturgeon in the region. Therefore, effects resulting from disturbance of prey species and foraging habitat would be insignificant.

5.1.5 Conclusions

Based on the relatively low quality of foraging habitat in the Action Area compared to that which is available in the coastal waters off the southeastern U.S., and the highly localized nature of the impacts, temporary resuspension of sediments is not expected to result in measureable adverse effects to Atlantic or shortnose sturgeon.

Vessel strikes are unlikely to occur due to the slow speeds at which barges and support vessels would move, minimizing chances for collision. Any behavioral changes due to encounters with vessels would not be expected to result in chronic stress or compromise the fitness of individuals or populations.

In estimating the potential effects to Atlantic and shortnose sturgeon from pile driving noise, when the model applies the 187 or 183 dB re 1 μPa^2sec SEL injury thresholds, it assumes Atlantic and shortnose sturgeon are remaining within the range of effect during the entirety of a given 24-hour period. In other words, fish that remained within the calculated zone of influence (as described in Section 5.1.3.3 above) for an entire day of pile driving activity would accumulate energy from every impact strike. Individuals that spent part of the day outside of this range due to avoidance or natural behavioral motivations would accumulate a lesser amount of energy, and may not reach the 187 or 183 dB re 1 μPa^2sec SEL injury thresholds. As explained in NMFS (2012), use of the SEL thresholds is less relevant in this instance since Atlantic and shortnose sturgeon are not expected to remain within the area during the entire duration of pile driving.[5] When assessing the potential for physiological impacts, the 206 dB re 1µPa peak threshold is more appropriate as it represents the instantaneous noise level versus a cumulative noise level that would be practically impossible to receive under real world conditions.

Use of soft starts at the beginning of impact pile driving may reduce the likelihood of adverse effects because initiating driving at a lower power may allow sturgeon and other wildlife to move away from the immediate vicinity of the activity, thereby reducing the likelihood of exposure to sound levels that could cause further behavioral disturbance or injury.

Sturgeon close to piles when pile driving begins are expected to react by leaving the area, and any individuals approaching the piles while pile driving is ongoing would most likely avoid the area (NMFS 2012; McCauley et al. 2000; Pearson et al. 1992; SIO and NSF 2008). It is reasonable to assume that on

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[5] The National Marine Fisheries Service Northeast Region evaluated pile driving impacts on Atlantic and shortnose sturgeon in a 2012 biological opinion and concluded "*...in order for this criteria [SEL] to be relevant, we would need to expect that shortnose sturgeon would remain in that area for the entire duration of the pile driving activity. This is not a reasonable expectation because it does not take into account any behavioral response to noise stimulus. We expect sturgeon to respond behaviorally to noise stimulus and avoid areas above their noise tolerance. This behavioral response is expected to occur at noise levels of 150 dB re 1µPa RMS. We expect that any sturgeon close to piles when pile driving begins to react by leaving the area and expect that any sturgeon approaching the piles while pile driving is ongoing would move around the area. Because of this, it is extremely unlikely that a sturgeon would remain in the ensonified area over the duration of the installation of an entire pile. As evidenced in the figure above (Figure 12), the SEL 187 dB re 1µPa area never occupies the entire width of the river; therefore, there is no danger that a fish would not be able to "escape" from the area while pile driving is ongoing. Because we do not expect sturgeon to remain within the ensonified area for more than the time it would take them to swim out of the area (no more than a few minutes), we have determined that when assessing the potential for physiological impacts, the 206 dB re 1µPa peak criteria is more appropriate. This represents the instantaneous noise level. Thus, considering the area where this noise level will be experienced would account for fish that were in the area when pile driving started or were temporarily present in the area*."

receiving pile driving noise at reduced intensity during soft starts, Atlantic and shortnose sturgeon would move away from the immediate vicinity of the activity before full driving intensity is reached, thereby reducing the likelihood of exposure to sound levels that could cause injury or further behavioral disturbance (NMFS 2012). This, combined with the intermittent occurrence of pile driving on any active day suggests that while minor effects may occur, they would be limited in duration, intensity, and continuity. No population level impacts for Atlantic or shortnose sturgeon would be anticipated to occur, and the continued survival of these species would be unaffected.

Pursuant to the Endangered Species Act, the Proposed Action:

- may affect, but is not likely to adversely affect, Atlantic sturgeon; and
- may affect, but is not likely to adversely affect, shortnose sturgeon.

5.2 Sea Turtles

Based on historical data and surveys (Section 3.2), the potential for sea turtles to occur in the Action Area is relatively low. However, should individual turtles occur in the vicinity during in-water construction, they may be exposed to the stressors described below.

5.2.1 Temporary Resuspension of Sediments

Resuspended sediments would increase turbidity and could affect foraging success for sea turtles, which are visual predators. The overall level of sediment disturbance associated with the Proposed Action would be significantly lower than that of maintenance dredging in the channel, and resuspended sediments are expected to dissipate within a few hours. The activities that generate suspended sediments would be short-term and highly localized to the area immediately around the SUBASE Kings Bay waterfront, and suspended sediments are expected to disperse and/or settle rapidly. Therefore, direct effects to sea turtles from temporary resuspension of sediments are expected to be minimal.

5.2.2 Vessel Strikes

Construction would require the use of barges and support vessels which could potentially collide with or cause short-term behavioral changes in sea turtles. The Navy would mitigate the potential for collisions and behavioral modification to sea turtles by abiding by the *Sea Turtle and Smalltooth Sawfish Construction Conditions* as revised on 23 March 2006 (Appendix A). Any behavioral changes due to encounters with vessels would not be expected to result in chronic stress or compromise the fitness of individuals or populations.

5.2.3 Effects from Underwater Noise

Activities under the Proposed Action are expected to result in increased underwater noise levels in SUBASE Kings Bay, due primarily to the installation and removal of support piles. Some noise will also be generated by support vessels, small boat traffic, and barge-mounted equipment, such as generators.

Acoustic impacts criteria and thresholds were developed in cooperation with NMFS for sea turtle exposures to various sound sources. Only one criterion applicable to sound produced by pile driving exists for sea turtles. The NMFS threshold value for onset of injury to sea turtles due to both impact pile driving and vibratory pile driving is 190 dB re 1 μPa sound pressure level root mean square. This criterion was developed in cooperation with NMFS and is not based on experimental evidence of injuries caused to sea turtles by pile driving sound, but instead was derived from pinniped thresholds and applied as a precautionary measure when addressing impacts from pile driving to sea turtles.

There are limited data available on sea turtle behavioral reactions to sound. As such, no behavioral criterion has been adopted by the NMFS for sea turtles for pile driving noise and as such, behavioral effects must be assessed qualitatively. Startle responses to anthropogenic sound have been documented in sea turtles (O'Hara and Wilcox 1990; Moein Bartol et al.1995; McCauley et al. 2000). As such it can be conservatively assumed that pile driving has the potential to cause startle responses. Note that all sea turtle species regularly encounter natural events that can cause startle reactions, such as the appearance of predators or changing weather conditions.

Noise from the Proposed Action may reach the 190 dB threshold for sea turtles only during impact driving of steel piles for the Warping Wharf (Map ID 3F) project in FY 2021. On the four planned in-water work days, the maximum range from the pile being driven that noise levels may reach this threshold is just under 16 meters. Because a small number of piles would be driving, and installation would occur intermittently throughout the day, the potential for a sea turtle to be affected is minimal. Protective measures outlined in the Sea Turtle and Smalltooth Sawfish Construction Conditions would also be observed, further reducing the potential for adverse effects.

While minor behavioral disturbances from sounds produced by the activities may occur, they are expected to be temporary and discountable, given the nature of the ambient conditions at the Action Area and the low occurrence of sea turtles.

5.2.4 Effects to Prey Species and Forage Habitat

Shallow subtidal and intertidal areas found in Kings Bay typically provide a diverse benthic community with both infauna and epifauna utilized as prey for sea turtles. These habitat areas also develop algae mats (benthic diatoms) that formulate an important component of the estuarine food web for deposit-feeders and serve as a food source for some species of sea turtles. Pile installation and removal, installation of in-water and shoreline structures, and temporary displacement of habitats for construction may remove or disturb prey or localized forage habitat for sea turtles (Newell et al. 1998). Removal of prey and forage items during temporary disturbance from repair and construction activities would constitute a short-term impact with rapid invertebrate, algal, and community recovery rates (McCauley et al. 1977, Van Dolah et al. 1984, NRC 1985).

Foraging habitat in the Action Area is of relatively low value as a result of ongoing anthropogenic disturbance. In general, minor disruptions in the water column or removal of small portions of benthic habitat that may result from the Proposed Action are expected to have minimal impacts on the overall availability of suitable foraging habitat for sea turtles in the region. Therefore, effects resulting from disturbance of prey species and foraging habitat would be insignificant.

5.2.5 Conclusions

Based on the relatively low quality of foraging habitat in the Action Area compared to that which is available in the coastal waters off the southeastern U.S., and the highly localized nature of the impacts, temporary resuspension of sediments is not expected to result in measureable adverse effects to ESA-listed sea turtles.

Vessel strikes are unlikely to occur due to the slow speeds at which barges and support vessels would move, minimizing chances for collision. Any behavioral changes due to encounters with vessels would not be expected to result in chronic stress or compromise the fitness of individuals or populations.

Adherence to the *Sea Turtle and Smalltooth Sawfish Construction Conditions* would further reduce potential for adverse effects.

Use of soft starts at the beginning of impact pile driving may reduce the likelihood of adverse effects because initiating driving at a lower power may allow sea turtles to move away from the immediate vicinity of the activity, thereby reducing the likelihood of exposure to sound levels that could cause further behavioral disturbance or injury.

Implementation of standard protective measures (Appendix A) would minimize the likelihood of sea turtles being in the immediate vicinity of construction activities, and any individuals approaching are expected to avoid it one pile driving starts. This, combined with the intermittent occurrence of pile driving on any active day suggests that while minor effects may occur, they would be limited in duration, intensity, and continuity. No population level impacts for sea turtles are expected, and the continued survival of these species would be unaffected.

Pursuant to the Endangered Species Act, the Proposed Action:

- may affect, but is not likely to adversely affect, green sea turtles, and would have no effect on their critical habitat;
- may affect, but is not likely to adversely affect, hawksbill sea turtles, and would have no effect on their critical habitat;
- may affect, but is not likely to adversely affect, Kemp's ridley sea turtles;
- may affect, but is not likely to adversely affect, leatherback sea turtles, and would have no effect on their critical habitat; and
- may affect, but is not likely to adversely affect, loggerhead sea turtles, and would have no effect on their critical habitat.

5.3 Indirect Effects

Upon completion of the in-water work, conditions are expected to return to their previous state within a relatively short amount of time. Noise in the water will return to pre-construction levels. Local bathymetry, sediments, and water quality are expected to return to prior states within hours (in the case of sediments and water quality) to a few months (in the case of bathymetry) under normal deposition and succession regimes. With the exception of a projected increase in the footprint of the Layberth Pier (Site VI), no permanent alteration of habitat is anticipated, and no new negative effects to species or their habitat are expected to begin once the Proposed Action is complete.

5.4 Interrelated and Interdependent Actions and Activities

There are no interrelated or interdependent actions associated with the Proposed Action.

5.5 Cumulative Effects

Identified below are several nonfederal actions that occur or could occur in the vicinity of the Action Area. Other nonfederal projects may be taking place in the Action Area, and it can be expected that they will undergo ESA section 7 consultation through the Army Corps of Engineers' permitting process; therefore, they are not discussed here.

5.5.1 Marine Vessel Traffic

The waters of Kings Bay are largely restricted to military and support vessels transiting to and from the SUBASE. However, Cumberland Sound and the Saint Mary's River are heavily traveled by commercial, recreational, and government marine vessels. Recreational activities in the area consist primarily of power boating, sport fishing, and jetskiing.

The potential effects of high density boat and ship traffic on the environment and listed species include, but are not limited to, reduced water quality, increased turbidity and sediment suspension, increased risk of collisions, and elevated underwater and airborne noise levels (Bassett et al. 2012). However, it is not possible to quantify the number of individual ESA-listed fish or sea turtles that could be affected or the scope or timing of such effects.

5.5.2 Climate Change

Climate change will likely cause alterations to hydrologic conditions within the Action Area. The southeastern U.S. has experienced a two degree increase in average temperatures since the 1970s (U.S. House of Representatives 2013). Changes to local hydrology could affect both marine and terrestrial species as fresh- and saltwater mixing regimes change as a result of climate impacts to hydrology.

5.5.3 Summary

Based on the geographic and temporal distribution of the projects and activities described above, cumulative effects to fish and sea turtles are expected to be minimal. Other projects and activities such as commercial and recreational fishing and boating may be considered a part of the environmental baseline because they are ongoing actions.

6. Effects Conclusions

The Navy's conclusions for effects to ESA-listed species and their critical habitat are listed in Table 6-1.

Table 6-1. Effects Conclusions for ESA-Listed Species

Species		Navy Conclusion[1]	
Common Name	Scientific Name	Species	Critical Habitat
Atlantic sturgeon	*Acipenser oxyrinchus oxyrinchus*	NLAA	n/a
shortnose sturgeon	*Acipenser brevirostrum*	NLAA	n/a
green sea turtle	*Chelonia mydas*	NLAA	No effect
hawksbill sea turtle	*Eretmochelys imbricata*	NLAA	No effect
Kemp's ridley sea turtle	*Lepidochelys kempii*	NLAA	n/a
leatherback sea turtle	*Dermochelys coriacea*	NLAA	No effect
loggerhead sea turtle	*Caretta caretta*	NLAA	No effect

[1]NLAA = not likely to adversely affect; n/a = not applicable, no critical habitat designated

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8. List of Preparers

Jacqueline Bort, Marine Resources Specialist, NAVFAC Atlantic
M.Phil., Human Ecology, College of the Atlantic
B.Sc., Marine Biology, University of North Carolina Wilmington

Jonathan Crain, GIS Specialist, NAVFAC Atlantic
B.Sc., Geography, University of Louisville

Cara Hotchkin, Marine Resources Specialist, NAVFAC Atlantic
Ph.D., Ecology, The Pennsylvania State University
B.Sc., Marine Biology, University of Rhode Island
B.Sc., Coastal and Marine Policy and Management, University of Rhode Island

Taura Huxley-Nelson, Natural Resources Specialist, NAVFAC Southeast
M.P.A., Park University
B.Sc., Natural Resources, Cornell University

Jered Jackson, Natural Resources Specialist, NAVFAC Southeast
M.S., Marine Sciences, Troy University
B.Sc., Marine Biology, University of South Alabama

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Appendix A

In-water Construction Conditions

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UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006
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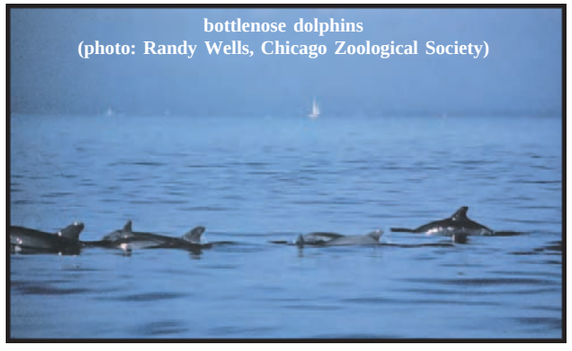


bottlenose dolphins
(photo: Randy Wells, Chicago Zoological Society)

Marine mammals have sensitive hearing and many species communicate by vocalizing underwater.

- Underwater sound produced by a vessel's engines and propellers can disturb these animals.

Cautiously move away from the animals if you observe any of the following behaviors:

- Rapid changes in direction or swimming speed.
- Erratic swimming patterns.
- Escape tactics such as prolonged diving, underwater exhalation, underwater course changes, or rapid swimming at the surface.
- Tail slapping or lateral tail swishing at the surface.
- Female attempting to shield a calf with her body or by her movements.

Even if approached by a marine mammal or sea turtle.

- Do not touch or swim with the animals.

Never feed or attempt to feed marine mammals or sea turtles.

- It can alter their natural behavior, make them dependent on handouts, and can be harmful to their health.
- Marine mammals, like all wild animals, may bite and inflict injuries to people who try to feed them.

Note: NMFS regulations at 50 CFR § 216.3 strictly prohibit feeding or attempting to feed a marine mammal in the wild.

Marine Mammals and the Law

The Marine Mammal Protection Act (MMPA) prohibits the take of all marine mammal species in U.S. waters. *Take* is defined as *"to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal."*

Harassment is defined in the MMPA as *"any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild; or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering."* Some exceptions are made for specifically authorized scientific research.

Take is further defined by regulation to include *feeding or attempting to feed a marine mammal in the wild.*

The Endangered Species Act (ESA) provides additional protection to species of marine mammals listed as endangered or threatened. The ESA prohibits the take of species listed as endangered or threatened. The definition of take is the same under the ESA as under the MMPA, except that the ESA adds the terms harm, pursue, shoot, wound, trap and collect.

The maximum fine for violating the MMPA is $20,000 and one year in jail. The maximum fine for violating the ESA is $50,000 and one year in jail.

clymene dolphin (photo: Keith Mullin, NMFS)

For more information please call:

Protected Resources Division
Southeast Regional Office
National Marine Fisheries Service
263 13th Avenue S.
St. Petersburg, FL 33701
(727) 824-5312
http://sero.nmfs.noaa.gov/pr/protres.htm

Southeast Enforcement Division
Southeast Regional Office
National Marine Fisheries Service
263 13th Avenue S.
St. Petersburg, FL 33701
(727) 824-5344
http://www.nmfs.noaa.gov/ole/Southeast/

To report harassment or other violations of the MMPA or ESA, please call the Toll free Enforcement Hotline: 1-800-853-1964

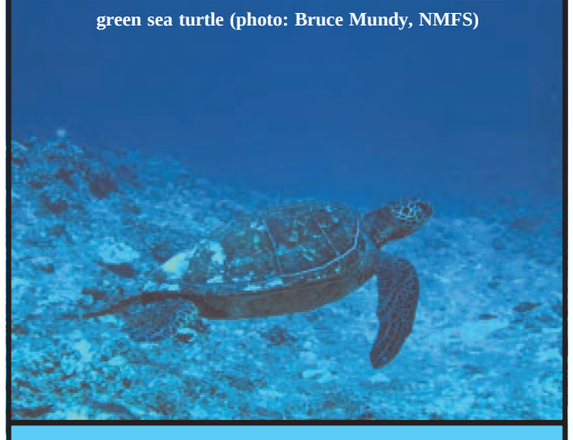
For stranded, injured or abandoned marine mammals, call the NMFS stranding hotline:
(305) 862-2850

For information on manatees or sea turtles:
U.S. Fish and Wildlife Service
6620 Southpoint Drive S., Ste. 310
Jacksonville, FL 32216-0912
(904) 232-2580
http://www.fws.gov/northflorida/

NMFS Southeast Region Marine Mammal and Sea TurtleViewing Guidelines

bottlenose dolphins (photo:Yugi Okino)

Protected Resources Management Division



green sea turtle (photo: Bruce Mundy, NMFS)

These guidelines are intended to inform the public about protection of marine wildlife. They are not a replacement for Federal legal requirements.

Marine Mammal and Sea Turtle Viewing "Code of Conduct"

1. Remain a respectful distance from marine mammals and sea turtles. The minimum recommended distances are:
dolphins, porpoises, seals = 50 yards
sea turtles = 50 yards
whales = 100 yards*

** Federal law prohibits all approaches to right whales within 500 yards.*

2. Time spent observing marine mammals and sea turtles should be limited to 1/2 hour.

3. Marine mammals and sea turtles should not be encircled or trapped between watercraft, or watercraft and shore.

4. If approached by a marine mammal or sea turtle, put your watercraft's engine in neutral and allow the animal to pass. Any vessel movement should be from the rear of the animal.*

** Pursuit of marine mammals and sea turtles is prohibited by Federal law.*

5. Never feed or attempt to feed marine mammals or sea turtles.*

** Federal law prohibits feeding or attempting to feed marine mammals.*

bottlenose dolphins
(photo: Randy Wells, Chicago Zoological Society)

green sea turtle (photo: George Balaz, NMFS)

Limit your viewing time.

- Prolonged exposure to one or more vessels increases the likelihood that marine mammals will be disturbed.
- Viewing periods of greater than ½ hour should be undertaken only if you are absolutely sure that you are not causing disturbance or any changes in behavior.
- Since individual animals' reactions will vary, carefully observe all animals and leave the vicinity if you see signs of disturbance.
- Your vessel may not be the only vessel in the day that approaches the same animal(s); please be aware of cumulative impacts.

Travel in a predictable manner.

- Marine mammals appear to be less disturbed by vessels that are traveling in a predictable manner.
- The departure from a viewing area has as much potential to disturb animals as the approach.
- If a marine mammal or sea turtle approaches, put your engine in neutral and allow the animal to pass.
- Never pursue or follow marine wildlife.
- Never attempt to herd, chase, or separate groups of marine mammals or females from their young.
- Avoid excessive speed or sudden changes in speed or direction in the vicinity of animals.

If you need to move around marine wildlife, do so from behind (i.e., never approach head-on).

- Vessels that wish to position themselves so that the animals would pass them, should do so in a manner that stays fully clear of the animal's path.

Be aware that marine mammals may surface in unpredictable locations.

- Breaching and flipper slapping whales may endanger people and/or vessels.

harbor seal (NMFS file photo)

Be on the look-out for seals.

- As their populations expand, seals are being found in southeastern states with increasing regularity, especially in North Carolina.
- Viewing or approaching seals hauled out on land should be done without the animal's awareness of your presence.
- Avoid detection by sight, smell, or sound (e.g., by staying hidden behind natural cover and approaching viewing areas quietly by avoiding conversation and noisy movements).
- Pups are often left alone when the mother is feeding.

  They are not abandoned and should be left alone.

To reduce the potential for wildlife viewing that inadvertently harms marine mammals or violates Federal law, the National Marine Fisheries Service (NMFS) provides the following information and guidelines for viewing whales, dolphins, seals, and sea turtles in the NMFS Southeast Region (from North Carolina to Texas, Puerto Rico and the U.S. Virgin Islands).

Close approaches by humans to marine mammals may cause them to lose their natural wariness and become aggressive towards people. They are also vulnerable to injury or death from entanglement in fishing gear or boat strikes. NMFS strongly encourages people to follow the guidelines presented here while spending time on or near the water.

Please review these guidelines and make the "Code of Conduct" personal practice. Bring binoculars along on a viewing excursion to assure a good view from the recommended viewing distances. Together we can assure marine mammal viewing will be as rewarding as it is today for many generations to come.

Marine mammals are more likely to be disturbed when more than one boat is near them.

- Avoid approaching the animals when another vessel is near.
- Always leave marine mammals an "escape route."
- When several vessels are in an area, communication between operators will help ensure that you do not cause disturbance.

northern right whale (photo: Center for Coastal Studies)

Special Provisions for Manatee

The following conditions are intended as a minimum to protect this species and its habitat during any activities that are in close proximity to the known locations of this species on this project.

1. The permittee agrees that all personnel associated with the project will be advised that there are civil and criminal penalties for harming, harassing or killing manatees, which are protected under the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972. The permittee and contractor will be held responsible for any manatee harmed, harassed, or killed as a result of construction activities.

2. All on-site project personnel are responsible for observing water-related activities for the presence of manatees. All construction and activities in open water will cease upon sighting of manatees within 100 feet of the project area. Construction activities will not resume until the manatees have left the project area for at least thirty minutes.

3. A trained spotter provided by the Contractor, shall be onsite for sightings of manatees during the construction of the project. Personnel designated by the Contractor shall receive training by the Georgia Department of Natural Resources, Coastal Resources Division, Brunswick, Georgia. The contact person for the Georgia Department of Natural Resources is Clay George at 912-262-3336.

4. Siltation barriers will be made of material in which manatees cannot become entangled, are properly secured, and are regularly monitored to avoid manatee entrapment. Barriers must not block manatee entry to or exit from essential habitat.

5. All vessels associated with the project will operate at “no wake/idle” speeds at all times while in the construction area. All vessels will follow routes of deep water whenever possible.

6. Propellers on all boats 21 feet or less in length shall be equipped with propeller guard systems, approved by the Project Manager, designed to prevent harm to manatees.

7. Extreme care will be taken in lowering equipment or materials, including, but not limited to piles, sheet piles, casings for drilled shaft construction, spuds, pile templates, anchors, etc., below the water surface and into the stream bed; taking any precaution not to harm any manatee(s) that may have entered the construction area undetected. All such equipment or materials will be lowered at the lowest possible speed.

8. Prior to initiation of construction, the permittee shall install at least two (2) temporary manatee awareness construction signs in locations clearly visible from the navigation channel (Attachment A). The signs shall be displayed and maintained throughout construction and shall be removed by the permittee upon completion of construction. Placement of all signs shall be as approved by the Georgia Department of Natural

Resources, Coastal Resources Division, Brunswick, Georgia. The contact person for the Georgia Department of Natural Resources is Clay George at 912-262-3336.

9. All temporary construction materials will be removed upon completion of the work, and salt marsh areas will be restored. No construction debris or trash will be discarded in the water.

10. Any dead manatee(s) found in the project area must be secured to a stable object to prevent the carcass from being moved by the current. The Contractor shall immediately notify the Government Project Manager who in turn will notify the Environmental Office at 912 573-4678. The Environmental Office will notify:

a. the U. S. Fish and Wildlife Service, Coastal Sub-Office at 912-832-8739 and,
b. the GDNR, Nongame Conservation Section at 912-262-3336.

11. The Contractor shall immediately report to the Government Project Manager any incident (e.g. collisions, injuries and mortalities) which occurs that causes harm or could be detrimental to the continued existence of the manatee along the project corridor. The Government Project Manager will in turn notify the Environmental Office at 912 573-4678. The Environmental Office will notify:

a. the U. S. Fish and Wildlife Service, Coastal Sub-Office at 912-832-8739 and,
b. the GDNR, Nongame Conservation Section at 912-262-3336 or,
800-2-SAVE-ME.

12. In the event of injury or mortality of a manatee, all aquatic activity in the project area must cease pending section 7 consultation under the Endangered Species Act with the U. S. Fish and Wildlife Service and the lead Federal agency.

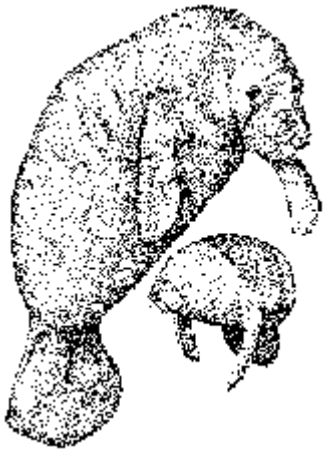
13. The Contractor shall keep a log detailing sightings, collisions, or injury to manatees, which have occurred during the contract period. Following project completion, the log and a report summarizing the any incidents and / or sightings of manatees will be submitted to the Government Project Manager and Environmental Office.

14. The Environmental office will submit above mentioned log to:

a. the U. S. Fish and Wildlife Service, 4980 Wildlife Drive, NE, Townsend, Georgia 31331 and,
b. the GDNR, Nongame Conservation Section, One Conservation Way, Brunswick, Georgia 31520

Attachment A

MARINE FACILITY
MANATEE SIGNS
PLACEMENT PROCEDURES



The West Indian manatee (*Trichechus manatus*) is an endangered species throughout its range. Manatees are protected at the Federal level by the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972, as amended. Protection measures such as these signs are necessary to increase boater awareness. The increased level of Georgia coastal development and associated marinas and boat traffic will increase the probability of negative impacts to the seasonal manatee population. Manatees inhabit Georgia waters from March through November. The main threat to manatee populations is human related boat/barge collisions. Raising boater awareness and educating the public is necessary for manatee conservation in Georgia waters and has been proven effective.

The informational/educational display sign, "Manatee Habitat", is intended to increase boater awareness of manatees that are present in Georgia waters. This sign informs boaters of the potential threat boats pose to the animals and how to help decrease negative impacts caused by those vessels. Although the placement of these signs is mandatory and required by permit, they are informative and non-regulatory in nature.

<u>Procedure for Approval of Sign Installation</u>:

1. The applicant should forward a project site plan, including the proposed location for the permanent signs to: Manatee Sign Approval, Nongame Conservation Section, Department of Natural Resources, One Conservation Way, Brunswick, Georgia 31520. The applicant should also include a chart indicating the location of the facility in relation to waterways, location within a

given county (specify county name), Contact person with phone number, and the Permit and/or Lease number associated with the project

2. The Nongame Conservation Section of the Georgia Department of Natural Resources (GDNR) will review the proposed sign placement site plan and will respond to the applicant within 30 days. If the proposed location is unacceptable, guidance on an alternate site will be provided. The contact person should notify the Nongame Conservation Section when sign placement has been completed (912-264-7218). A photograph(s) of the posted manatee signage at your facility must be submitted with the required permit compliance form to the Marsh and Shore Regulatory Program of the Coastal Resources Division/Georgia Department of Natural Resources.

3. If during a site visit, approved signs, and their locations are found not to be in compliance with the instructions given in this document, relocation or addition of signs will be required. Annual site visits will be conducted to document sign placement and condition. All signs locations will be recorded in the GDNR manatee database.

Approved Sign Suppliers:

The signs are available through the companies listed below and may also be available from other local suppliers throughout the state. Permit/lease holders, marinas, and boat docking/launching facilities should contact sign companies directly to obtain pricing information and arrange for shipping and billing.

Approved Suppliers of Manatee Signs:

Grafix, Inc.
455 Montgomery Street
Post Office Box 1028
Savannah, Georgia 31402
Voice: 912-691-1117
Fax: 912-232-3845

Image Sign Company
785 King George Blvd., Bldg. 3
Savannah, Georgia 31419
Voice: 912-961-1444
Fax: 912-961-1499

Doug Bean Signs, Inc.
160 Dean Forest Rd
Savannah, Georgia 31408
Voice: 912-964-1900
Fax: 912-964-2900

Fendig Signs
411 Arnold Rd
Saint Simons Island, Georgia 31522

Good & Associates
Saint Simons Island, Georgia
(912) 638-7664

Temporary Construction Signs

Appendix B

Fundamentals of Acoustics

B.1 Fundamentals of Acoustics

Bioacoustics, or the study of how sound affects living organisms, is a complex and interdisciplinary field that includes the physics of sound production and propagation, the source characteristics of sounds, and the perceptual capabilities of receivers. This appendix is intended to introduce the reader to the basics of sound measurements and sound propagation, as well as the hearing and vocal production abilities of species that may occur in the project area. The potential for noise from pile driving to cause auditory masking for marine mammals within the project area is also considered.

Sound is an oscillation in pressure, particle displacement, or particle velocity, as well as the auditory sensation evoked by these oscillations, although not all sound waves evoke an auditory sensation (i.e., they are outside of an animal's hearing range) (ANSI S1.1-2013). Sound may be described in terms of both physical and subjective attributes. Physical attributes may be directly measured. Subjective (or sensory) attributes cannot be directly measured and require a listener to make a judgment about the sound. Physical attributes of a sound at a particular point are obtained by measuring pressure changes as sound waves pass. The following material provides a short description of some of the basic parameters of sound.

Sound can be characterized by several factors, including frequency, intensity, and pressure (Richardson et al. 1995). Sound frequency (measured in Hertz [Hz]) and intensity (amount of energy in a signal [Watts per meter^2]) are physical properties of the sound which are related to the subjective qualities of pitch and loudness (Kinsler et al. 1999). Sound intensity and sound pressure (measured in Pascals [Pa]) are also related; of the two, sound pressure is easier to measure directly, and is therefore more commonly used to evaluate the amount of disturbance to the medium caused by a sound ("amplitude").

Because of the wide range of pressures and intensities encountered during measurements of sound, a logarithmic scale known as the decibel is used to evaluate these properties; in acoustics, "level" indicates a sound measurement in decibels. The decibel [dB] scale expresses the logarithmic strength of a signal (pressure or intensity) relative to a reference value of the same units. This document reports sound levels with respect to sound pressure only. Each increase of 20 dB reflects a ten-fold increase in signal pressure, i.e., an increase of 20 dB means ten times the pressure, 40 dB means one hundred times the pressure, 60 dB means one thousand times the pressure, and so on.

The sound levels in this document are given as sound pressure levels [SPL]. For measurements of underwater sound, the standard reference pressure is 1 microPascal [μPa, or 10^{-6} Pascals], and is expressed as "dB re 1μPa". For airborne sounds, the reference value is 20 μPa, expressed as "dB re 20 μPa". Sound levels measured in air and water are not directly comparable, and it is important to note which reference value is associated with a given sound level.

Airborne sounds are commonly referenced to human hearing using a method which weights sound frequencies according to measures of human perception, de-emphasizing very low and very high frequencies which are not perceived well by humans. This is called A-weighting, and the decibel level measured is called the A-weighted sound level [dBA]. A similar method has been proposed for evaluating underwater sound levels with respect to marine mammal hearing. While preliminary weighting functions for marine mammal hearing have been developed (Southall et al. 2007), they are not yet applied to sound exposure from pile driving activities. Therefore, underwater sound levels given in this document are not weighted and evaluate all frequencies equally.

Table B-1 summarizes common acoustic terminology. Two of the most common descriptors are the instantaneous peak SPL and the root-mean-square [rms] SPL. The peak SPL is the instantaneous maximum or minimum over- or underpressure observed during each sound event and is presented in dB re 1 μPa peak. The rms level is the square root of the energy divided by a defined time period, given as dB re 1 μPa rms.

Table B-1. Definitions of Acoustical Terms

Term	Definition
Decibel [dB]	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure or intensity of the sound measured to the appropriate standard reference value. This document uses only sound pressure measurements to calculate decibel levels. The reference pressure for water is 1 microPascal (µPa) and for air is 20 µPa (approximate threshold of human audibility).
Sound Pressure Level [SPL]	Sound pressure is the force per unit area, usually expressed in microPascals (or 20 micro Newtons per square meter), where 1 Pascal is the pressure resulting from a force of 1 Newton exerted over an area of 1 square meter. Sound pressure level is the quantity that is directly measured by a sound level meter, and is expressed in decibels referenced to the appropriate air or water standard.
Frequency, Hz	Frequency is expressed in terms of oscillations, or cycles, per second. Cycles per second are commonly referred to as Hertz (Hz). Typical human hearing ranges from 20 Hz to 20,000 Hz; hearing ranges in non-humans are widely variable and species specific.
Peak Sound Pressure (unweighted), dB re 1µPa peak	The maximum absolute value of the instantaneous sound pressure expressed as dB re 1µPa peak.
Root-Mean-Square [rms], dB re 1µPa	The rms level is the square root of the pressure divided by a defined time period, expressed in decibels. For impulsive sounds, the rms has been defined as the average of the squared pressures over the time that comprise that portion of waveform containing 90 percent of the sound energy for one impact pile driving impulse. For non-impulsive sounds, rms energy represents the average of the squared pressures over the measurement period and is not limited by the 90 percent energy criterion. Expressed as dB re 1µPa.
Sound Exposure Level [SEL], dB re 1µPa^2 sec	Sound exposure level is a measure of energy. Specifically, it is the dB level of the time integral of the squared-instantaneous sound pressure, normalized to a 1-second period. It can be an extremely useful metric for assessing cumulative exposure because it enables sounds of differing duration to be compared in terms of total energy.
Waveforms, µPa over time	A graphical plot illustrating the time history of positive and negative sound pressure of individual pile strikes shown as a plot of µPa over time (i.e., seconds).
Frequency Spectra, dB over frequency range	A graphical plot illustrating the frequency content over a given frequency range. Bandwidth is generally defined as linear (narrowband) or logarithmic (broadband) and is stated in frequency (Hz).
A-Weighted Sound Level, dBA	A frequency-weighted measure used for airborne sounds only. A-weighting de-emphasizes the low and high frequency components of a given sound in a manner similar to the frequency response of the human ear and correlates well with subjective human reactions to noise. A-weighted levels are referenced to 20 µPa unless otherwise noted.
Ambient Noise Level	The background noise level, which is a composite of sounds from all sources near and far. The normal or existing level of environmental noise at a given location, given in dB referenced to the appropriate pressure standard.

Adapted and derived from URS Corporation (2007)

B.2 Sound vs. Noise

Sound may be purposely created to convey information, communicate, or obtain information about the environment. Examples of such sounds are sonar pings, marine mammal vocalizations/echolocations, tones used in hearing experiments, and small sonobuoy explosions used for submarine detection.

Noise is undesired sound (ANSI S1.1-1994). Whether a sound is noise depends on the receiver (i.e., the animal or system that detects the sound). For example, small explosives and sonar used to locate an enemy submarine produce *sound* that is useful to sailors engaged in anti-submarine warfare, but is may be aversive *noise* to marine species. Sounds produced by naval aircraft and vessel propulsion are considered noise because they represent possible energy inefficiency and increased detectability, which are undesirable.

Noise also refers to all sound sources that may interfere with detection of a desired sound and the combination of all of the sounds at a particular location (ambient noise).

B.3 Description of Noise Sources

Ambient noise in the project area is a composite of sounds from natural sources, normal port activities, and temporary projects such as maintenance dredging or pile driving.

In-water construction activities associated with this project include vibratory and impact pile driving. The sounds produced by these activities fall into two sound types: impulsive (impact driving) and non-impulsive (vibratory driving). Distinguishing between these two general sound types is important because of each sound type may cause different types of physical effects, particularly with regard to hearing (Ward 1997).

Impulsive sounds (e.g., explosions, seismic airgun pulses, and impact pile driving) are referred to as pulsed sounds in Southall et al. (2007), and are brief, broadband, atonal transient sounds which can occur as isolated events or be repeated in some succession (Southall et al. 2007). Impulsive sounds are characterized by a relatively rapid rise from ambient pressure to a maximal pressure value followed by a decay period that may include a period of diminishing, oscillating maximal and minimal pressures (Southall et al. 2007). Impulsive sounds generally have a greater capacity to induce physical injury compared with sounds that lack these features (Southall et al. 2007).

Non-impulsive sounds ("non-pulsed" in Southall et al. 2007) can be tonal, broadband, or both. They lack the rapid rise time and can have longer durations than impulsive sounds. Non-impulsive sounds can be either intermittent or continuous sounds. Examples of non-impulsive sounds include vessels, aircraft, and machinery operations such as drilling, dredging, and vibratory pile driving (Southall et al. 2007).

In environments with non-porous boundaries (i.e. rock seafloor, rigid sides, etc.), reverberation may extend the duration of both impulsive and non-impulsive sounds.

References

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Kinsler, L.E., A.R. Frey, A.B. Coppens, and J.V. Sanders. 1999. *Fundamentals of Acoustics* (4th ed.). New York, NY: Wiley.

Richardson, W.J., C.R. Greene, C.I. Malme, and D.H. Thomson. 1995. *Marine Mammals and Noise*: Academic Press.

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URS Corporation. 2007. *Port of Anchorage Marine Terminal Development Project Underwater Noise Survey Test Pile Driving Program, Anchorage, Alaska*. Report prepared for Integrated Concepts & Research Corporation, Anchorage, Alaska.

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Appendix C

Extended Methods –
Proxy Source Levels for Acoustic Modeling

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C.1 Acoustic Modeling

Acoustic modeling was conducted to estimate the zones of influence in which acoustic energy produced during pile driving has the potential to affect protected fish and sea turtle physiology and behavior.

C.2 Proxy Source Levels

Noise levels produced by pile driving are greatly influenced by factors including pile type, driving method, and the physical environment in which the activity takes place. A number of studies have examined sound pressure levels recorded from underwater pile driving projects in California and Washington, and a few studies have recently been conducted on the U.S. east coast at a number of naval installations. Proxy source levels were determined using existing data from piles driven in previous projects. Published data were gathered from reports published by the California Department of Transportation (CALTRANS), the Washington State Department of Transportation (WSDOT), and the U.S. Navy. A regional source level proxy document was compiled by NAVFAC Northwest for Puget Sound projects (U.S. Navy 2014); some of these analyses were also applied to the Kings Bay projects due to a lack of additional data.

While some pile types are well-represented in the existing data, other types have been measured only infrequently. Therefore, different methods for determining the proxy source levels were used. For all projects, data points that were not reported at 10 m distance from the incident pile were normalized using the practical spreading equation, and estimated source levels at 10 m were used in the calculations of proxy source levels. For this analysis, data from individual piles was used (when available). When individual pile data were not available for a project, the project average was used. This approach removes the necessity for weighting project averages by the number of piles, while still including the environmental context from each included project.

Data from the east coast were prioritized due to the differences in bathymetry and sediment between west coast sites in Washington and California, and the location at Kings Bay. For pile types for which east coast data were not available, data collected on the west coast were averaged to approximate source levels. During the averaging process, reported data points were converted from dB values into pressure measurements, averaged, and re-converted to decibels.

C.2.1 Impact Driving

Impact driving is the primary method intended for use during the Proposed Action, due to a shallow limestone layer underneath the surface sediments at SUBASE Kings Bay. The depth of this layer varies due to prior dredging of the facility basins during construction of the existing piers and wharves. Pile types that will be installed with impact driving include 18- and 24-inch concrete piles, as well as 14-inch steel H piles and 24- and 30-inch steel pipe piles.

Sound level metrics for impact driving include RMS, Peak, and SEL metrics. Definitions of these terms and formulae for calculating them can be found in CALTRANS (2009) guidance.

C.2.1.1 Concrete Piles

Concrete piles to be driven via impact during the Proposed Action include 18- and 24-inch diameter piles. There are no measured data on concrete piles smaller than 24 inches from the east coast of the U.S. Therefore, for 18-inch concrete piles, proxy source levels were determined from the CALTRANS (2012) compendium. Data were available from the west coast for 18-inch concrete piles (N=1), and these data

were used as a proxy for driving of 18-inch concrete piles during the Propose Action (CALTRANS 2012).

Driving of 24-inch concrete piles has been measured in Norfolk, VA, by the U.S Navy. These data were averaged to determine a proxy value for this pile type. Source data for impact driving of concrete piles is given in Table C-1.

C.2.1.2 Steel Piles

Three types of steel piles will be installed with an impact hammer during the Propose Action. Impact driving of steel pipe piles (24- and 30-inch) has both been measured in a number of locations, though not on the U.S. east coast. For steel H piles (14-inch), measurements of impact driving are available only from west coast projects, as given in CALTRANS 2012. Calculations and source data are presented in Table C-2.

Table C-1. Proxy Source Level Data for Impact Driving of Concrete Piles

Pile to be driven	Proxy Pile Type	Source Level								
		RMS			Peak			SEL		
		dB	Pa	Average	dB	Pa	Average	dB	Pa	Average
16- and 18-inch concrete	16" and 18" Concrete*[1,2]	171	2.51189E+11	170 dB re 1 µPa rms	183	1.58E+12	184 dB re 1 µPa Peak	na	na	159 dB re 1 µPa SEL
		159	39810717055		172	2.93E+11		155	2.15E+10	
		169	1.84785E+11		189	3.98E+12		159	3.98E+10	
24-inch concrete	24" Concrete[3]	169	1.84785E+11	174 dB re 1 µPa rms	183	1.58E+12	184 dB re 1 µPa Peak	166	1.17E+11	165 dB re 1 µPa SEL
		162	63095734448		176	5.41E+11		153	1.58E+10	
	24" Concrete[4,¥]	173	3.58296E+11		183	1.66E+12		163	7.72E+10	
		175	4.64159E+11		185	2.15E+12		165	1E+11	
		177	5.95286E+11		186	2.37E+12		167	1.28E+11	
		176	5.56991E+11		185	2.22E+12		166	1.2E+11	
		176	5.17539E+11		186	2.4E+12		166	1.12E+11	

*Values are weighted project averages as analyzed in US Navy 2014; original data from CALTRANS 2012; 1 – US Navy 2014; 2- CALTRANS 2012; 3 – US Navy 2013; 4- US Navy 2015

¥ – values measured at > 10m from incident pile were normalized to 10m before calculating averages.

Table C-2. Proxy Source Level Data for Impact Driving of Steel Piles

Pile to be driven	Proxy Pile Type	Source Level								
		RMS			Peak			SEL		
		dB	Pa	Average	dB	Pa	Average	dB	Pa	Average
14-inch Steel H	14-inch Steel H[1]	175	4.64159E+11	178	190	4.64E+12	196	na	na	168
		178	7.35642E+11		200	2.15E+13		163	7.36E+10	
		176	5.4117E+11		193	7.36E+12		165	1E+11	
		178	7.35642E+11		194	8.58E+12		163	7.36E+10	
		178	7.35642E+11		194	8.58E+12		177	6.31E+11	
		180	1E+12		195	1E+13		170	2.15E+11	
24-inch Steel Pipe*	24-inch Steel Pipe[2]	184	1.84785E+12	190	211	1.17E+14	206	183	1.58E+12	179
		170	2.15443E+11		211	1.17E+14		181	1.17E+12	
		180	1E+12		209	8.58E+13		181	1.17E+12	
		186	2.51189E+12		207	6.31E+13		178	7.36E+11	
		184	1.84785E+12		209	8.58E+13		181	1.17E+12	
		186	2.51189E+12		207	6.31E+13		175	4.64E+11	
		194	8.57696E+12		208	7.36E+13		178	7.36E+11	
		195	1E+13		205	4.64E+13		176	5.41E+11	
		193	7.35642E+12		208	7.36E+13		179	8.58E+11	
		196	1.16591E+13		204	3.98E+13		174	3.98E+11	
	24-inch Steel Pipe[3]	192	6.30957E+12		209	8.58E+13		185	2.15E+12	
		189	3.98107E+12		208	7.36E+13		181	1.17E+12	
		188	3.41455E+12		204	3.98E+13		180	1E+12	
		183	1.58489E+12		199	1.85E+13		180	1E+12	
		166	1.16591E+11		183	1.58E+12		176	5.41E+11	

[1]CALTRANS (2012); [2]WSDOT(2005a); [3]WSDOT(2005b); [4]WSDOT(2010b); [5]WSDOT(2005c)

* Inconsistencies in source levels given between US Navy (2014) and this analysis are due to the use of data given in the executive summary table of WSDOT 2005a and 2005b, rather than the text of the report by US Navy 2014. This analysis uses data from the reports' text due to an ambiguous metric ("RMS (peak) dB") in the executive summary table.

Table C-2. Proxy Source Level Data for Impact Driving of Steel Piles (*continued*)

Pile to be driven	Proxy Pile Type	Source Level								
		RMS			Peak			SEL		
		dB	Pa	Average	dB	Pa	Average	dB	Pa	Average
24-inch Steel Pipe*	24-inch Steel Pipe[3]	178	7.35642E+11	190	194	8.58E+12	206	171	2.51E+11	179
		185	2.15443E+12		202	2.93E+13		178	7.36E+11	
		182	1.35936E+12		197	1.36E+13		174	3.98E+11	
		183	1.58489E+12		200	2.15E+13		174	3.98E+11	
	24-inch Steel Pipe[1]	194	8.57696E+12		207	6.31E+13		178	7.36E+11	
		189	3.98107E+12		203	3.41E+13		178	7.36E+11	
		188	3.41455E+12		205	4.64E+13		173	3.41E+11	
30-inch Steel Pipe*	30-inch Steel Pipe[4]	192	6.00387E+12	193	212	1.29E+14	209	182	1.29E+12	188
		192	5.95286E+12		213	1.5E+14		182	1.28E+12	
		192	5.97161E+12		211	1.1E+14		184	1.75E+12	
	30-inch Steel Pipe[2]	195	1E+13		209	8.58E+13		186	2.51E+12	
	30-inch Steel Pipe[1]	190	4.64159E+12		210	1E+14		177	6.31E+11	
		190	4.64159E+12		205	4.64E+13		na	na	
	30-inch Steel Pipe[5]	192	6.30957E+12		204	3.98E+13		189	3.98E+12	
		193	7.35642E+12		204	3.98E+13		191	5.41E+12	
		196	1.17703E+13		207	6.37E+13		196	1.18E+13	

[1]CALTRANS (2012); [2]WSDOT(2005a); [3]WSDOT(2005b); [4]WSDOT(2010b); [5]WSDOT(2005c)

* Inconsistencies in source levels given between US Navy (2014) and this analysis are due to the use of data given in the executive summary table of WSDOT 2005a and 2005b, rather than the text of the report by US Navy 2014. This analysis uses data from the reports' text due to an ambiguous metric ("RMS (peak) dB") in the executive summary table.

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C.2.2 Vibratory Driving

Vibratory driving is to be used at SUBASE Kings Bay during the Proposed Action as a method of extracting piles that are intended for demolition or replacement, and to install composite piles. Piles to be extracted with vibratory methods will only be vibrated out if an initial effort to remove them with a crane fails. Vibratory extraction may be used on 18- and 24-inch concrete piles, 14-inch steel H piles, and 24- and 30-inch steel pipe piles.

C.2.2.1 Concrete Piles

During the Proposed Action, both 18- and 24-inch concrete piles may be extracted with a vibratory pile driver. There are no current data for vibratory driving of concrete piles, either for installation or extraction. Therefore, vibratory driving of steel pipe piles was used as an estimate of source levels. To avoid pseudoreplication, when multiple measured points were available for a single pile (due to multiple sensors in the water), the mid-water column sensor measurement was used. Source data were gathered from 24-inch steel pipe piles, as this is the smallest steel pipe pile for which vibratory driving data are available (Table C-3).

C.2.2.2 Steel Piles

Three types of steel piles will be installed or extracted with vibratory methods during the Proposed Action. Measured source level data were available for all three pile types (14-inch steel H piles, and 24- and 30-inch steel pipe piles). These data are presented in Table C-3.

Table C-3. Proxy Source Level Data for Vibratory Extraction of Steel Piles

Pile to be driven	Proxy Pile Type	Source Level RMS		
		dB	Pa	Average
14-inch Steel H Piles	14-inch Steel H Pile[1]	162	6.03E+10	163 dB re 1µPa rms
		166	1.12E+11	
		158	3.51E+10	
		163	7.17E+10	
		163	6.96E+10	
24-inch Steel Pipe Piles and 18- and 24-inch Concrete Piles	24-inch Steel Pipe Pile[2]	157	2.93E+10	166 dB re 1µPa rms
	24-inch Steel Pipe Pile[3]	157	2.93E+10	
	24-inch Steel Pipe Pile[4]	160	4.64E+10	
		160	4.64E+10	
	24-inch Steel Pipe Pile[5]	156	2.51E+10	
		157	2.72E+10	
		158	3.17E+10	

[1]U.S. Navy (2013b); [2]WSDOT (2010a); [3] U.S. Navy (2012); [4]CALTRANS (2012); [5]U.S. Navy (2013a); [6]WSDOT (2010c); [7]WSDOT (2010d); [8]WSDOT (2011c)

Table C-3. Proxy Source Level Data for Vibratory Extraction of Steel Piles (*continued*)

Pile to be driven	Proxy Pile Type	Source Level RMS		
		dB	Pa	Average
24-inch Steel Pipe Piles and 18- and 24-inch Concrete Piles	24-inch Steel Pipe Pile[5]	155	2.15E+10	166 dB re 1µPa rms
		154	1.9E+10	
		168	1.63E+11	
		163	7.36E+10	
		160	4.64E+10	
		156	2.54E+10	
		171	2.4E+11	
		166	1.12E+11	
		167	1.3E+11	
		168	1.52E+11	
		174	4.27E+11	
		170	2.31E+11	
		175	4.78E+11	
		175	4.64E+11	
		159	3.98E+10	
		160	4.64E+10	
		164	8.58E+10	
		162	6.5E+10	
		168	1.58E+11	
		169	1.74E+11	
		171	2.51E+11	
		148	7.36E+09	
		149	8.58E+09	
		147	6.77E+09	
30-inch Steel Pipe Piles	30-inch Steel Pipe Pile[6]	164	8.58E+10	166 dB re 1µPa rms
		173	3.25E+11	
		162	6E+10	
	30-inch Steel Pipe Pile[7]	170	2.03E+11	
		163	7.43E+10	
		161	5.11E+10	
		163	7.43E+10	
	30" Steel Pipe Pile[8]	165	1E+11	
		165	1E+11	

[1]U.S. Navy (2013b); [2]WSDOT (2010a); [3] U.S. Navy (2012); [4]CALTRANS (2012); [5]U.S. Navy (2013a); [6]WSDOT (2010c); [7]WSDOT (2010d); [8]WSDOT (2011c)

C.2.2.3 Composite and Timber Piles

For composite piles (used in projects 1B and 5), no measured data on vibratory installation or extraction are available. The source level estimates for this type of pile were based on data from timber piles driven on the east coast of the U.S. (Table C-4). These data were also used to estimate source levels for the extraction of 16-inch timber piles during projects 1A, 1B, and 5.

Table C-4. Proxy Source Level Data for Vibratory Installation of Composite Piles

Pile to be driven	Proxy Pile Type	Source Level		
		RMS		
		dB	Pa	Average [dB re 1µPa rms]
16- and 18-inch Composite Piles and 16-inch Timber Piles	12 – 16-inch Timber Piles[1]	142	3.13E+09	160
		142	3.01E+09	
		141	2.69E+09	
		151	1.12E+10	
		164	8.09E+10	
		162	6.31E+10	
		164	8.83E+10	
		165	1E+11	
		164	9E+10	

[1]U.S. Navy (2015)

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Appendix D

Pile Driving Zone of Influence (ZOI) Maps for Fish

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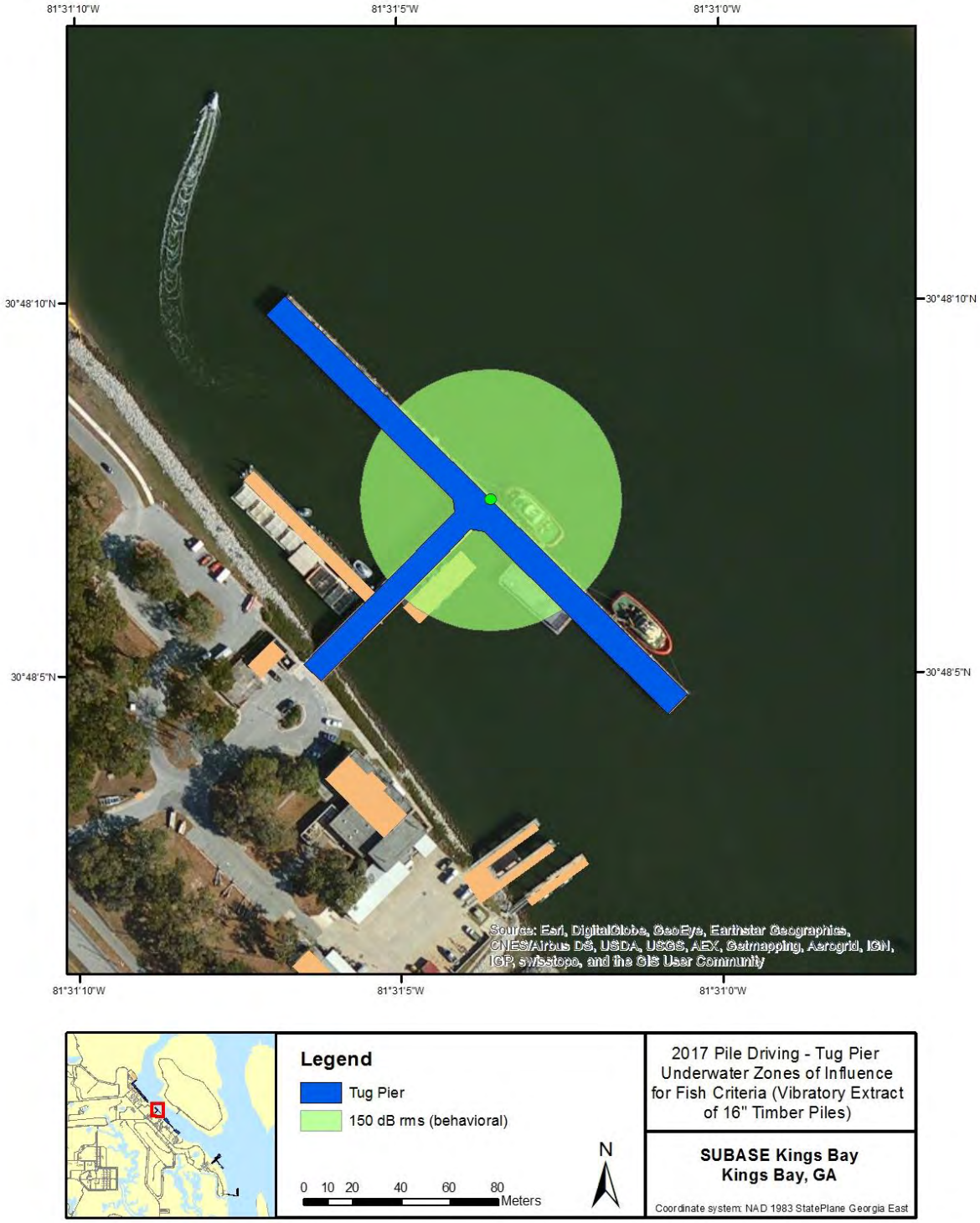

Figure D-1. Project 1A – Tug Pier Vibratory Extraction ZOIs for 16-inch Timber Piles (2017)

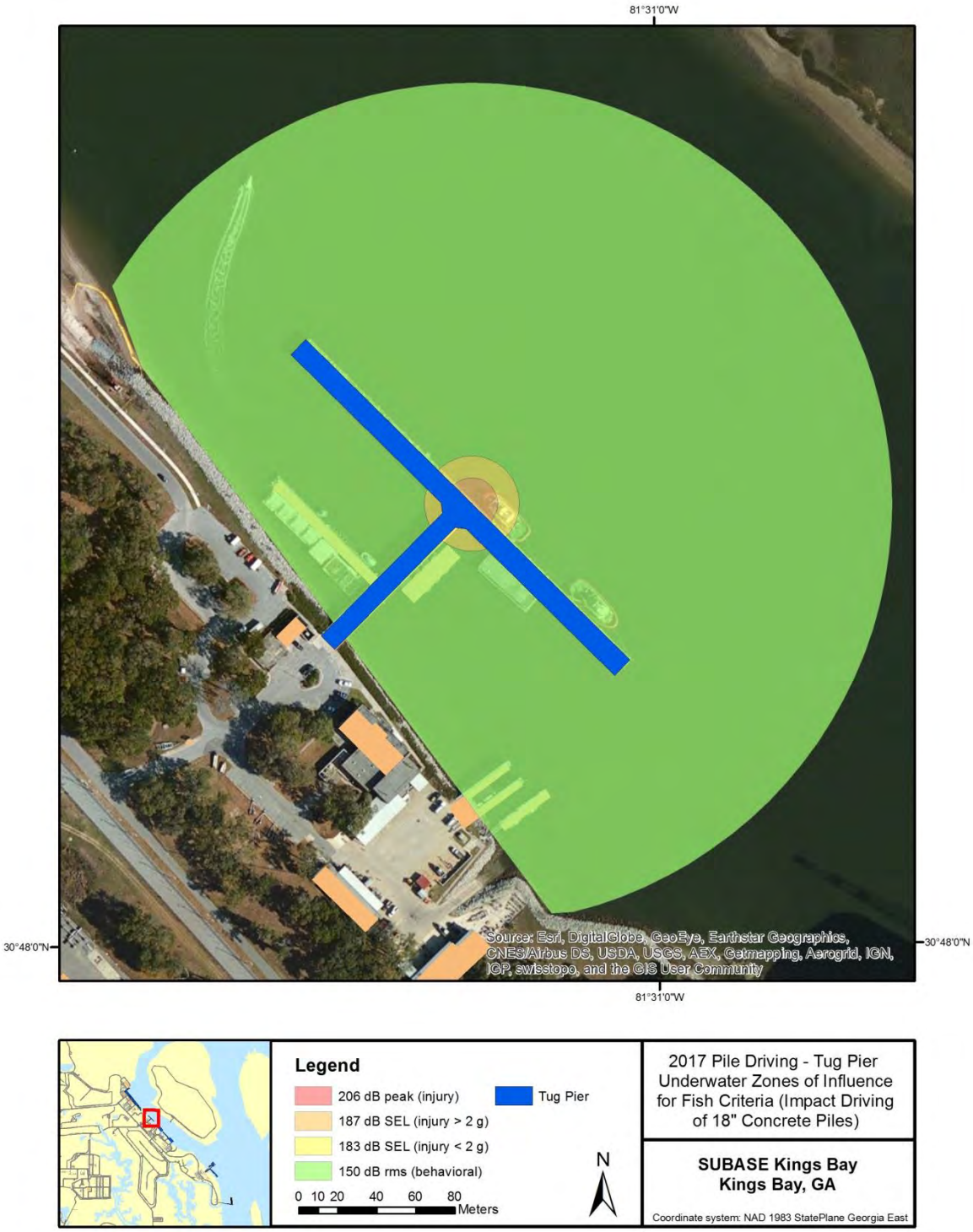

Figure D-2. Project 1A – Tug Pier Impact Driving ZOIs for 18-inch Concrete Piles (2017)

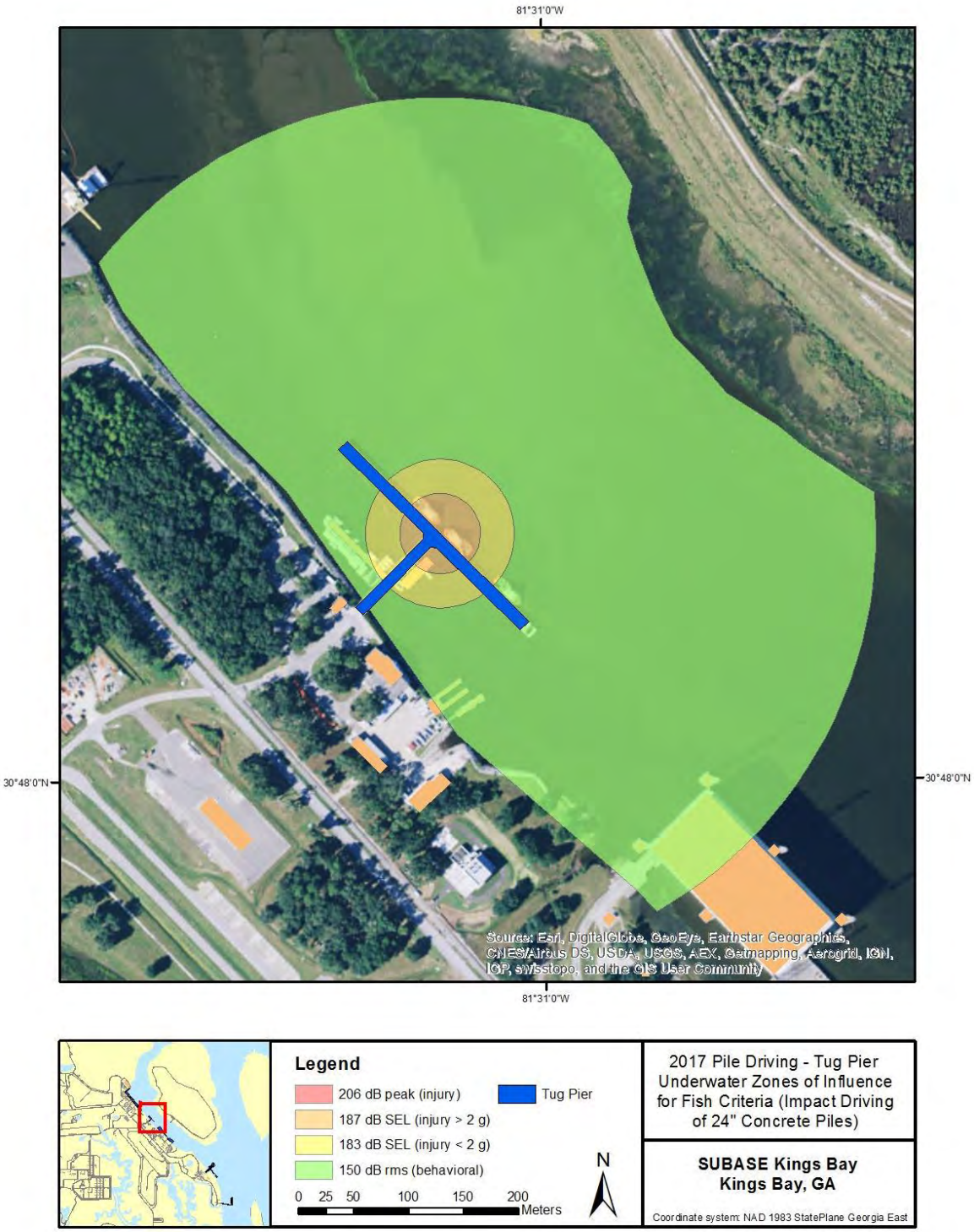

Figure D-3. Project 1A – Tug Pier Impact Driving ZOIs for 24-inch Concrete Piles (2017)

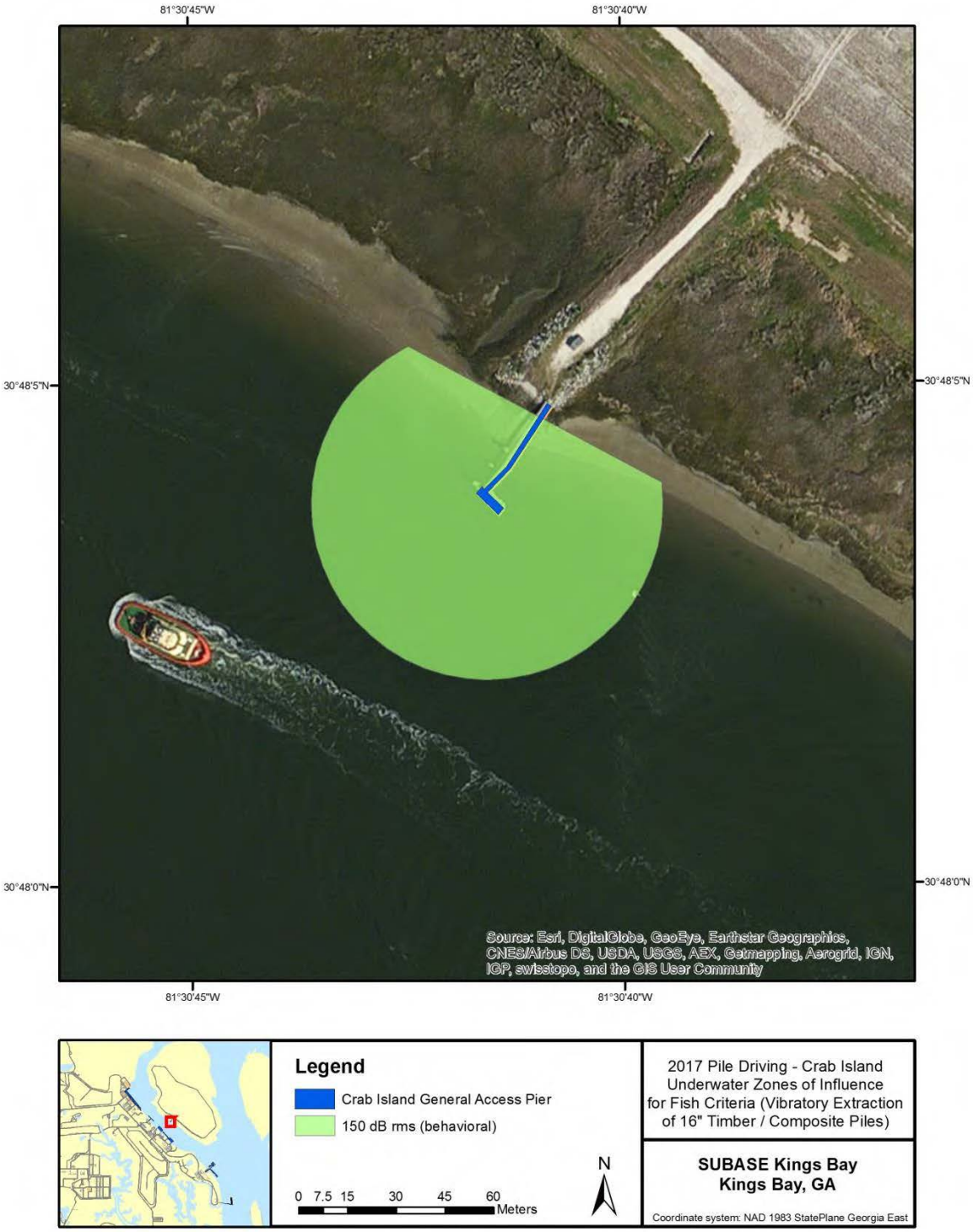

Figure D-4. Project 1B – Crab Island Access Pier Vibratory Extraction / Driving ZOIs for 16-inch Timber / Composite Piles (2017)

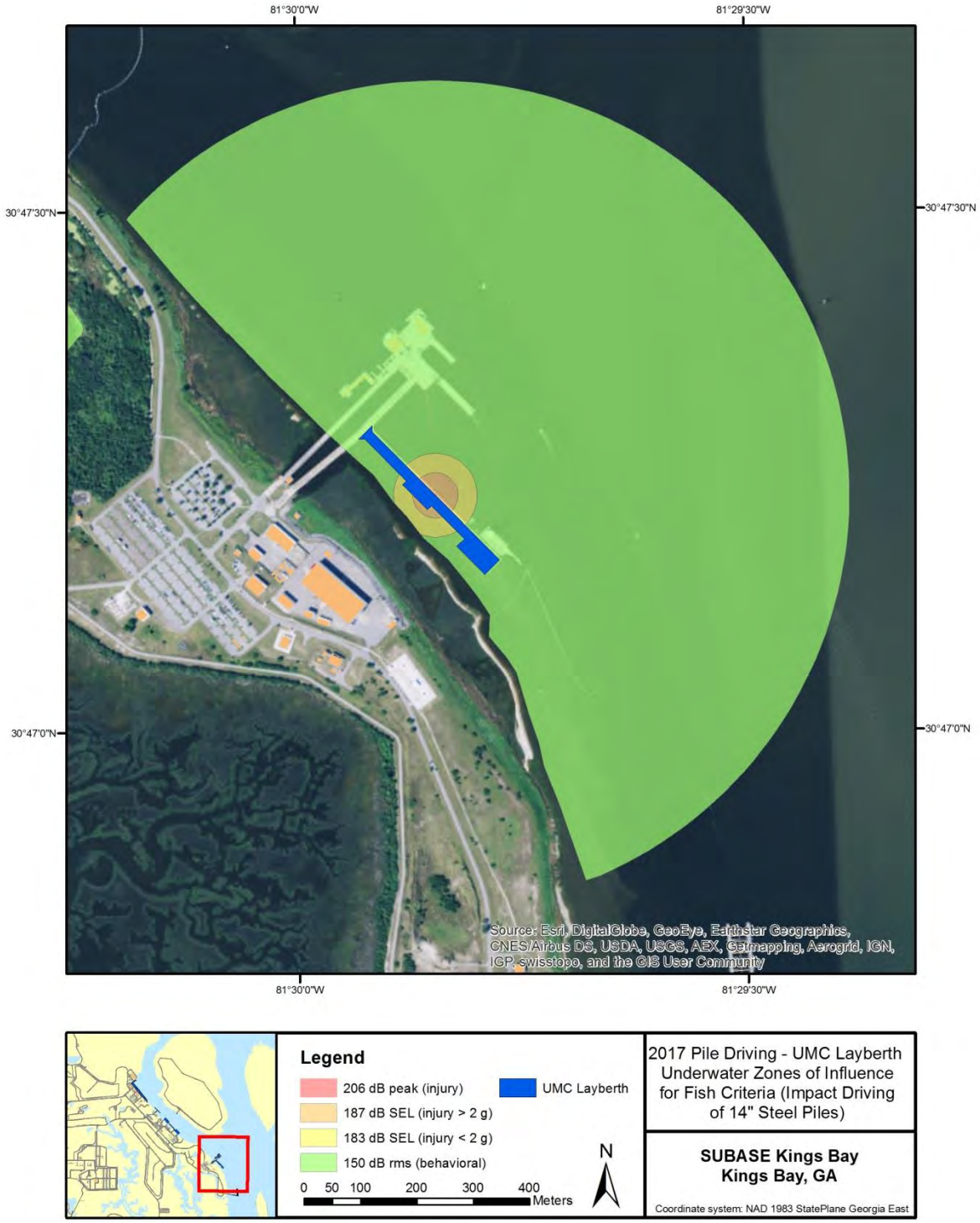

Figure D-5. Project 2 – UMC Layberth (P661) Impact Driving ZOIs for 14-inch Steel Piles (2017)

Figure D-6. Project 3A – EHW #2 Vibratory Extraction ZOIs for 24-inch Steel / Concrete Piles (2017 / 2022)

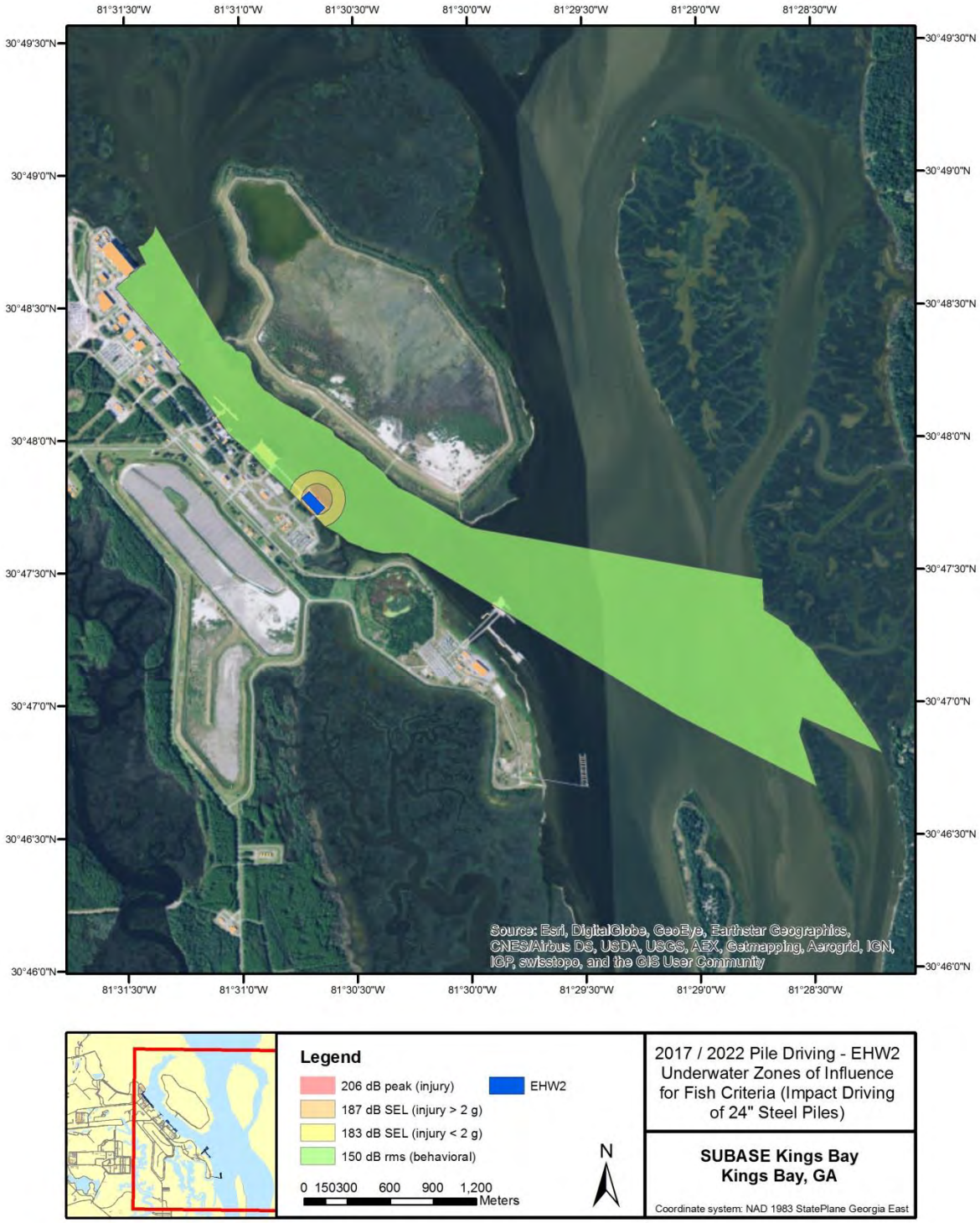

Figure D-7. Project 3A – EHW #2 Impact Driving ZOIs for 24-inch Steel Piles (2017 / 2022)

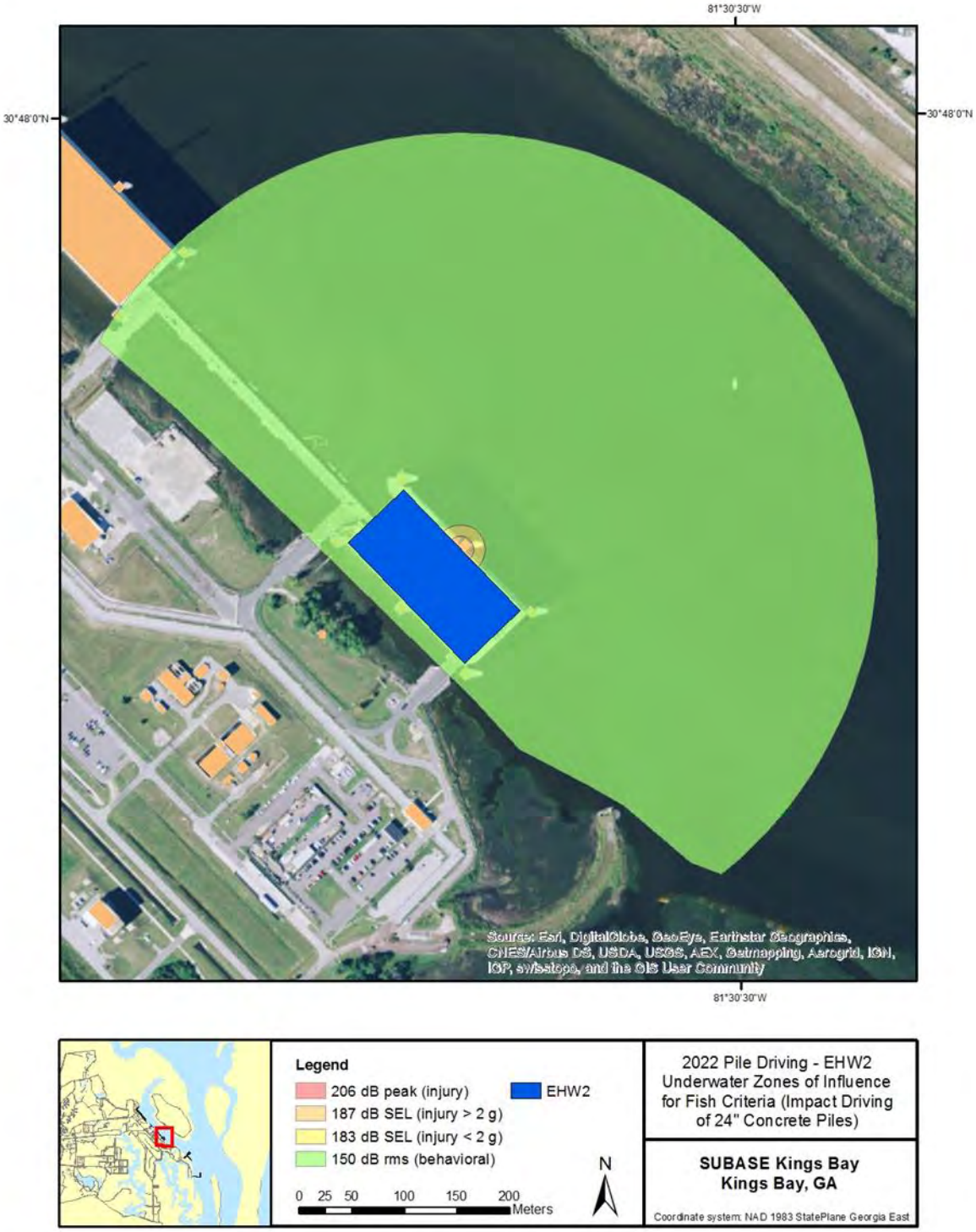

Figure D-8. Project 3A – EHW #2 Impact Driving ZOIs for 24-inch Concrete Piles (2022)

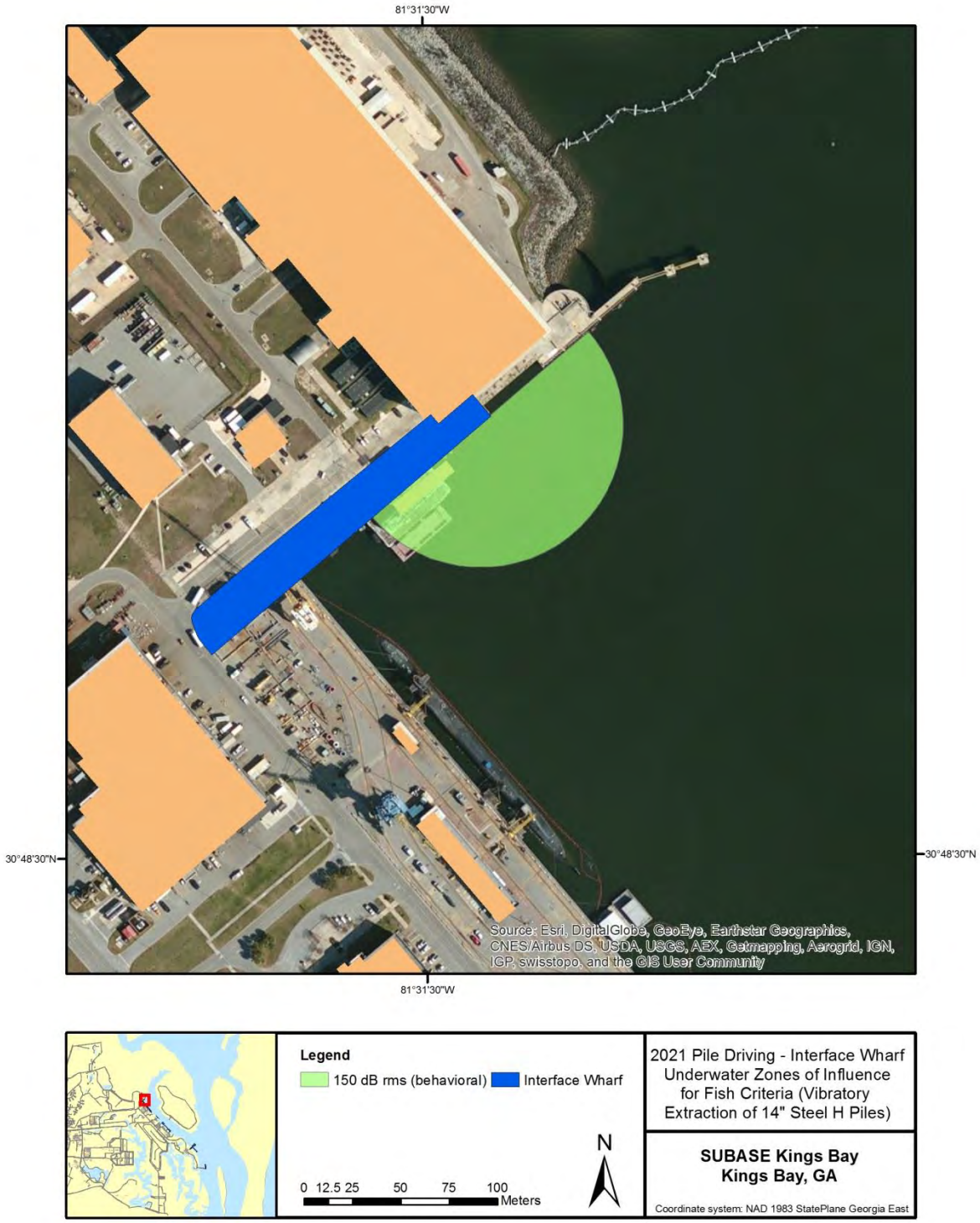

Figure D-9. Project 3B – Dry Dock Interface Wharf Vibratory Extraction ZOIs for 14-inch Steel Piles (2021)

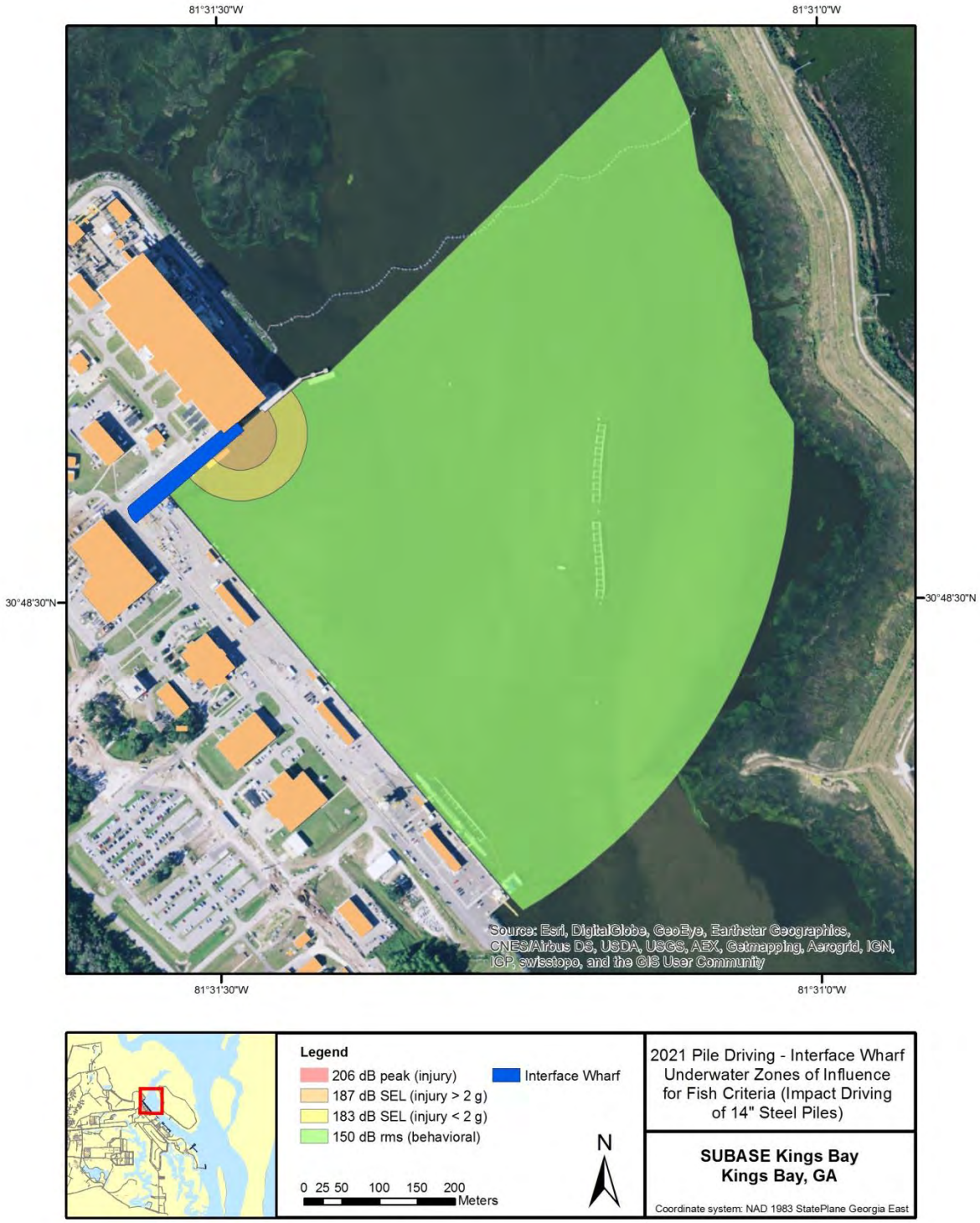

Figure D-10. Project 3B – Dry Dock Interface Wharf Impact Driving ZOIs for 14-inch Steel Piles (2021)

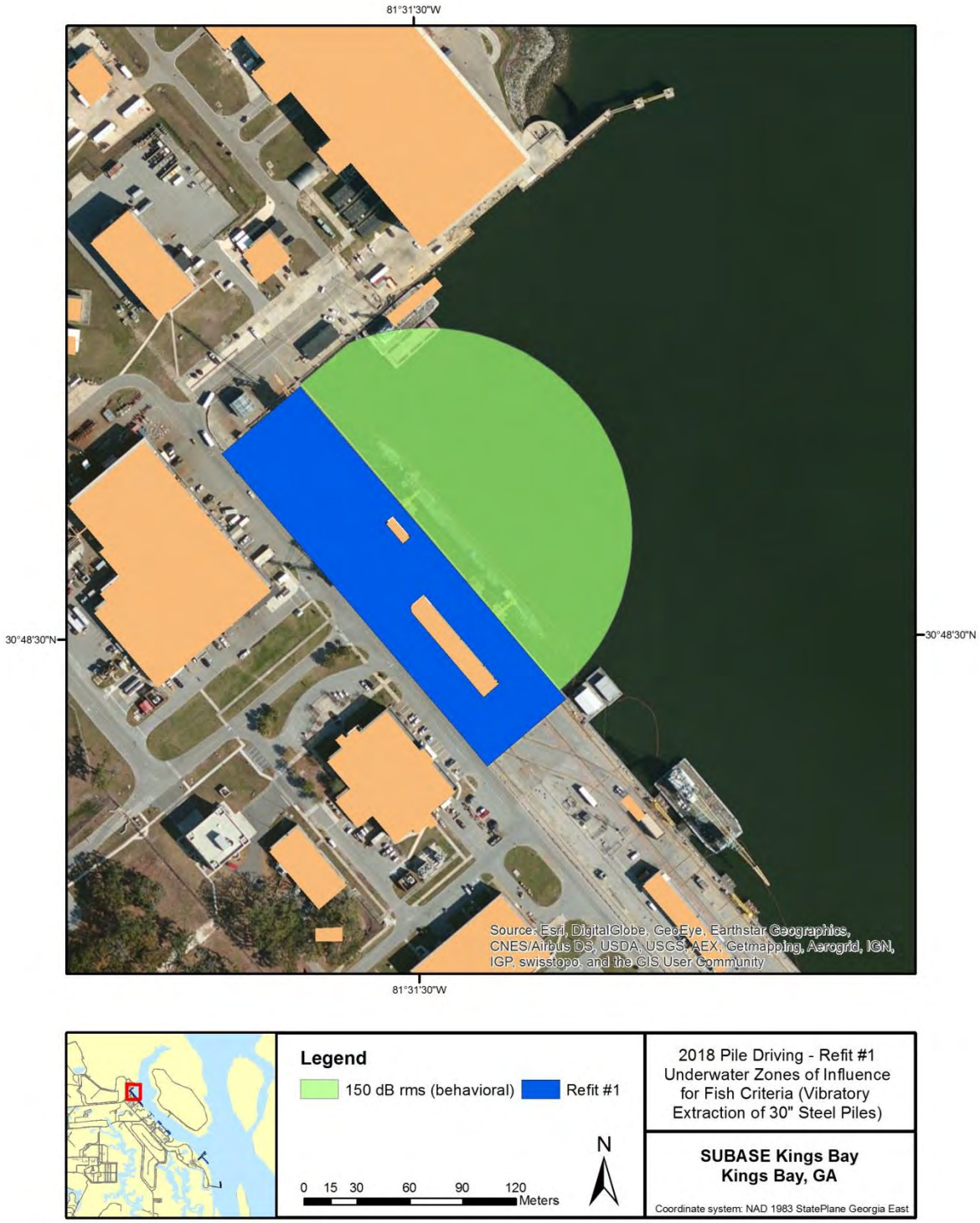

Figure D-11. Project 3C – Refit Wharf #1 Vibratory Extraction ZOIs for 30-inch Steel Piles (2018)

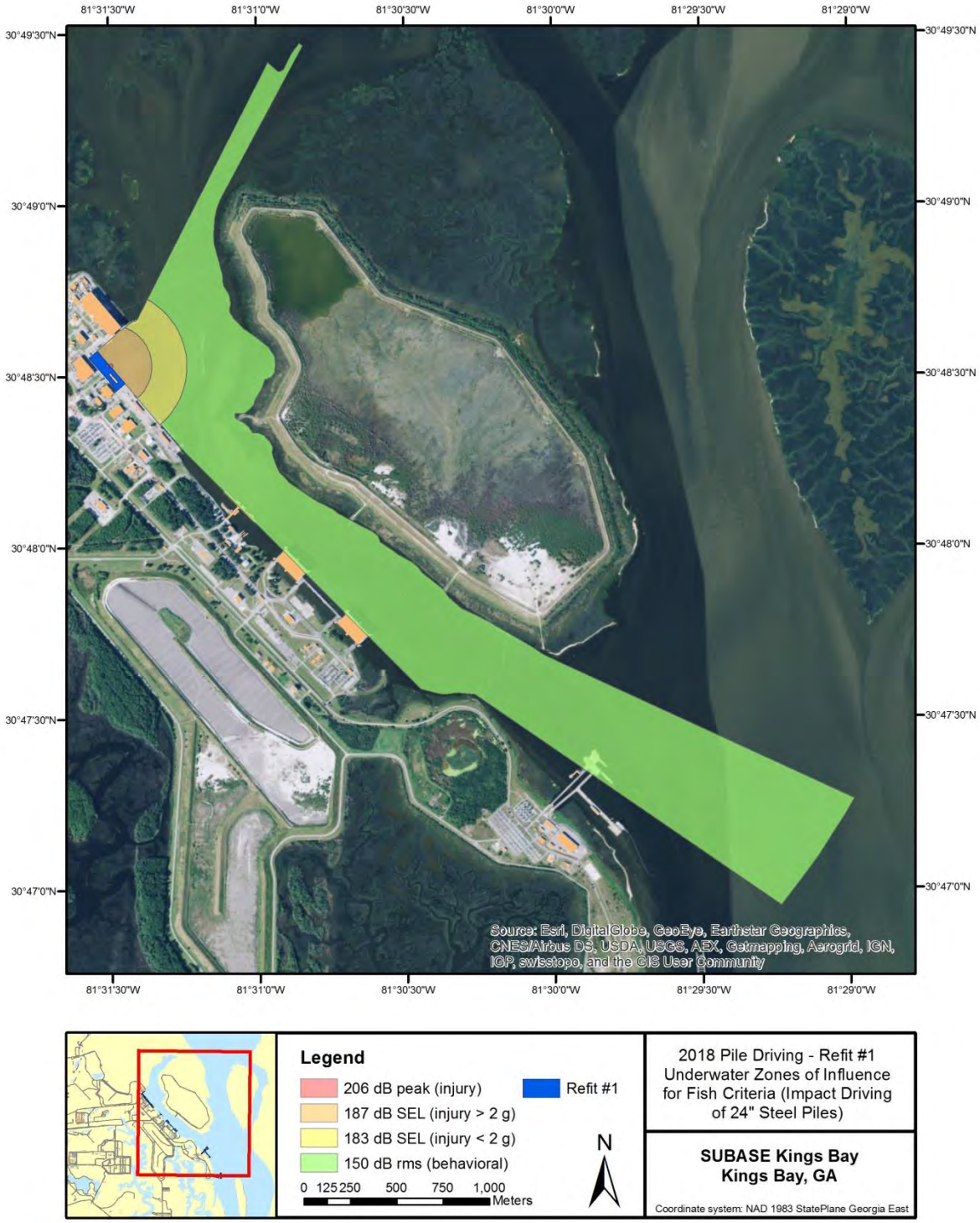

Figure D-12. Project 3C – Refit Wharf #1 Impact Driving ZOIs for 24-inch Steel Piles (2018)

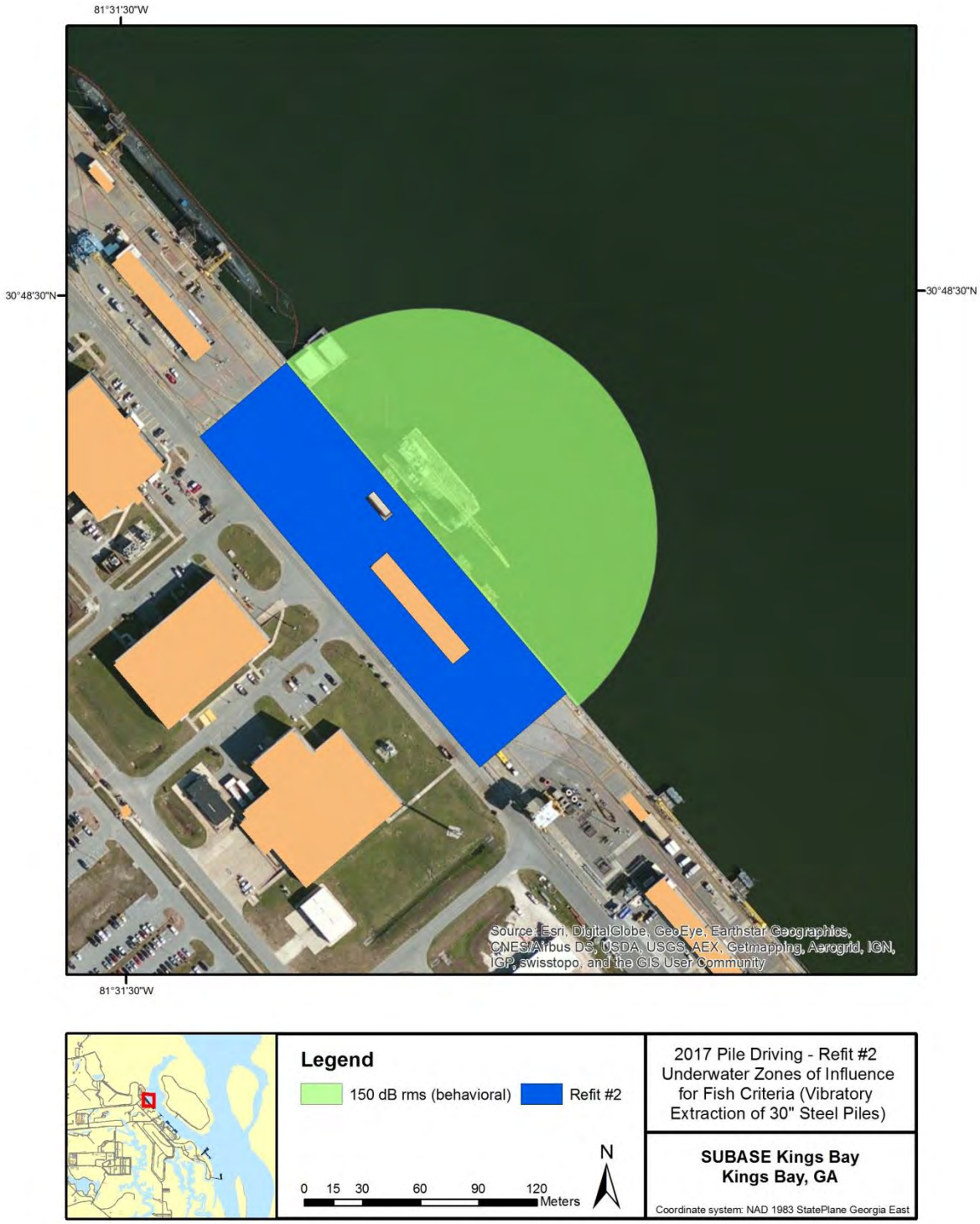

Figure D-13. Project 3D – Refit Wharf #2 Vibratory Extraction ZOIs for 30-inch Steel Piles (2017)

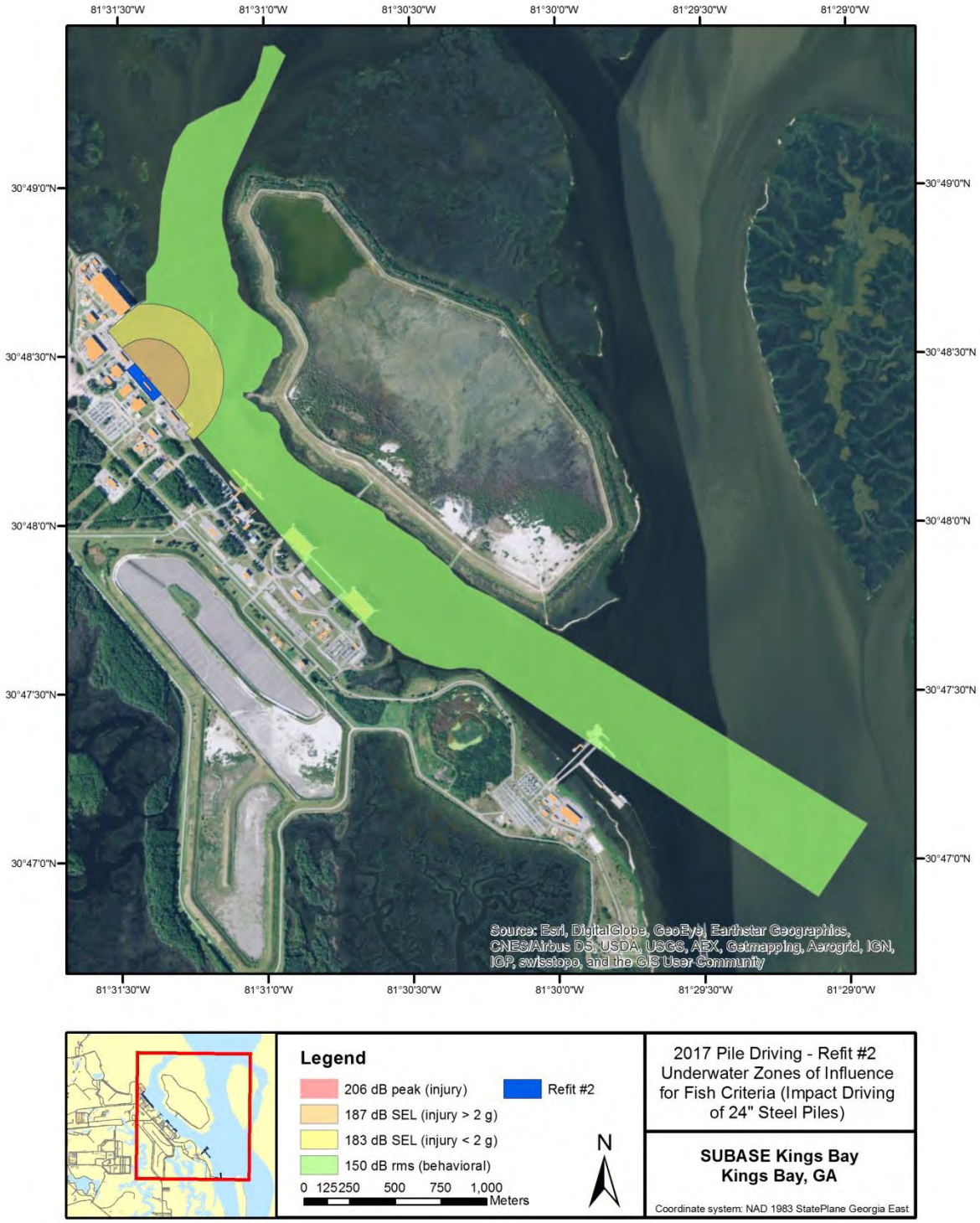

Figure D-14. Project 3D – Refit Wharf #2 Impact Driving ZOIs for 24-inch Steel Piles (2017)

Figure D-15. Project 3E – Refit Wharf #3 Vibratory Extraction ZOIs for 30-inch Steel Piles (2018)

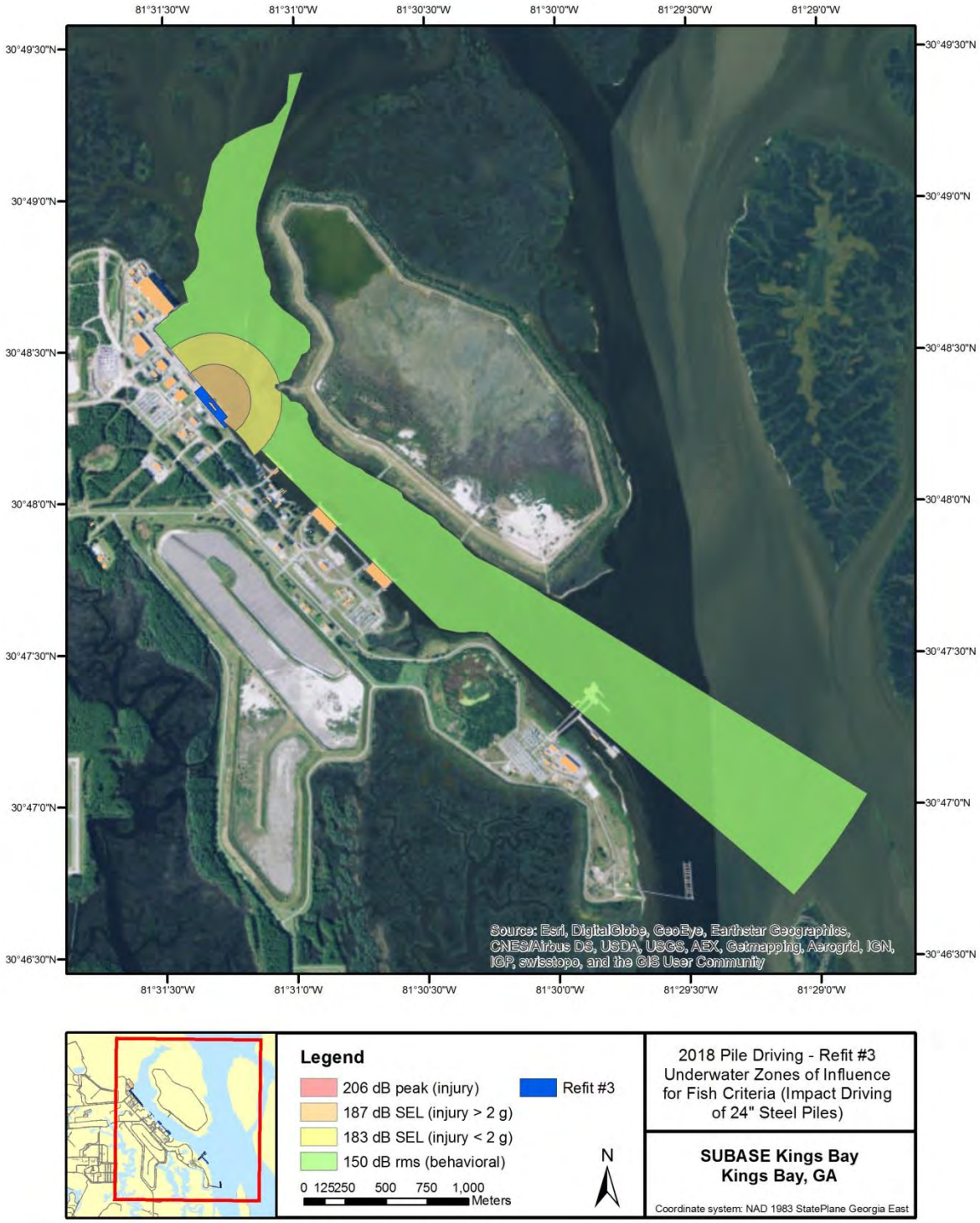

Figure D-16. Project 3E – Refit Wharf #3 Impact Driving ZOIs for 24-inch Steel Piles (2018)

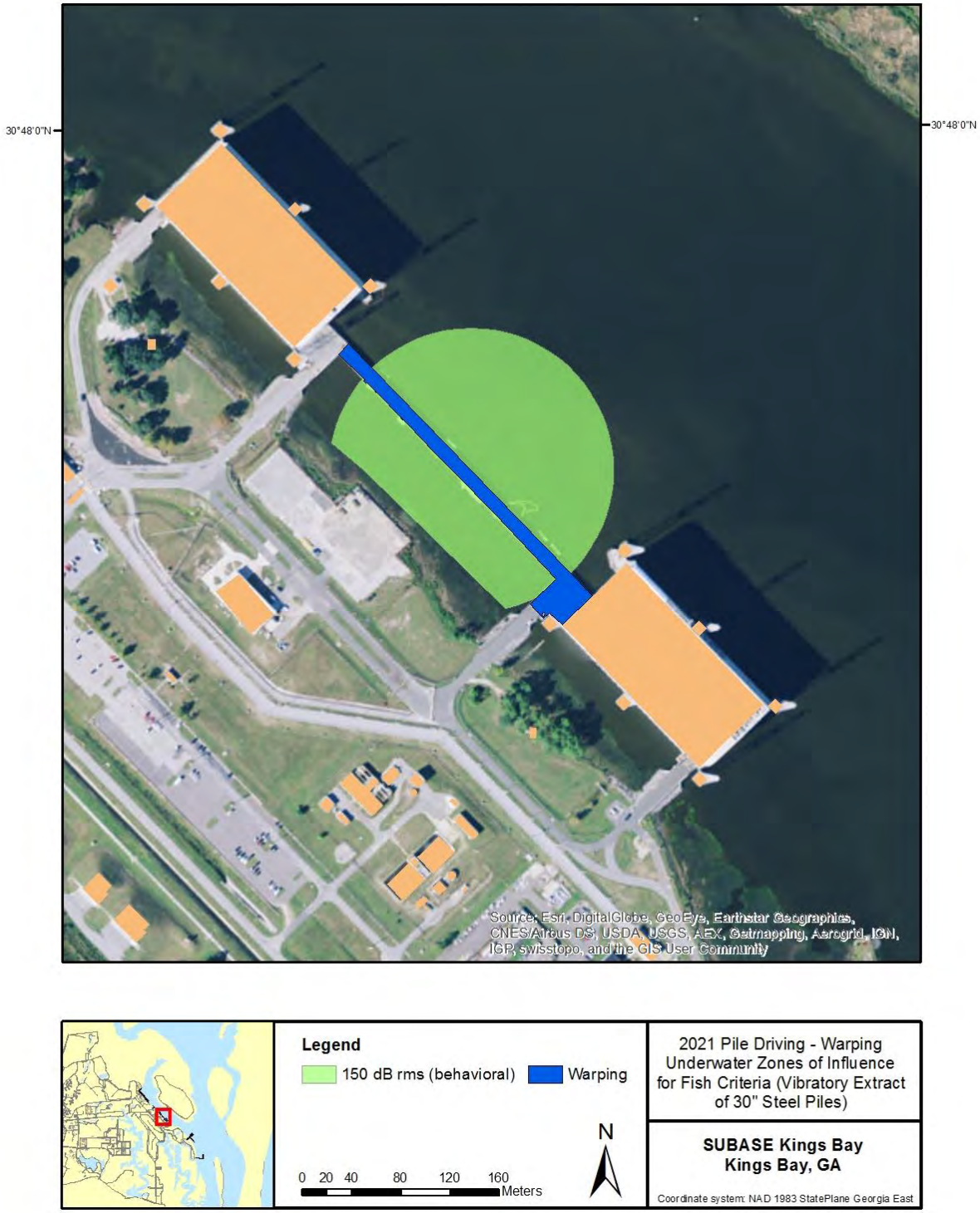

Figure D-17. Project 3F – Warping Wharf with Capstans Vibratory Extraction ZOIs for 30-inch Steel Piles (2021)

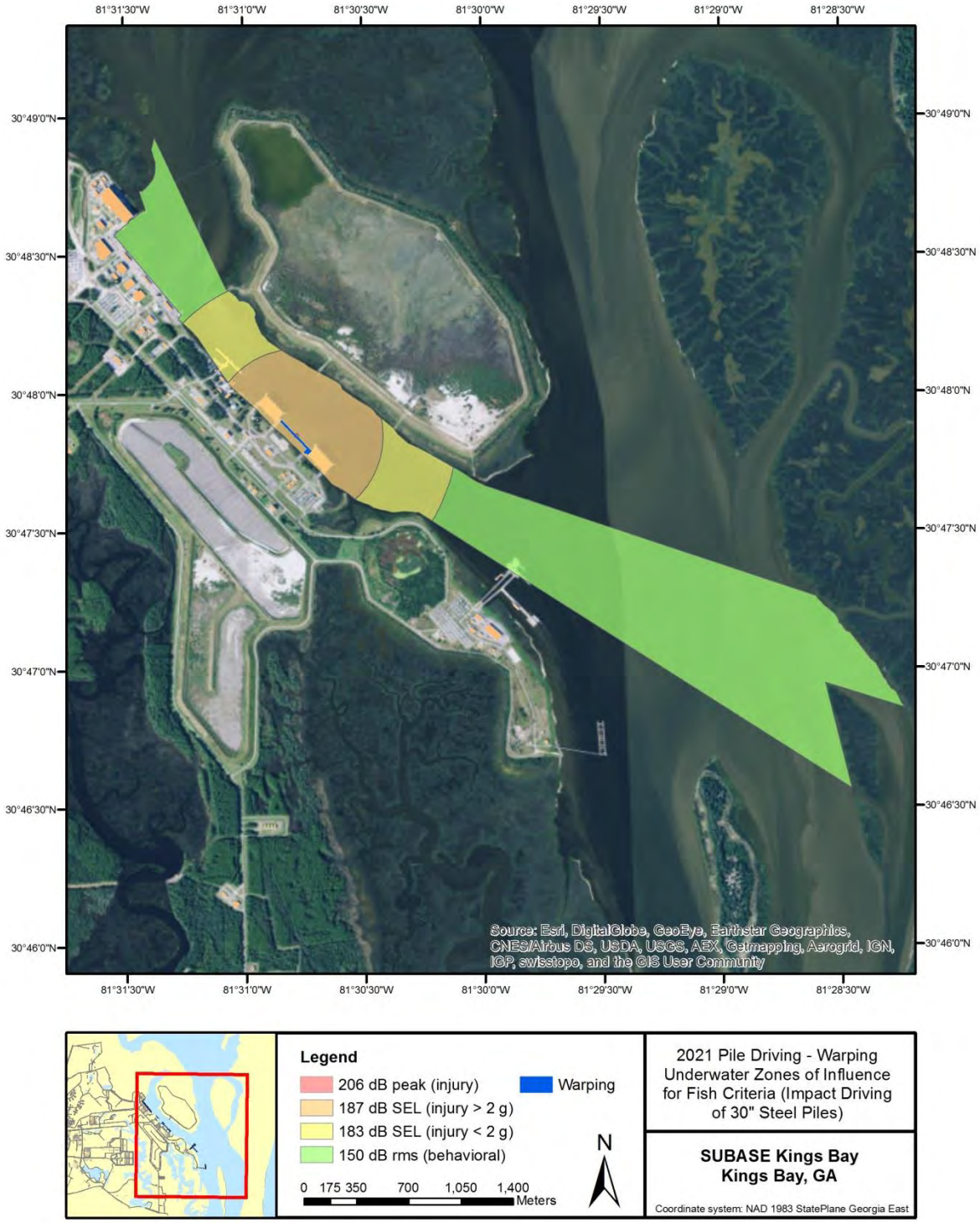

Figure D-18. Project 3F – Warping Wharf with Capstans Impact Driving ZOIs for 30-inch Steel Piles (2021)

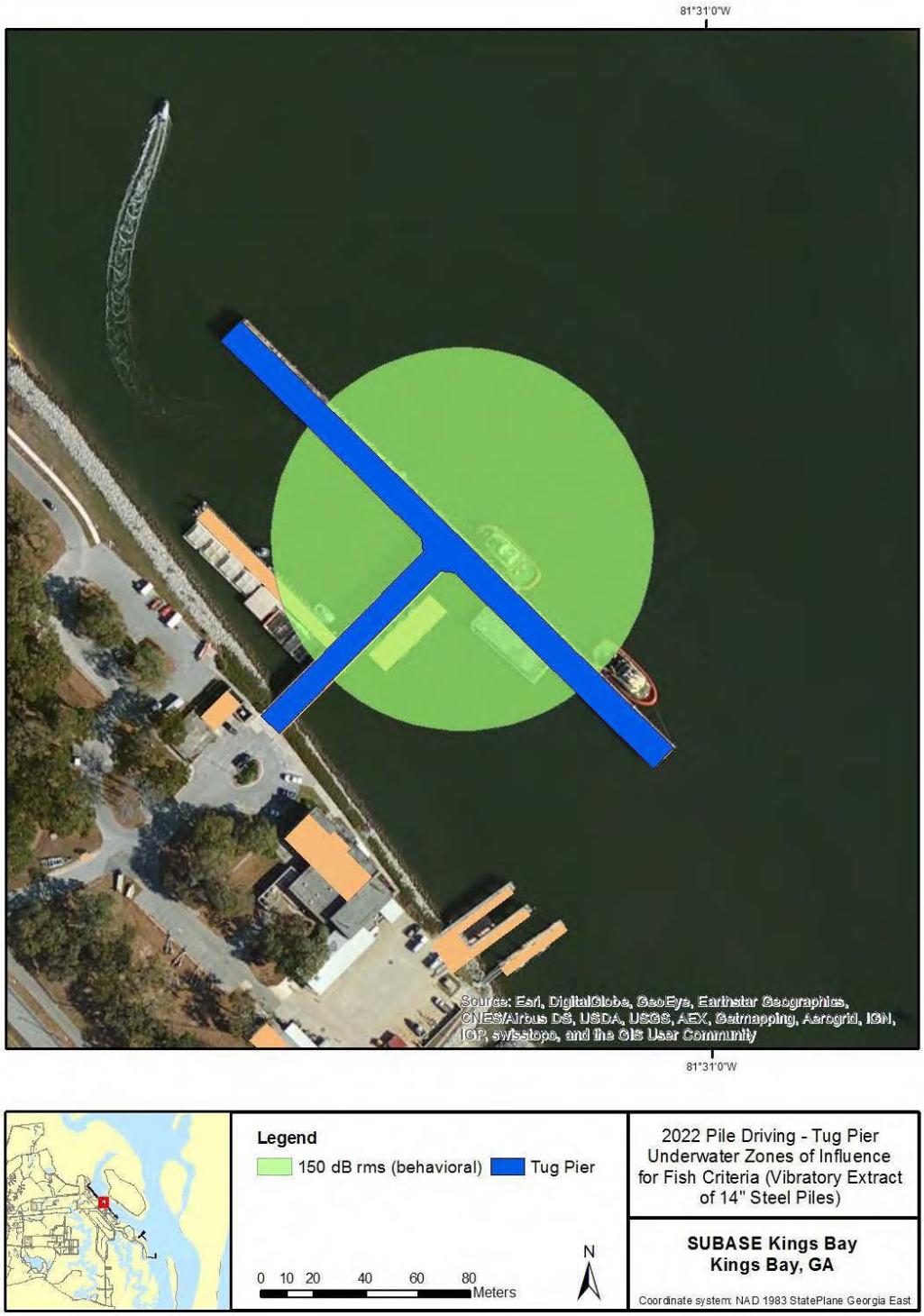

Figure D-19. Project 3G – Tug Pier Vibratory Extraction ZOIs for 14-inch Steel Piles (2022)

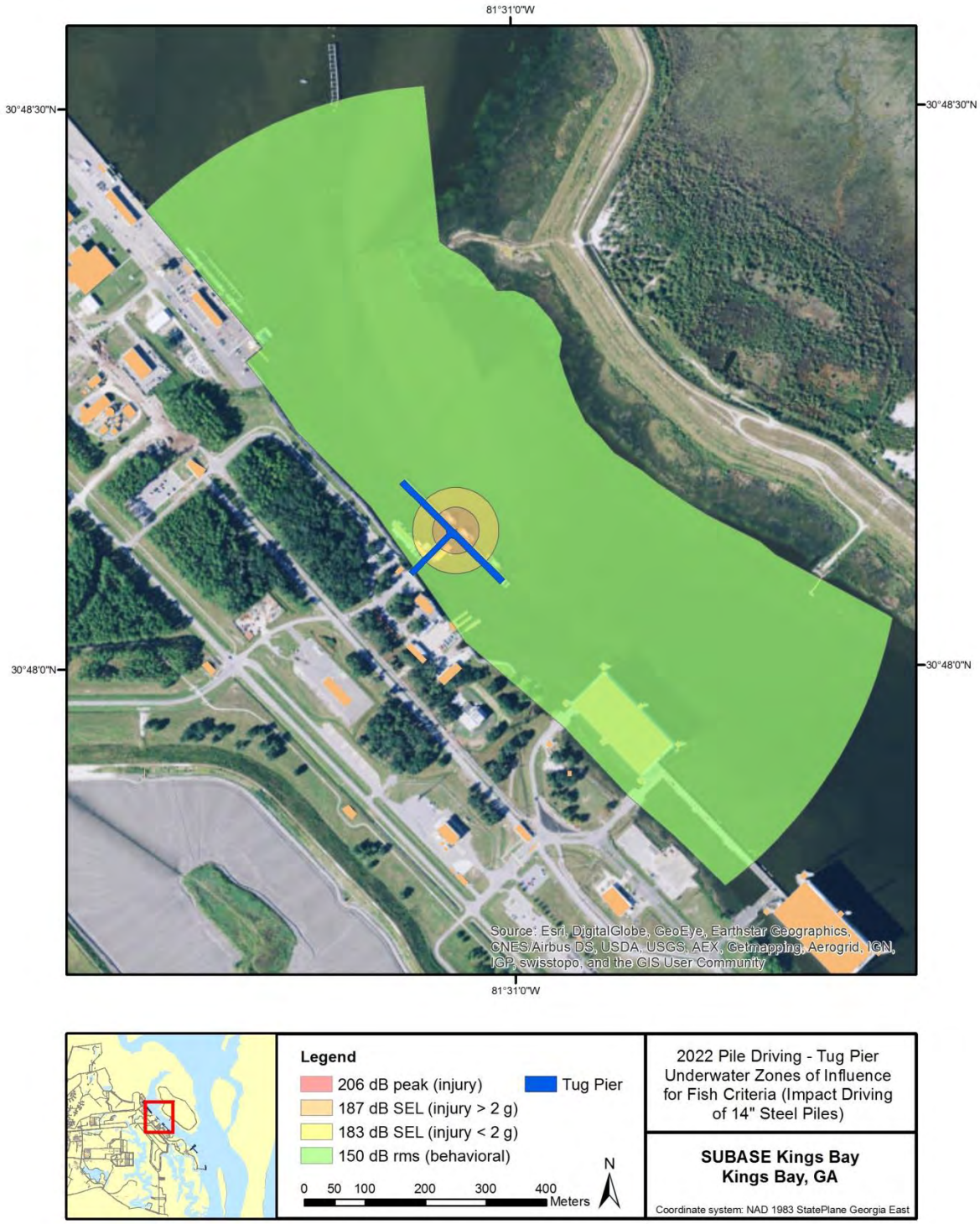

Figure D-20. Project 3G – Tug Pier Impact Driving ZOIs for 14-inch Steel Piles (2022)

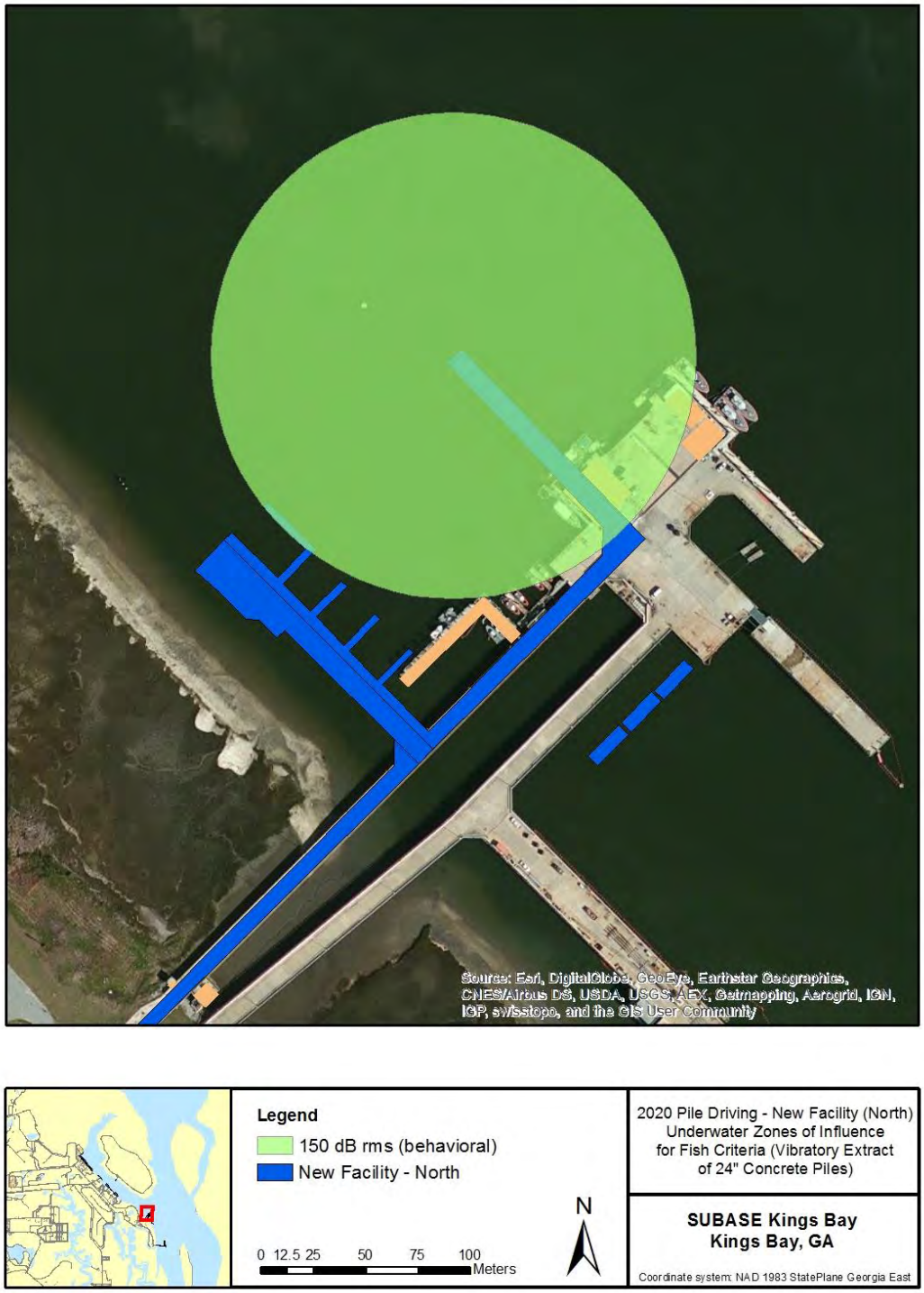

Figure D-21. Project 4A – New Facility Vibratory Extraction ZOIs for 24-inch Concrete Piles (2020)

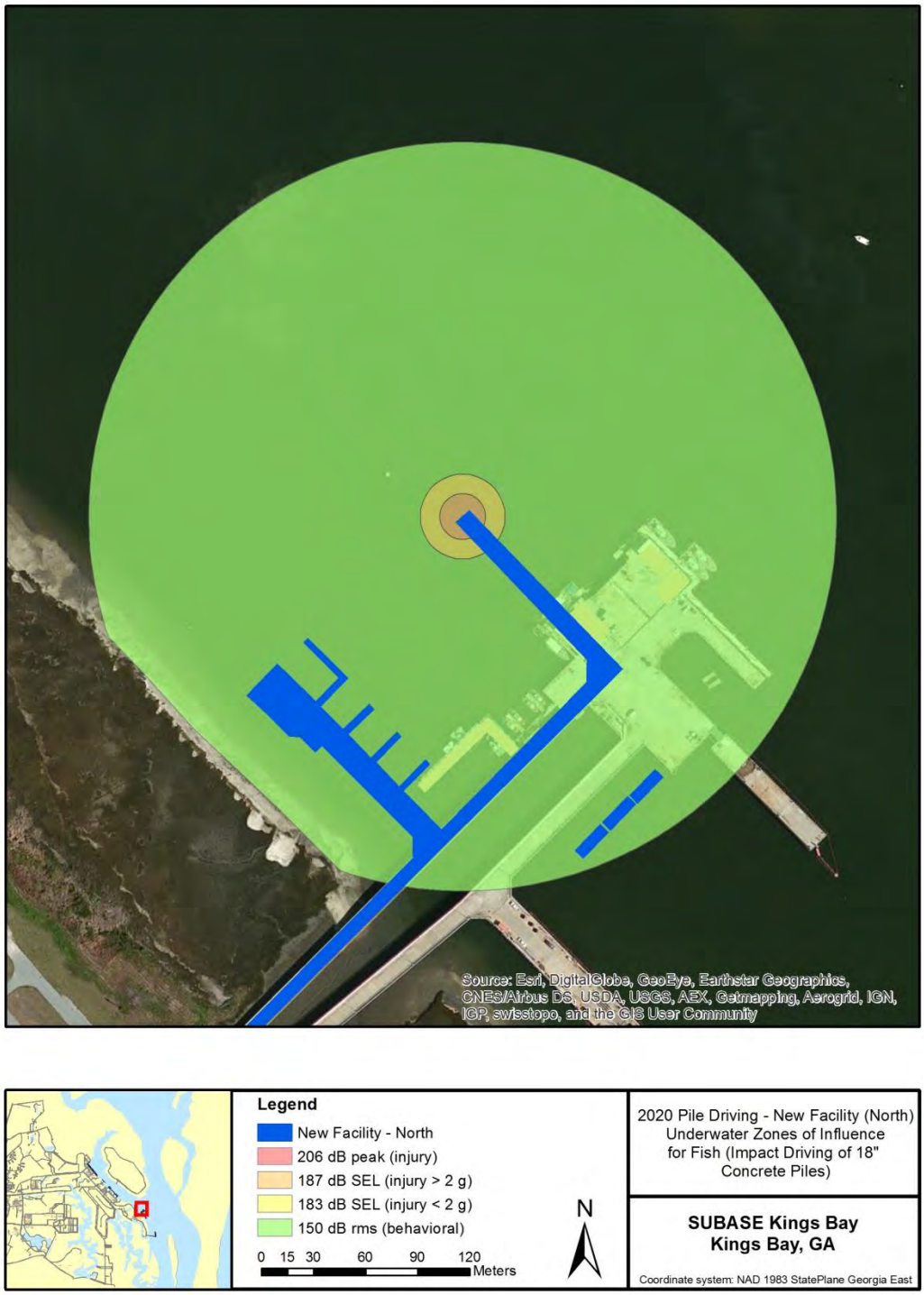

Figure D-22. Project 4A – New Facility Impact Driving ZOIs for 18-inch Concrete Piles (2020)

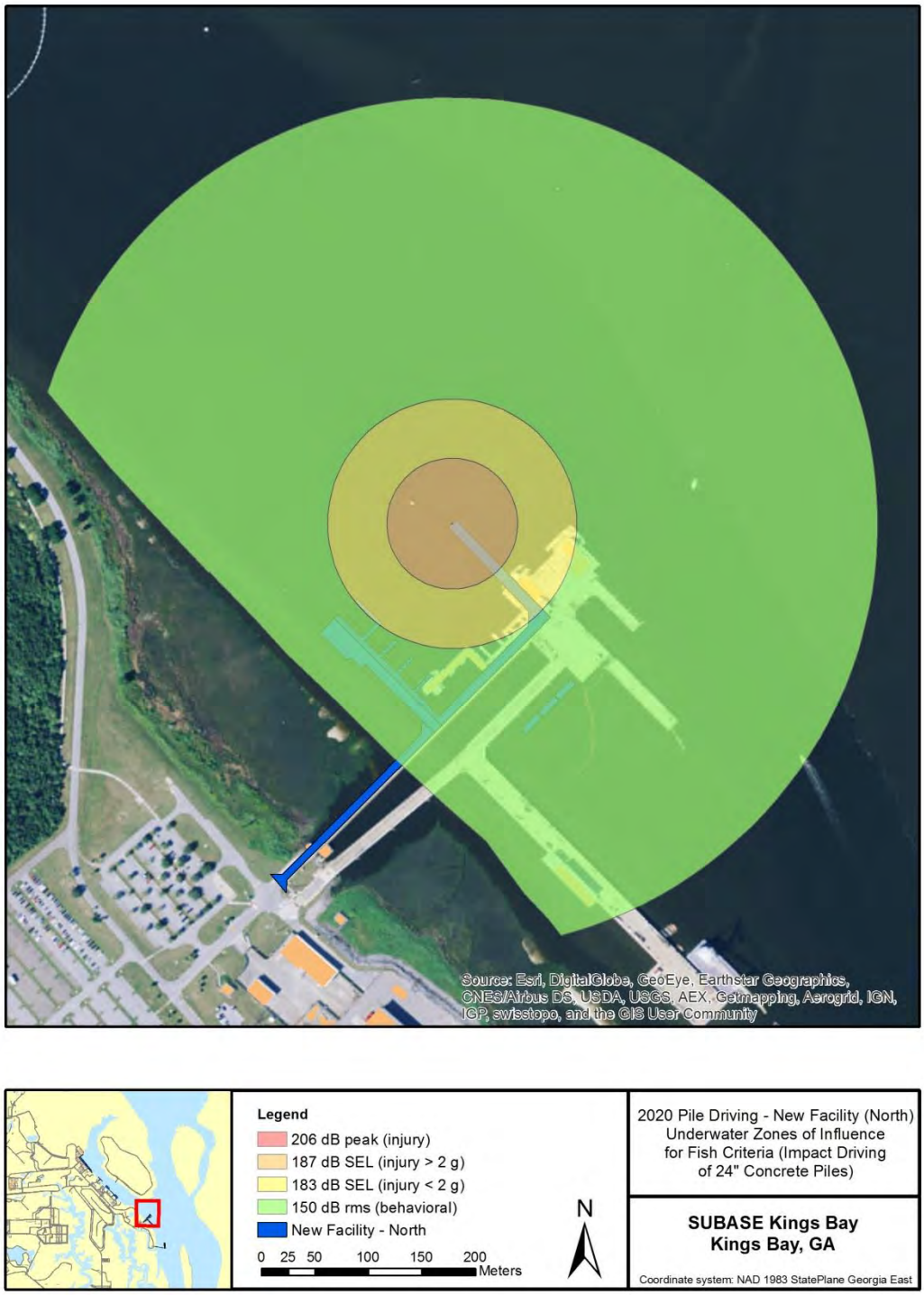

Figure D-23. Project 4A – New Facility Impact Driving ZOIs for 24-inch Concrete Piles (2020)

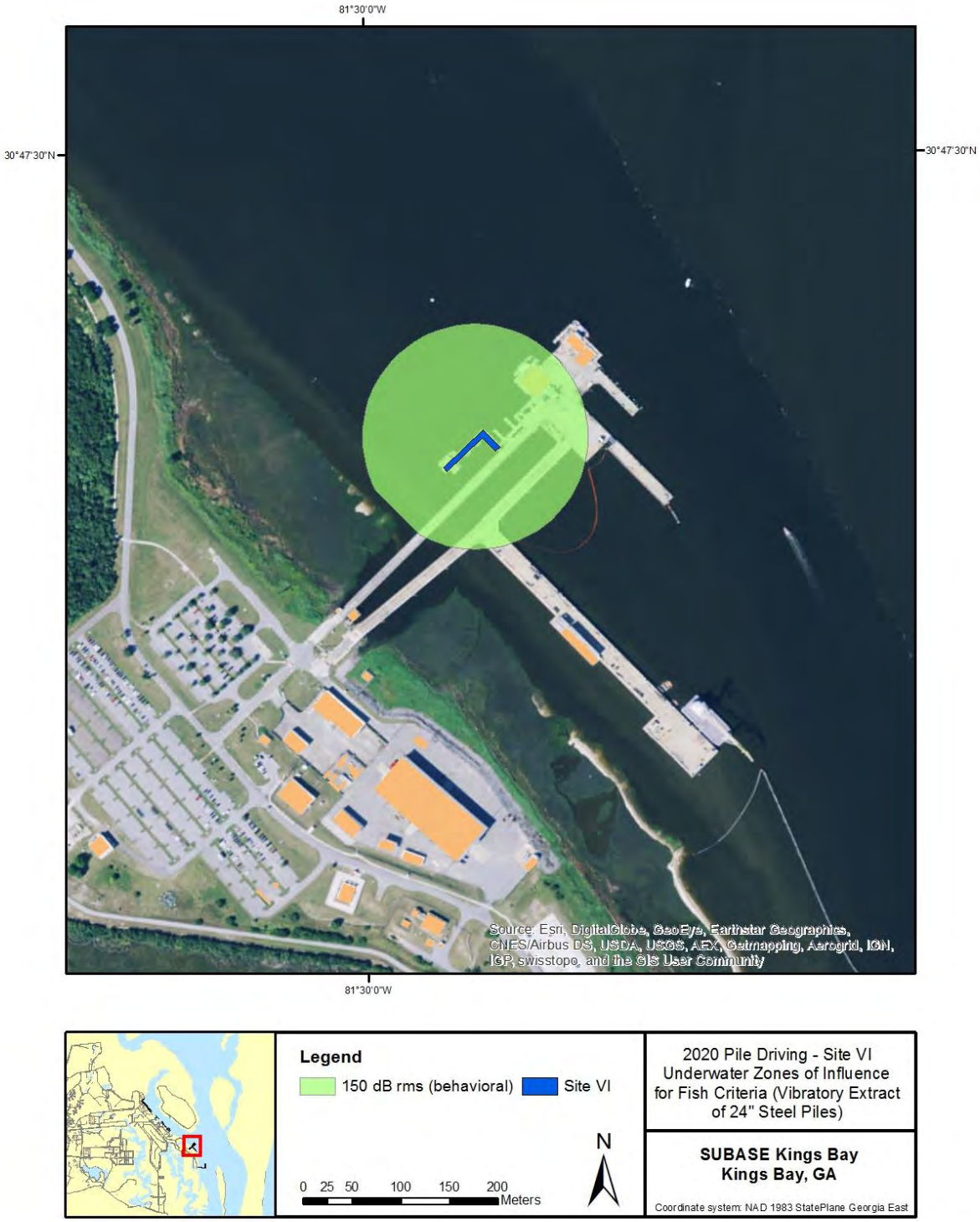

Figure D-24. Project 4B – Small Craft Berth Site VI Vibratory Extraction ZOIs for 24-inch Steel Piles (2020)

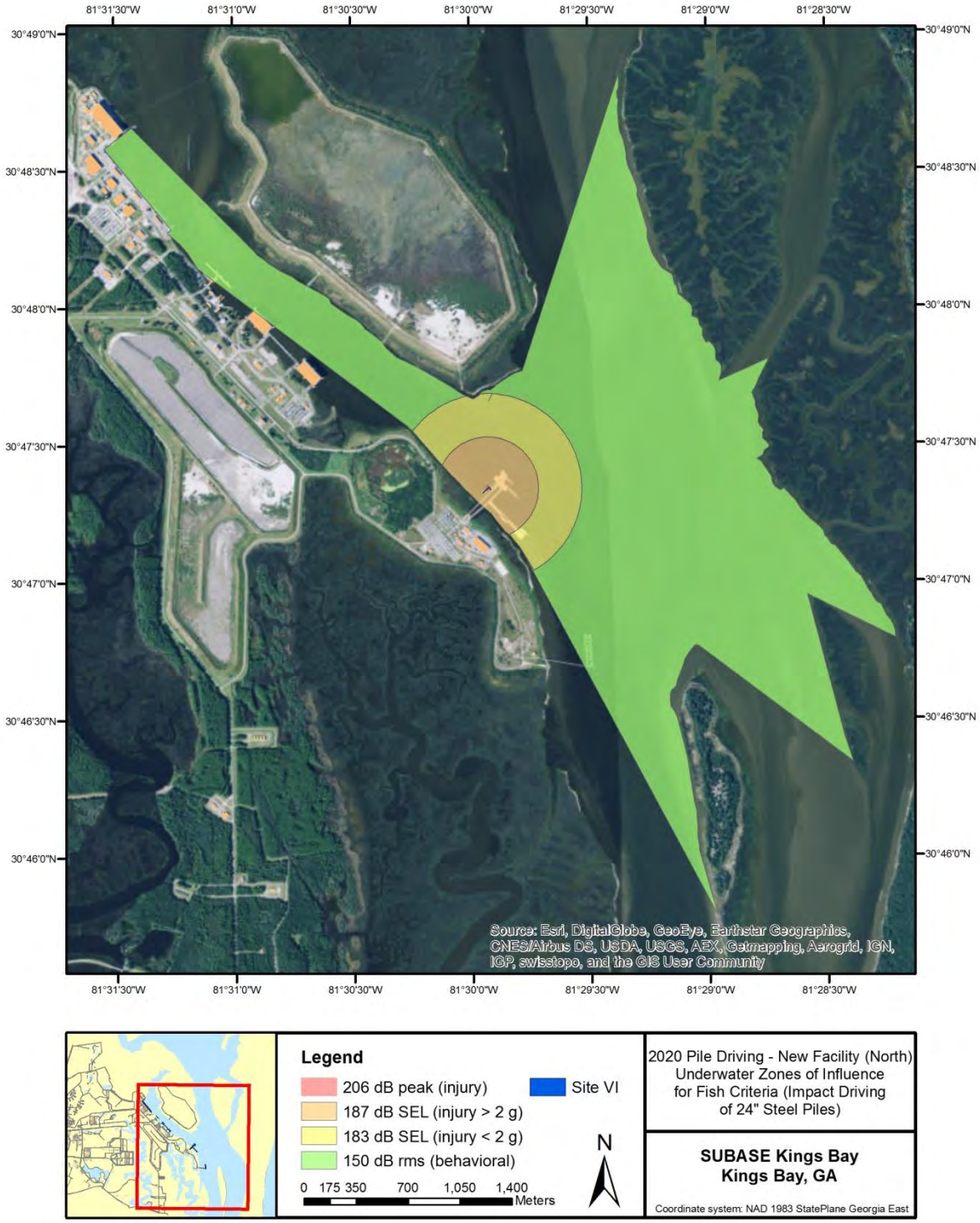

Figure D-25. Project 4B – Small Craft Berth Site VI Impact Driving ZOIs for 24-inch Steel Piles (2020)

Figure D-26. Project 5 – Magnetic Silencing Facility Vibratory Extraction / Driving ZOIs for 16-inch Timber / Composite Piles (2017)

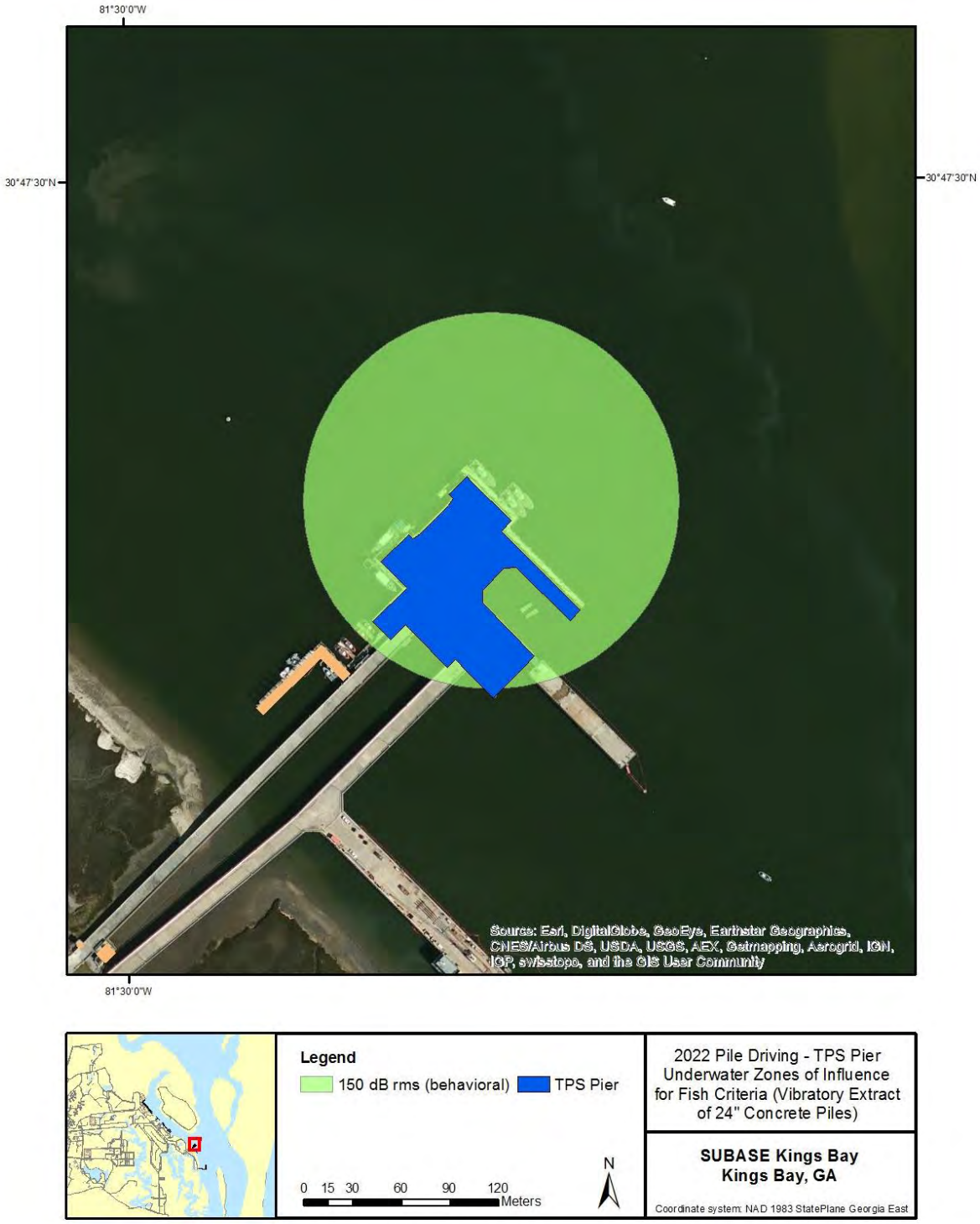

Figure D-27. Project 6A / 6B – TPS Pier and North Trestle Demolition Vibratory Extraction ZOIs for 24-inch Concrete Piles (2022)

APPENDIX D
ESSENTIAL FISH HABITAT ASSESSMENT

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV22/001
January 4, 2016

Dr. Pace Wilber
Atlantic Branch Supervisor
NOAA Fisheries - Habitat Conservation Division
219 Fort Johnson Road
Charleston, SC 39412

SUBJECT: ESSENTIAL FISH HABITAT CONSULTATION FOR WATERFRONT PILE REPAIR, REPLACEMENT, AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

Pursuant to 50 C.F.R. 600.920(e) and the Magnuson-Stevens Fishery Conservation and Management Act section 305(b)(4)(A), the Navy is providing this Essential Fish Habitat assessment to initiate consultation on potential impacts of waterfront construction at Naval Submarine Base Kings Bay, Georgia.

In-water construction is projected to occur during years 2017 through 2022 and construction best management practices shall be followed to prevent negative impacts to water quality. Anticipated impacts to EFH are minor and no dredging will occur. All actions will occur within the existing NSB Kings Bay waterfront footprint.

The Navy and the NMFS Habitat Conservation Division have a history of effective partnering and we look forward to continuing that relationship with these repair and maintenance activities that are vital to our country's national security. The Navy strongly desires to schedule this work under a contract that must be executed in Fiscal Year 2017 and therefore requests that this EFH consultation be completed no later than 25 April 2016.

If you have any questions or need further information regarding this matter, please contact Ms. Taura Huxley-Nelson, Natural Resources Specialist, at commercial: (904) 542-6307 or email: taura.a.huxley1@navy.mil.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the
Commanding Officer

Enclosure: Essential Fish Habitat Assessment for Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, Georgia

ESSENTIAL FISH HABITAT ASSESSMENT FOR WATERFRONT PILE REPAIR, REPLACEMENT, AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

Submitted to:

NOAA Fisheries, Habitat Conservation Division
219 Fort Johnson Road
Charleston, SC 29412

Prepared by:

Naval Facilities Engineering Command, Southeast
Box 30, Building 903
NAS Jacksonville, FL 32212-0030

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List of Acronyms

BMP	best management practice
DO	dissolved oxygen
DOD	Department of Defense
EFH	Essential Fish Habitat
FAC	facility (reference number)
FY	fiscal year
HAPC	Habitat Area of Particular Concern
HDPE	high density polyethylene
MHW	mean high water
MLLW	mean lower low water
MSA	Magnuson-Stevens Fishery Conservation and Management Act
MSF	Magnetic Silencing Facility
Navy	United States Navy
NMFS	National Marine Fisheries Service
SAFMC	South Atlantic Fishery Management Council
SSBN	Trident ballistic missile submarine
SSGN	guided missile submarine
St.	Saint (e.g., St. John's River)
SUBASE	Naval Submarine Base
TPS	Transit Protection System
U.S.	United States
USEPA	United States Environmental Protection Agency
WRA	Waterfront Restricted Area

1. Introduction

Naval Submarine Base (SUBASE) Kings Bay is the United States (U.S.) Department of the Navy's (Navy's) East Coast home port for ballistic missile nuclear submarines supporting the Trident II (D-5) missile. SUBASE Kings Bay efficiently and effectively manages, maintains, and operates Trident ballistic missile (SSBN) and guided missile (SSGN) submarines, Trident II D-5 and Tomahawk Land Attack Missiles and systems, and infrastructure and quality of life facilities and programs.

A study of SUBASE Kings Bay water-based support facilities found the conditions varied widely from good to seriously deteriorated (U.S. Department of the Navy 2010). Continuous monitoring of these conditions by SUBASE Kings Bay logistical support staff confirm the advanced deterioration and critical nature of some issues that pose operational and safety risks. Additionally, other areas of initial deterioration were identified which require remedy in order to maintain the useful life of existing structures. Damage observed includes deteriorated concrete piles, pile caps, and deck components (cracked, spalled, delaminated, exposed/corroded internal reinforcing steel structures); marine pest (wood borer) damage on wooden piles; broken or unmaintained moorings fittings; and corrosion on steel piles and pile caps (Figures 1-1 through 1-4).

The purpose of the Proposed Action is to maintain the structural integrity of the in-water pile-supported structures across the installation's waterfront. This action would be accomplished by repairing damaged and aged piles and installing new piles, and ensuring compliance with the current revisions to Department of Defense (DOD) and Navy security directives. The Proposed Action is needed because the in-water pile-supported structures and associated infrastructure are deteriorating and do not provide adequate and stable mooring facilities for ships and submarines, and do not comply with current DOD and Navy security directives.

As required by the Magnuson-Stevens Fishery Conservation and Management Act (MSA), the purpose of this document is to assess the impacts on Essential Fish Habitat (EFH) from the United States (U.S.) Department of the Navy's (Navy) proposed wharf repair and maintenance activities. The objective of this EFH Assessment is to evaluate how the projects proposed as part of the Proposed Action may affect EFH designated by the South Atlantic Fishery Management Council (SAFMC) and the National Marine Fisheries Service (NMFS).

This EFH Assessment includes a description of the proposed action; an overview of the EFH designated within the activity area; an analysis of the direct and cumulative effects on EFH for the managed fish and their food resources; the Navy's determinations regarding the effects of the proposed activity; and proposed mitigation measures selected to minimize any potential adverse effects that could result from the proposed activity. The determinations of effects were based on an evaluation of available scientific data and literature and on information collected for the *Draft Environmental Assessment for Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, Georgia* (in preparation).

Figure 1-1. Concrete bullrail with delamination

Figure 1-2. Concrete pile cap corrosion spall and exposed steel reinforcements members

Figure 1-3. Double bitt concrete mooring foundation with an open corrosion spall

Figure 1-4. View of an open corrosion spall with exposed reinforcing on a concrete pile cap

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2. Project Description

2.1 Project Location

SUBASE Kings Bay is located in the southeastern corner of Georgia, eight miles north of the Georgia-Florida border, approximately four miles inland from the Atlantic Ocean, and approximately two miles north of St. Mary's, Georgia, along the western shore of Cumberland Sound (Figure 2-1). The approximate 16,000-acre installation provides berthing and support services to naval submarines and other assets. The entirety of SUBASE Kings Bay, including the land areas and adjacent water areas along Kings Bay and Cumberland Sound between Marianna Creek to the north and Mill Creek to the south, is restricted from general public access.

2.2 Proposed Action

To ensure the Navy can continue its mission of supporting the Fleet Ballistic Missile System and Trident Submarine Program, the Navy proposes to repair (including direct repairs and repairs by replacement) in-water structures at SUBASE Kings Bay, and construct a new Transit Protection System (TPS) Headquarters/Operational Support Facility pier adjacent to the existing Layberth Pier. These repairs, upgrades, and new construction would 1) address critical damage and mission and safety requirements, 2) limit further deterioration and increase the useful life of the structures, and/or 3) upgrade infrastructure to meet requirements of new submarine technology.

The Proposed Action would occur between 2017 through 2022 and is comprised of six distinct projects. Of those six projects, Projects 1, 3, 4, and 6, are comprised of multiple smaller projects. A summary of the six proposed projects is provided in Table 2-1, and Table 2-2 details pile removal and installation requirements associated with each. Figures 2-2 and 2-3 illustrate the general locations of the proposed projects.

2.2.1 Project 1: Port Operations Waterfront Facilities Repair

In order to maintain the waterfront infrastructure and security required to carry out homeport and refit services to SSBN and SSGN submarines, repairs to the Port Operations Waterfront Facilities are required. Under the Project, structural concrete and steel repairs and corrosion protection is needed on the following waterfront facilities:

- Tug Pier Facility [FAC] #5926 (Project 1A)
- General Access Pier Crab Island FAC #5888 (Project 1B)

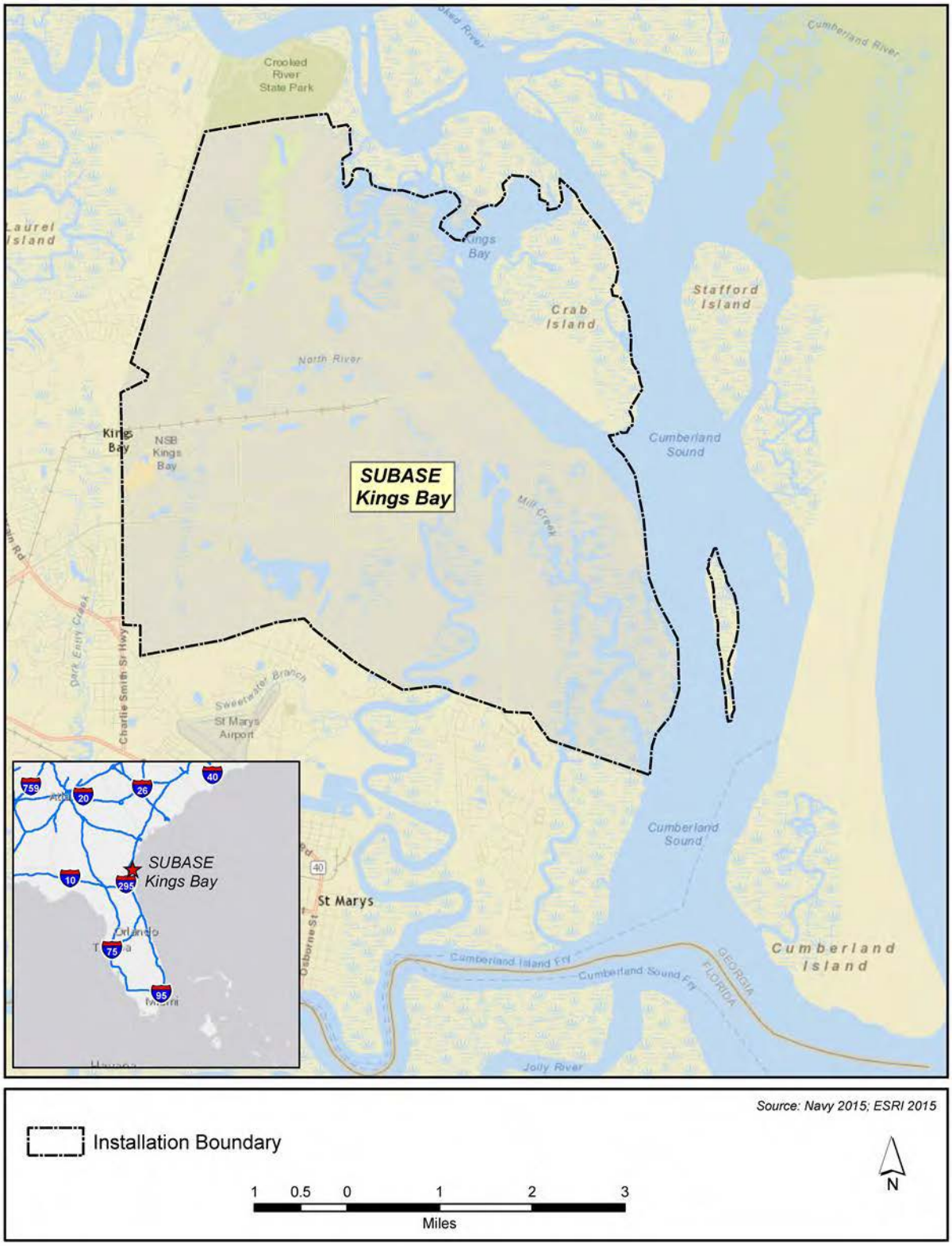

Figure 2-1. Naval Submarine Base Kings Bay Location Map

Table 2-1. Summary of Proposed Waterfront Repairs and Security-Related Upgrades

Primary Description		Project	Map ID	Description	Facility Number (FAC)	Projected Start (FY)
Ref #	Title					
1	Port Operations Waterfront Facilities Repairs	Tug Pier	1A	Repair concrete structural piles, pile caps, utility cover grates, headwall, mooring support and hardware, and deck undersides; replace wooden fender piles with concrete piles; and modify the fender system on the south side of access pier.	5926	2017
		General Access Pier Crab Island	1B	Install new guide piles, and repair brow and handrails.	5888	2017
2	Unspecified Minor Construction Layberth Fender Pile Modification P661 Project		2	Install additional fender piles to shorten the distance between existing piles and provide the required support for hydro-pneumatic fenders.	5976	2017
3	Waterfront Pile Repair and Replacement / Maintenance Program	Explosive Handling Wharf #2 Pier w/Capstans	3A	Repair high-density polyethylene (HDPE) fender pile wraps, sacrificial anodes attached to the steel fender piles, steel safety ladders and treated timber bracing; repair or replace various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings and two steel guide pipe piles on the diver's float.	5109	2017 / 2022
		(Dry Dock) Interface Wharf	3B	Replace timber fender bearing strips and wales, repair concrete deck, bullrail, edge beams, and mooring foundations; and repair, paint and recoat cathodic protection on the steel H Pile fender system and sheet pile.	5995	2021
		Refit Wharf #1	3C	Replace various pile caps, piles, and the outboard edge beam; and repair, clean, and paint several mooring fittings.	5909	2018
		Refit Wharf #2	3D	Replace or repair various pile caps, piles, outboard edge beams, and mooring foundations; and reattach underdeck lighting conduit and clean and repaint various mooring fittings.	5910	2017
		Refit Wharf #3	3E	Replace or repair various pile caps, piles, the outboard edge beams, and mooring foundations; and clean and repaint various mooring fittings.	5916	2018
		Warping Wharf w/Capstan	3F	Repair HDPE fender pile wraps; replace or repair various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings.	5877	2021
		Tug Pier	3G	Replace timber fender piles with guide piles and small boat access floats; paint mooring fittings; and repair concrete pile caps, concrete piles, concrete underdeck, and storm drain.	5926	2022
4	Transit Protection System (TPS) P617 Off-shore Supply Vessel (OSV) Berthing Project	New Pier - TPS Headquarters / Operational Support Facility	4A	Construct new pier to serve TPS Headquarters/Operational Support Facility functions. The new TPS pier would be provided with full hotel service capability including power; potable water; fire protection; sewage connections; Ship Overboard Drainage (SOD) collection; fuel; and telephone, cable, and Local Area Network (LAN) services.	n/a	2020
		Small Craft Berth Site VI	4B	Modifies the existing berthing pier on the north trestle at Site VI to comply with current DOD and Navy security directives. The pier and floating berthing slips would be provided with full hotel service capability. The berthing pier would consist of a pile supported reinforced concrete structure with floating sections. This project includes the installation of two-5,000 gallon above ground storage tanks and provides two associated truck off-loading connections and fuel dispensing units.	5936	2020
5	Magnetic Silent Facility with Cranes (RM14-1710 TRIREFFAC Waterfront Facilities Repair)		5	Replace timber fender piles, restraining chains, aluminum utility tray, and concrete pile utility guide bracket; and repair wooden hand rails and the cracked concrete deck underside.	5980	2017
6	Demolition of the Transit Protection System Pier and Layberth North Trestle	TPS Pier Demolition	6A	Remove the tip of the existing TPS pier.	5934	2022
		North Trestle Demolition	6B	Demolish North Layberth Trestle.	5977	2022

Table 2-2. Summary of Proposed Pile Removal and Installation Requirements

Primary Description		Project	Map ID	FAC #	Fiscal Year[1]	Depth (feet)	Pile Description	Total # of Piles		Method		In-water Work Days
Ref #	Title							Install	Remove	Install	Remove	
1	Port Operations Waterfront Facilities Repairs	Tug Pier	1A	5926	2017	24	18-inch square concrete	148	n/a	impact	n/a	30
							24-inch square concrete	18		impact	n/a	4
							16-inch timber round	n/a	159	n/a	vibratory	31
		General Access Pier Crab Island	1B	5888	2017	15	16-inch composite round	2	n/a	vibratory	n/a	1
							16-inch timber round	n/a	2	n/a	vibratory	1
2	Unspecified Minor Construction Layberth Fender Pile Modification P661 Project		2	5976	2017	46	14-inch steel H	55	n/a	impact	n/a	7
3	Waterfront Pile Repair and Replacement / Maintenance Program	Explosive Handling Wharf #2 Pier w/Capstans	3A	5109	2017	46	24-inch steel round	2	2	impact	vibratory	2
					2022	46	24-inch concrete square	3	3	impact	vibratory	2
					2022	46	24-inch steel round	10	10	impact	vibratory	7
		(Dry Dock) Interface Wharf	3B	5995	2021	46	14-inch steel H	99	99	impact	vibratory	15
		Refit Wharf #1	3C	5909	2018	46	24-inch steel round	6	n/a	impact	n/a	1
							30-inch steel round	n/a	6	n/a	vibratory	1
		Refit Wharf #2	3D	5910	2017	46	24-inch steel round	6	n/a	impact	n/a	1
							30-inch steel round	n/a	6	n/a	vibratory	1
		Refit Wharf #3	3E	5916	2018	46	24-inch steel round	6	n/a	impact	n/a	1
							30-inch steel round	n/a	6	n/a	vibratory	1
		Warping Wharf w/Capstan	3F	5877	2021	46	30-inch steel round	8	8	impact	vibratory	4
		Tug Pier	3G	5926	2022	30	14-inch steel H	77	77	impact	vibratory	16
4	Transit Protection System (TPS) P617 Off-shore Supply Vessel (OSV) Berthing Project	New TPS Pier	4A	n/a	2020	35	24-inch concrete square	165	n/a	impact	n/a	55
							18-inch concrete square	50	n/a	impact	n/a	17
							24-inch concrete square	n/a	121	n/a	vibratory	8
		Small Craft Berth Site VI	4B	5936	2020	35	24-inch steel round	30	30	impact	vibratory	8

Table 2-2. (*continued*) Summary of Proposed Pile Removal and Installation Requirements

Primary Description		Project	Map ID	FAC #	Fiscal Year[1]	Depth (feet)	Pile Description	Total # of Piles		Method		In-water Work Days
Ref #	Title							Install	Remove	Install	Remove	
5	Magnetic Silent Facility with Cranes (RM14-1710 Trident Refit Facility Waterfront Facilities Repair)		5	5980	2017	46	18-inch composite round	18	n/a	vibratory	n/a	3
							16-inch timber round	n/a	18	n/a	vibratory	3
6	Demolition of the Transit Protection System Pier and Layberth North Trestle	TPS Pier Demolition	6A	5934	2022	46	24-inch concrete square	0	649	n/a	vibratory	41
		Layberth North Pier Demolition	6B	5977	2022	46	24-inch concrete square	0	121	n/a	vibratory	6

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Figure 2-2. General Locations of the Proposed Projects

Figure 2-3. Existing Layberth Pier in Site VI and Modifications for Projects 4 and 6

2.2.1.1 1A: Tug Pier Repair

The existing Tug Pier is currently operating in a generally dilapidated and unsafe condition. Although several timber piles appear to have recently been replaced, extensive marine borer damage[1] has caused significant loss of pile integrity near the low tide level on 53 older timber fender piles along the inboard (center) side of the pier head and the pier approach. Deterioration and cracking, such as spalling[2], delamination, and corrosion of internal reinforcing steel are occurring on six concrete piles, 23 concrete pile caps, and 20 square feet of concrete deck underside. Forty-four mooring fittings show areas of coating loss and surface corrosion.

Under the Project, the Tug Pier concrete structural piles, pile caps[3], headwall, and deck undersides would be repaired. Concrete would be removed to expose the corroded steel reinforcing bars in areas where the concrete has already cracked and spalled, the steel would be repaired or replaced, and the overlying concrete restored. Wooden fender[4] piles would be replaced with concrete piles. The steel reinforcing bars and utility cover grates would be replaced as needed. The fender system on the south side of the access pier would be modified with floats on guide piles to allow mooring of smaller vessels. The concrete base support structures on mooring hardware would be repaired and the mooring hardware would be repainted. All broken and cracked wooden fenders piles and wooden fender piles with wooden guide piles would be replaced with concrete piles

Repairing the Tug Pier would require the installation of 148 new 18-inch square concrete piles, the installation of 18, 24-inch square concrete piles, and the removal of 159 existing 16-inch wood fender piles. The piles would be removed with a vibratory hammer. The concrete piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that five to 16 piles would be removed or installed per day or up to 65 days of in-water work. In-water work is scheduled to begin in Fiscal Year (FY) 17.

2.2.1.2 1B: Crab Island Access Pier Repairs

The Access Pier at Crab Island was impacted by tropical storms in 2012 and the wooden guide piles are damaged. New fiberglass re-enforced plastic composite guide piles with HDPE jackets would be installed at the Access Pier, and the gangplank and handrails would be repaired. Repairing the Access Pier at Crab Island would require the installation of two, 16-inch round composite piles and the vibratory removal of two wooden guide piles. Extraction and installation would both be performed using a vibratory hammer. It is anticipated that an average of two piles would be installed or removed per day for approximately two days of in-water work. In-water work is scheduled to begin in FY17.

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[1] Marine borers bore into and eat submerged wood; infestation results in piles becoming riddled and eventually collapsing.

[2] Spalling/delamination are the separation and breaking away of layers or small pieces of concrete.

[3] Pile caps transmit the load from the structure to the pile group.

[4] Fenders protect the submarine and shore facility from damage due to contact between the two during berthing and mooring.

2.2.2 Project 2: Unspecified Minor Construction Layberth Fender Pile Modification P661

The Layberth Pier serves the critical functions of weapons loading and unloading, resupply, and maintenance activities for allied vessels visiting SUBASE Kings Bay. The Pier is currently designated as a site for loading Tomahawk missiles in the event weapons loading operations are underway in one of the Explosive Handling Wharves. The loss of the use of this pier would significantly impact SUBASE Kings Bay's ability to berth SSBNs, SSGNs, and foreign vessels. The existing Layberth fenders are currently installed on 5-foot centers (i.e., center of pile to center of pile), and the gaps between the fender piles are too wide to adequately support the hydro-pneumatic fenders. Hydro-pneumatic fenders are designed to provide a high level of energy absorption with linear distribution load distribution making them highly effective to protect both a berthing vessel and the fender system.

The Unspecified Minor Construction (UMC) Layberth Fender Pile Modification P661 would provide berthing for the Submarine Group 10 SSGN homeported at SUBASE Kings Bay, berthing for visiting vessels, and overflow berthing for Tridents homeported at SUBASE Kings Bay. By reducing the distance between existing piles by installing additional piles, the pier would provide necessary structural support required for the installation and operation of an upgraded Yokahama pneumatic fender, which is necessary to safely moor submarines.

Upgrading the Layberth pier would require the installation of 55 new 14-inch steel H-piles. No existing piles would need to be removed. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of eight piles would be installed per day for approximately seven days of in-water work. In-water work is scheduled to begin in FY17.

2.2.3 Project 3: Waterfront Repair and Replacement Maintenance Program

The Waterfront Pile Repair and Replacement Maintenance Program consist of repairing and/or replacing structurally unsound piles along the waterfront restricted area (WRA). This project includes multiple individual projects as follows:

- Project 3A: Explosives Handling Wharf #2, Pier with Capstans (FAC #5109)
- Project 3B: (Dry Dock) Interface Wharf (FAC #5995)
- Project 3C: Refit Wharf #1 (FAC #5909)
- Project 3D: Refit Wharf #2 (FAC #5910)
- Project 3E: Refit Wharf #3 (FAC #5916)
- Project 3F: Warping Wharf with Capstan (FAC #5877)
- Project 3G: Tug Pier (FAC #5926)

2.2.3.1 3A: Explosives Handling Wharf #2 Pier with Capstans

The Explosive Handling Wharves at SUBASE Kings Bay serve as covered deep water facilities for the loading and off-loading of munitions and other heavy objects onto submarines. Without this facility in operational condition, the secondary loading location would be the only place for such actions to take place. In the event of a mechanical failure or any other event causing the secondary location to be disabled, munitions or heavy supplies could not be loaded or unloaded from the submarines.

Explosives Handling Wharf #2 displays significant deterioration of a non-rated cleat mooring fitting on the diver's float, various high-density polyethylene (HDPE) fender pile wraps, sacrificial anodes attached to the steel fender piles, steel safety ladders and treated timber bracing; damaged reinforced concrete on various pile caps, piles, and mooring foundations. Likewise, mooring fittings and two steel guide pipe piles on the diver's float require cleaning and repainting.

Upgrading Explosives Handling Wharf #2 would require the installation of two new 24-inches round steel piles and the removal of two guide piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated two piles would be installed or removed per day for approximately two days of in-water work.

Additional future repair projects at this location may include the installation of three, 24-inch square concrete and ten, 24-inch round steel piles and the removal of three dolphin piles and ten fender piles. The piles would be removed and installed as described in the above paragraph. For the second phase, it is anticipated that three to eight piles would be removed or installed per day or up to nine days of in-water work. The in-water work is scheduled to begin in FY22.

2.2.3.2 3B: (Dry Dock) Interface Wharf

The Interface Wharf serves as a loading and unloading for the submarine fleet as well as a service and storage wharf for non-dry-dock repairs and maintenance. Without this facility in operational condition, other refit wharves or the dry dock would have to be used to complete such tasks.

The existing Interface Wharf is increasingly deteriorating. Marine borer damage and subsequent peeling and rot are documented on 96 timber fender piles at and below mean high water (MHW). Fifteen linear feet of timber wale at the curb elevation has impact and rot damage. Spalled concrete occurs at one location on the bullrail corner, on one mooring foundation, on one location on the deck at the handrail attachment, and on two linear feet of the beam seat on the east side of the dry dock gate. All steel fender piles show areas of surface corrosion within and immediately above the tidal zone. (Visual examination and ultrasonic thickness testing indicates the steel piles have up to 0.25-inch of rust scale; the actual loss of steel is less than 0.125-inch loss of actual steel thickness.)

Under the Project, the timber fender bearing strips and wales would be replaced, and the concrete deck, bullrail, edge beams, and mooring foundations would be repaired. Additionally, the steel H Pile fender system would be repaired and painted. Cathodic protection would be recoated on the steel H Pile fender system and sheet pile.

Repairing the Interface Wharf would require the installation of 99 new 14-inch steel H-piles and removal of 99 existing 14-inch steel H-piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of 14 piles would be removed or installed per day for approximately 15 days of in-water work. The in-water work is scheduled to begin in FY21.

2.2.3.3 3C: Refit Wharf 1

Refit Wharfs 1, 2, and 3 provide storage and maintenance services to Trident Submarines and others as requested, including incremental overhaul, modernization, and repair support. All three Refit Wharfs are in disrepair and present a safety risk to the personnel and heavy equipment utilizing the pier; in certain areas, it is recommended that vehicles, mobile cranes, storage and any other heavy loads be prohibited from within the areas supported by deteriorated pile cap locations to limit the possibility of further damage or structural failures. Without the wharves in operational condition, submarines would need to be docked at other locations for repairs, reducing the operational efficiency of Kings Bay maintenance mission, extending the length of vessel docking times, and creating congestion with other vessels already in port.

Refit Wharf 1 displays damaged steel beams supporting the outboard access walkway; damaged reinforced concrete on various pile caps, piles, and the outboard edge beam. Likewise, several mooring fittings require repair, cleaning, and painting.

Repairing Refit Wharf 1 would require the installation of six, 24-inch round steel guide piles and the removal of six existing 30-inch fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of six piles would be removed or installed per day for approximately two days of in-water work. The in-water work is scheduled to begin in FY18.

2.2.3.4 3D: Refit Wharf 2

Refit Wharf 2 displays broken steel beams supporting the outboard access walkway and damaged reinforced concrete on various pile caps, piles, outboard edge beams, and mooring foundations. Additionally, some of the underdeck lighting conduit is detached and various mooring fittings require cleaning and repainting.

Repairing Refit Wharf 2 would require the installation of six, 24-inch round steel guide piles and the removal of six existing 30-inch fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of six piles would be removed or installed per day for approximately two days of in-water work. The in-water work is scheduled to begin in FY17.

2.2.3.5 3E: Refit Wharf 3

Refit Wharf 3 displays broken steel beams supporting the outboard access walkway and damaged reinforced concrete on various pile caps, piles, the outboard edge beams, and mooring foundations. Likewise, the mooring fittings require cleaning and painting.

Repairing Refit Wharf 3 would require the installation of six, 24-inch round steel guide piles and the removal of six, 30-inch fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of six piles would be removed or installed per day for approximately two days of in-water work. The in-water work is scheduled to begin in FY18.

2.2.3.6 3F: Warping Wharf with Capstan

The Warping Wharf serves as a non-covered extension of the inboard leg of the Explosives Handling Wharfs used for aligning submarines prior to berthing in the covered facilities. This facility provides for quick transfer from one Explosives Handling Wharf to the other, as well as protection for the submarines as there is a continuous barrier beside the submarine and attached capstans during docking. The Warping Wharf also functions as a berthing facility for Fleet Ballistic Cargo Ships.

Deterioration at the Warping Wharf includes various degraded HDPE fender pile wraps and damaged reinforced concrete on various pile caps, piles, and mooring foundations. Likewise, the mooring fittings require cleaning and painting.

Repairing the Warping Wharf would require the installation of eight, 30-inch round steel piles and the removal of eight existing fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of five piles would be removed or installed per day for approximately four days of in-water work. The in-water start work is scheduled to begin in FY21.

2.2.3.7 3G: Tug Pier FAC

Although this location is also discussed in Project 1A, additional future repair projects at this location may include the installation of 77 new 14-inch steel H-piles and removal of 77 existing steel fender piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of 10 piles would be removed or installed per day for approximately 16 days of in-water work. The in-water work is scheduled to begin in FY22.

2.2.4 Project 4: Transit Protection System Off-Shore Supply Vessel Berthing Modification Project

This project includes the construction of an onshore TPS Headquarters/Operational Support Facility, the construction of a new pier associated with TPS functions, and the modification of the existing berthing pier on the north trestle at Site VI to comply with current DOD and Navy security directives.

2.2.4.1 4A: New Facility

The new TPS pier would be provided with full hotel service capability including power, potable water, fire protection, wastewater, Ship Overboard Drainage (SOD) collection, fuel, and telecommunications (i.e., telephone, cable, and Local Area Network [LAN] services). The construction of the new pier would require the installation of 165 new 24-inch square concrete piles and 50 new 18-inch square concrete piles. Approximately 121 piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated 16 to 22 piles would be removed and three to 12 piles would be installed per day for approximately 80 days of in-water work. The in-water work is scheduled to begin in FY20.

2.2.4.2 4B: Small Craft Berth Site VI P617

The existing berthing pier on the north trestle at Site VI would be relocated to align with the new pier associated with the proposed TPS Headquarters/Operational Facility and modified to accommodate two offshore supply vessel s (OSVs); two, 87-foot Coast Guard Cutters (CGC); six, 33-foot long Screening Vessels (SVs); and six, 72-foot long SVs in accordance with current DOD and Navy security directives. The berthing pier would consist of a pile-supported, reinforced concrete structure including floating sections to berth the smaller craft. Two, 5,000 gallon horizontal, protected above-ground storage tanks and two associated truck off-loading connections (one for each tank) and fuel dispensing units for refueling the U.S. Coast Guard escort vessels would be installed.

As with the new pier described as Project 4A, the floating berthing slips would be provided with full hotel services. Drainage water from the piers would be collected, run through oil-water separators, and then disposed through existing sewage connections. The modification of the small craft berthing site associated with the TPS Pier and Headquarters Facility would require the installation of 30 new 24-inch round steel piles and the removal of 30 existing piles. The piles would be removed with a vibratory hammer. The steel piles would be driven by a Delmag Pile Hammer D62-22 or equivalent impact hammer. It is anticipated that an average of eight piles would be installed or removed per day for approximately eight days of in-water work. The in-water work is scheduled to begin in FY20.

2.2.5 Project 5: RM14-1710 TRIREFFAC Waterfront Facilities Repair, Magnetic Silencing Facility with Cranes

The Magnetic Silencing Facility (MSF) serves as a degaussing (process of decreasing or eliminating a remnant magnetic field) station for Trident Submarines. During normal oceanic operations ships and submarines naturally build up a magnetic signature, which can be visible and exploitable by enemy craft as well as damaging to sensitive equipment aboard the ship. The earth's magnetic fields between the North and South Poles are being crossed routinely at sea, and while either traversing these natural fields or lying dormant for extended periods of time during scheduled maintenance, a vessel's magnetic signature changes. To minimize the level of permanent magnetism, the MSF treatment slip is the first structure vessels encounter on their way into or out of SUBASE Kings Bay facilities.

The MSF at Kings Bay is in a deteriorated condition. Deterioration includes a broken 5-linear foot aluminum utility tray, one fender system restraining chain, and one utility guide bracket. Marine borer damage is occurring on one timber fender pile at and below MLW. The concrete underdeck has a 6-linear foot crack (0.125-inch wide).

The Project would replace the MSF and MSF trestle timber fender piles, restraining chains, aluminum utility tray, and concrete pile utility guide bracket. Wooden hand rails and the cracked concrete deck underside would be repaired. Repairing the MSF and MSF trestle would require the installation of 18 new 18-inch round composite piles. The fiberglass re-enforced plastic composite piles would be driven by a vibratory hammer. It is anticipated that an average of six piles would be installed per day for approximately three days of in-water work. The in-water work is scheduled to begin in FY17.

2.2.6 Project 6: Demolition Project using Restoration Modernization Funds: TPS Pier and North Trestle

As part of this project, the existing TPS Pier and the North Trestle would be demolished. The North Trestle and TPS Pier were designed to meet the short-term need to moor a floating dry dock and med-moor (moor using a bow anchor and stern lines to attach to the dock) a submarine tender for Poseidon Class submarines. This project includes the following components:

- Project 6A: Demolition of the TPS Pier (FAC #5934)
- Project 6B: Demolition of the North Trestle (FAC #5977)

2.2.6.1 6A: Demolition of the TPS Pier

Demolition of the TPS pier would require the vibratory removal of 649 existing 24-inch square concrete piles. It is anticipated that an average of 16 piles would be removed per day for approximately 41 days of in-water work. The in-water work is scheduled to begin in FY22.

2.2.6.2 6B: Demolition of the North Trestle

The trestle was intended as an interim fix during the transition to the newer Ohio Class submarines as the Poseidon Class submarines were decommissioned. The facility is obsolete, in poor condition, and cannot meet any current or future mission needs cost effectively. Demolition of the Layberth North trestle would require the removal of 121 existing 24-inch square concrete piles. The piles would be removed with a vibratory hammer. It is anticipated that an average of 20 piles would be removed per day for approximately six days of in-water work.

2.3 Best Management Practices

2.3.1 General Construction Best Management Practices

1) All work shall adhere to performance requirements of the Clean Water Act, Section 404 permit and Section 401 Water Quality Certification. No in-water work shall begin until after issuance of regulatory authorizations.

2) The construction contractor is responsible for preparation of an Environmental Protection Plan. The plan shall be submitted and implemented prior to the commencement of any construction activities and is a binding component of the overall contract. The plan shall identify construction elements and recognize spill sources at the site. The plan shall outline BMPs, responsive actions in the event of a spill or release, and notification and reporting procedures. The plan shall also outline contractor management elements such as personnel responsibilities, project site security, site inspections, and training.
3) No petroleum products, lime, chemicals, or other toxic or harmful materials shall be allowed to enter surface waters.
4) Washwater resulting from washdown of equipment or work areas shall be contained for proper disposal, and shall not be discharged unless authorized.
5) Equipment that enters surface waters shall be maintained to prevent any visible sheen from petroleum products.
6) No oil, fuels, or chemicals shall be discharged to surface waters, or onto land where there is a potential for re-entry into surface waters shall occur. Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. shall be checked regularly for leaks, and be maintained and stored properly to prevent spills.
7) No cleaning solvents or chemicals used for tools or equipment cleaning shall be discharged to ground or surface waters.
8) Construction materials shall not be stored where high tides, wave action, or upland runoff could cause materials to enter surface waters.
9) Barge operations shall be restricted to tidal elevations adequate to prevent grounding of a barge.

2.3.2 Pile Removal and Installation Best Management Practices

1) A containment boom surrounding the work area shall be used during creosote-treated pile removal to contain and collect any floating debris and sheen. The boom may be lined with oil-absorbing material to absorb released creosote.
2) Oil-absorbent materials shall be used in the event of a spill if any oil product is observed in the water.
3) All creosote-treated material and associated sediments shall be disposed of in a landfill that meets federal, state, and local environmental standards.
4) Removed piles and associated sediments (if any) shall be contained on a barge. If a barge is not utilized, piles and sediments may be stored in a containment area near the construction site.
5) Pilings that break or are already broken below the waterline may be removed by wrapping the piles with a cable or chain and pulling them directly from the sediment with a crane. If this is not possible, they shall be removed with a clamshell bucket. To minimize disturbance to bottom sediments and splintering of piling, the contractor shall use the minimum size bucket required to pull out piling based on pile depth and substrate. The clam shell bucket shall be emptied of piling and debris on a contained barge before it is lowered into the water. If the bucket contains only sediment, the bucket shall remain closed and be lowered to the

mud line and opened to redeposit the sediment. In some cases (depending on access, location, etc.), piles may be cut below the mud line and the resulting hole backfilled with clean sediment.

6) Any floating debris generated during installation shall be retrieved. Any debris in a containment boom shall be removed by the end of the work day or when the boom is removed, whichever occurs first. Retrieved debris shall be disposed of at an upland disposal site.
7) Whenever activities that generate sawdust, drill tailings, or wood chips from treated timbers are conducted, tarps or other containment material shall be used to prevent debris from entering the water.
8) If excavation around piles to be replaced is necessary, hand tools or a siphon dredge shall be used to excavate around piles to be replaced.
9) All in-water construction activities shall occur during daylight hours (one hour post sunrise to one hour prior to sunset). Construction activities on land could occur between 6:00 AM and 10:00 PM during any time of the year.

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3. Essential Fish Habitat

Numerous federally-managed species have been documented to occur in the waters off SUBASE Kings Bay at various times throughout the year (GADNR 2008; Heilprin and Combs 2008). Habitat associations and life history characteristics of these species are provided in Table 3-1. Many of the species are migratory, entering estuaries on a seasonal basis from nearby ocean waters. These include species that may use estuaries as a nursery for early life stages such as shrimp, coastal sharks, and members of the snapper-grouper complex, as well as species that opportunistically use estuaries as forage-refuge areas such as cobia (*Rachycentron canadum*).

3.1 South Atlantic Fishery Management Council Designations

The South Atlantic Fishery Management Council (SAFMC) is responsible for designating EFH and HAPCs for all federally managed species occurring in the coastal and marine waters off the coasts of North Carolina (south of Cape Hatteras), South Carolina, Georgia, and Florida (east coast). The Council designated EFH and HAPCs for these species through an amendment to each of the fishery management plans for the primary fisheries that they manage (SAFMC 1998, 2003, 2012). Of these fisheries, three have EFH designated within the Study Area: coastal migratory pelagics, shrimp, and snapper-grouper (Table 3-2).

The SAFMC (1998, 2003, 2012) designated EFH and HAPCs for the fisheries it manages at the management unit level rather than by individual species and life stage.

3.1.1 Coastal Migratory Pelagics

Three species are managed by the SAFMC as part of the coastal migratory pelagics management unit: cobia (*Rachycentron canadum*), king mackerel (*Scomberomorus cavalla*), and Spanish mackerel (*Scomberomorus maculates*). These species commonly inhabit the coastal waters of the South Atlantic Bight and the Gulf of Mexico. The SAFMC (1998) has designated the estuarine water column as EFH for these species within the vicinity of the Proposed Action (Table 3-2). There are no HAPCs designated for the coastal migratory pelagics management unit within the vicinity of the Proposed Action.

3.1.1.1 Shrimp

Four species of shrimp are managed under the shrimp management unit. Of these, the three penaeid shrimp species inhabit both estuarine and ocean environments, and are the only species in the management unit that have designated EFH in the vicinity of Kings Bay. The three penaeid shrimp species include: brown shrimp (*Penaeus aztecus*), pink shrimp (*Penaeus duorarum*), and white shrimp (*Penaeus setiferus*). Of the primary habitat types designated as EFH for penaeid shrimp by the SAFMC (1998), subtidal and intertidal non-vegetated flats and emergent wetlands (e.g., intertidal marshes, are found within the vicinity of the Proposed Action (Table 3-2). There are no HAPCs designated for the shrimp management unit within the vicinity of the Proposed Action.

3.1.1.2 Snapper-Grouper

The snapper-grouper management unit consists of 59 reef fish species. While composed primarily of snappers and groupers, the management unit also includes jacks, porgies, tilefishes, triggerfishes, grunts, wrasses, and spadefishes. Of the primary habitat types designated as EFH for the management unit by the SAFMC (1998), the following are found within the vicinity of the Proposed Action (Table 3-2):

- estuarine emergent vegetated wetlands (e.g., saltmarshes, brackish marsh);
- unconsolidated bottoms (soft sediments); and
- oyster reefs and shell banks.

In addition to EFH, one type of inshore habitat, oyster/shell habitat, was identified by the SAFMC (1998, 2012) as meeting the criteria for HAPCs for species in the snapper-grouper management unit (Table 3-2).

3.2 National Marine Fisheries Service Designations

NMFS has assumed the responsibility of designating EFH and HAPCs for federally managed highly migratory species (e.g., tunas, billfish, swordfish, and sharks) in the U.S. waters of the Atlantic Ocean and the Gulf of Mexico, as these species are not restricted to the waters under the jurisdiction of any single fishery management council. The NMFS adopted amendments to the fishery management plans of each of the six primary fisheries that they manage as a means of designating EFH and HAPC for each of the species (NMFS 2009). The six fisheries managed by NMFS include billfish, swordfish, tuna, large coastal sharks, small coastal sharks, and pelagic sharks.

The NMFS (2009) designated EFH and HAPC for highly migratory species at the individual species and life stage level, rather than holistically for an entire management unit as was done by the SAFMC.

Of all of the highly migratory species, only two shark species from the small coastal sharks management unit, Atlantic sharpnose shark (*Rhizoprionodon terraenovae*) and bonnethead shark (*Sphyrna tiburo*), and one species from the large coastal sharks management unit, blacktip shark (*Carcharhinus limbatus*), have a single habitat, the water column, designated as EFH within the vicinity of the Proposed Action (Table 3-2). There are no HAPCs designated for any highly migratory species within the vicinity of the Proposed Action.

Table 3-1. Federally-Managed Species in the Proposed Action Area

Common Name	Scientific Name	Habitat Associations	Nursery/ Spawning Habitats	Sensitive Life Stage Use of Estuary	Primary Prey	Life Stage in Proposed Action Area	Heilprin and Combs 2008	GADNR 2003–2008 (Stations 921 & 922)
Coastal Migratory Pelagic Species								
Cobia	*Rachycentron canadum*	Pelagic – water column, manmade structures, over reefs, mangroves; migratory	Nursery: Inshore Spawn: Offshore	Transient	Opportunistic feeders on small fish, crabs, shrimp and squid	Larvae, Post-larvae, Juveniles, and Adults	Not Observed	Present
Spanish Mackerel	*Scomberomorous maculatus*	Pelagic – water column, over rock or seagrass; migratory	Nursery: Inshore Spawn: Offshore	Nursery (spring-fall)	Pelagic schooling fish such as anchovies	Juveniles	Present	Present
Penaeid Shrimp Species								
Brown Shrimp	*Farfantepenaeus aztecus*	Marsh grass-water interface, mud-sandy substrate; migratory	Nursery: Estuary Spawn: Offshore	Nursery (spring-summer; may overwinter)	Invertebrates, decaying plant matter, organic debris	Post-larvae, Juveniles, and Sub-adults	Not Observed	Reported
White Shrimp	*Litopenaeus setiferus*	Marsh grass-water interface, mud-sandy substrate; migratory	Nursery: Estuary Spawn: Offshore	Nursery (spring-summer; may overwinter)	Invertebrates, decaying plant matter, organic debris	Post-larvae, Juveniles, and Sub-adults	Not Observed	Reported
Snapper-Grouper Complex Species								
Atlantic Spadefish	*Chaetodipterus faber*	Manmade structures, oyster reefs, mangroves; migratory	Nursery: Estuary, Inshore Spawn: Inshore, Offshore	Nursery (spring-summer, may overwinter)	Benthic invertebrates including crustaceans, mollusks, annelids, sponges, and cnidarians; plankton	Post-larvae, Juveniles, and Sub-adults	Not Observed	Common
Bank Sea Bass	*Centropristis striata*	Hard bottom	Nursery: Inshore Spawn: Offshore	Unknown	Benthic invertebrates (e.g., crustaceans), squid, and small fish.	Post-larvae, Juveniles, and Sub-adults	Not Observed	Present
Black Sea Bass	*Centropristis striata*	Manmade structures, oyster reefs, marsh edges, submerged vegetation; migratory	Nursery: Estuary, Inshore Spawn: Offshore	Nursery (spring-summer)	Benthic invertebrates (crustaceans, mollusks, and worms) and fish	Post-larvae, Juveniles, and Sub-adults	Not Observed	Present
Crevalle Jack	*Caranx hippos*	Pelagic – water column, juveniles may occur on seagrass beds; migratory	Nursery: Estuary, Inshore Spawn: Offshore	Nursery (spring-summer)	Opportunistic feeders on fish, shrimp and invertebrates	Post-larvae, Juveniles, and Sub-adults	Present	Present
Dog Snapper	*Lutjanus jocu*	Rocky or coral reefs; offshore movement with age	Nursery: Estuary Spawn: Offshore	Nursery (spring-summer)	Opportunistic feeders on fish and benthic invertebrates, including shrimps, crabs, gastropods and cephalopods	Post-larvae, Juveniles, and Sub-adults	Not Observed	Present
Gray snapper	*Lutjanus griseus*	Rocky areas, seagrass beds, mangrove areas, reefs, unconsolidated sediment; offshore movement with age	Nursery: Estuary, lower reaches of rivers Spawn: Offshore	Nursery (summer-fall)	Opportunistic feeders on small fish, shrimps, crabs, gastropods, and cephalopods	Post-larvae, Juveniles, and Adults	Present	Not Observed

Table 3-1 (*continued*) Federally-Managed Species in the Proposed Action Area

Common Name	Scientific Name	Habitat Associations	Nursery/ Spawning Habitats	Sensitive Life Stage Use of Estuary	Primary Prey	Life Stage in Proposed Action Area	Heilprin and Combs 2008	GADNR 2003–2008 (Stations 921 and 922)
Snapper-Grouper Complex Species (*continued*)								
Lane Snapper	*Lutjanus synagris*	Mangrove and vegetated flats, reefs, over mud bottom; offshore movement with age	Nursery: Mangrove and sea grass beds, bays Spawn: Offshore	Nursery (spring-summer)	Opportunistic feeders on small fish, shrimps, crabs, gastropods, and cephalopods	Post-larvae, Juveniles, and Sub-adults	Not Observed	Present
Rock Sea Bass	*Centropristis philadelphica*	Hard bottom, rocks, jetties, unconsolidated sediment; offshore movement with age	Nursery: Inshore Spawning: Offshore	Nursery (summer-fall)	Opportunistic feeders on small fish, crustaceans, and shellfish	Post-larvae, Juveniles, and Sub-adults	Not Observed	Common
Sheepshead	*Archosargus probatocephalus*	Rocky areas, reefs, pilings, seagrass beds; limited seasonal movements	Nursery: Estuary, Inshore Spawn: Offshore	Nursery (spring-summer)	Benthic invertebrates, including crabs, crustaceans, and mollusks	Post-larvae, Juveniles, and Sub-adults	Abundant	Not Observed
Highly Migratory Species								
Atlantic Sharpnose Shark	*Rhizoprionodon terraenovae*	Pelagic – water column; migratory	Nursery: Estuary, Inshore	Nursery (spring-fall)	Opportunistic feeders on fish (e.g., menhaden, eels, silversides, wrasses, jacks), shrimp, crabs, and mollusks.	Juveniles and Sub-adults	Not Observed	Present
Bonnethead Shark	*Sphyrna tiburo*	Pelagic – water column; migratory	Nursery: Estuary, Inshore	Nursery (warm months)	Opportunistic feeders on crustaceans (e.g., shrimp), mollusks, and fish.	Juveniles and Adults	Not Observed	Present
Lemon Shark	*Negaprion brevirostris*	Reefs, mangroves, bays, sounds, river mouths	Nursery: Mangrove areas, estuary, inshore	Nursery (warm months)	Fish, crustaceans, mollusks	Juveniles and Adults	Not Observed	Present

Table 3-2. Essential Fish Habitat and Habitat Area of Particular Concern Designations

Species/ Management Unit	EFH Designations	HAPC Designations
South Atlantic Fishery Management Council		
Coastal Migratory Pelagics	Water column	None
Penaeid Shrimp	Subtidal and intertidal non-vegetated flats, emergent wetlands	None
Snapper-Grouper Complex	Estuarine emergent vegetated wetlands, unconsolidated bottoms, and oyster reefs and shell banks	Oyster and shell habitat
National Marine Fisheries Service		
Atlantic sharpnose shark	Water column	None
Bonnethead shark	Water column	None
Blacktip shark	Water column	None

3.3 Description of Existing Habitats within the Proposed Action Area

A variety of habitats occur within SUBASE Kings Bay, which is part of a much larger estuarine embayment-complex including Cumberland Sound and associated tributaries. The embayment is protected from the open ocean by Cumberland Island, a large barrier island. A total of 3,681 acres of marine-associated estuarine habitats are within base boundaries, with most consisting of salt marsh (Table 3-3). Subtidal areas including the dredged channel are not included in the table, although this habitat type also occurs within the base boundary. The types of designated EFH with the potential to be affected by various projects at SUBASE Kings Bay include estuarine emergent wetlands (e.g., salt marsh), intertidal flats (mud and sand), oyster reefs and shell banks, subtidal soft-bottom, and estuarine water column (i.e., sum of intertidal and subtidal habitats). Oyster reefs and shell banks are a designated HAPC for the snapper-grouper complex; relatively small areas of oyster reef and shell mounds are present in localized areas, representing a subset of intertidal mudflat habitat within the base boundaries.

Habitat quality of designated EFH varies within the base. The Kings Bay channel has fairly uniform depths of -45 feet mean lower low water (MLLW) (Figure 1-1). The deepwater channel is depositional with fine-grained sediment, accumulation of organic matter, and reduced dissolved oxygen (DO) (Pinckard and Morris 2005, 2006). Benthic invertebrate communities are characterized as moderately to highly degraded due to the presence of low dissolved oxygen (DO) or methane bubbles indicative of anoxic conditions, shallow Redox Potential Discontinuity (RPD) depths, and presence of only opportunistic early succession Stage I organisms (e.g., species capable of quickly colonizing disturbed sites).

Table 3-3. Estuarine-Marine Habitats Within and Contiguous to the Proposed Action Area

Habitat Type	Within Base Boundary		Outside Base Boundary[1]	
	Acreage	Percentage of Total	Acreage	Percentage of Total
Salt Marsh	3,004	82	6,119	90
Intertidal Sandflat	46	1	48	<1
Intertidal Mudflat	29	<1	29	<1
Subtidal Soft Bottom	340	9	341	5
Buffer[2]	258	7	264	4
In-Water Structures	4	<1	7	<1
Total	**3,681**	**100**	**6,808**	**100**

Note: Acreages digitized from available aerial photographs.
[1] Areas outside base boundary include contiguous marshes extending north to the Crooked River and extending south to the St. Mary's River; [2] Buffer includes those areas located immediately along the landward boundary of channel and/or salt marsh that are not obviously one of the intertidal habitat category types; cover types include trees, shrubs, and grass.

Channel maintenance results in a relatively narrow intertidal zone along most of the shoreline. The north end of Kings Bay is not dredged beyond the turning basin and abruptly transitions to shallow subtidal and intertidal habitat, with fine sands predominant in the channel and finer-grained silts and clays in marsh creeks. Shallow subtidal and intertidal habitat areas also occur along the northwestern and southwestern shoreline of Crab Island, and along the southern shoreline of the base between the south end of the developed waterfront area and the Magnetic Silencing Facility. These areas have a predominance of fine sands in more exposed locations (i.e., close to open channel) and silts and clays in more protected locations.

Intertidal mudflats and sandflats have characteristically different benthic community assemblages, based on differences in grain size, organic matter which provides a food source for deposit feeders, and physical disturbance/sediment reworking by currents or wind waves (Pinckard and Morris 2006). Sand flats occur in more exposed areas along the channel and mudflats occur along more protected shorelines. Mudflats generally develop benthic communities that have a diverse mix of infauna

(species living in the sediment) and epifauna (species living on the sediment surface such as mud snails and small amphipods and crustaceans) (Dame et al. 2000). Sand flats generally support polychaetes, amphipods, and small bivalves.

The substrate in shallow, sandy, subtidal areas exhibits sand waves and smaller ripples, which provide evidence of substantial sediment reworking by tidal currents. Periodic physical disturbance/sediment reworking limits accumulation of organic detritus and maintains a relatively early-stage benthic invertebrate community comprised primarily of opportunistic polychaete species and small amphipod crustaceans (Pinckard and Morris 2006). Benthic habitat quality in the relatively shallow subtidal areas is characterized as moderately disturbed to good. The improved benthic habitat designation results from deeper RPD depths, higher DO, and absence of methane bubbles.

Oyster reef and shell mound habitat occurs along the marsh shoreline in the northern part of the base and immediately south of the developed waterfront. Broader, more extensive oyster reefs also occur in the intertidal zone bordering the northern end of Crab Island. The extent of oyster reefs has not been mapped throughout the base. However, the acreage represents a much smaller subset of the areas mapped as intertidal flats.

Salt marsh habitats are extensive at the northern and southern ends of the base. Smaller pocket marshes occur immediately south of the developed waterfront and in a narrow fringe along the shoreline for much of the Site VI region of the base, including the area around the Layberth Pier (Figure 2-3). Salt marsh fringe also occurs along the edge of Crab Island.

3.3.1 Description of Existing Water Conditions in the Proposed Action Area

Estuarine water quality within SUBASE Kings Bay reflects a mixing of ocean waters via tidal exchange through Cumberland Sound and freshwater inputs from rivers and tributaries, and to a lesser extent, stormwater outfalls.

Waters within the base experience substantial diurnal tidal fluctuations with measured currents capable of entraining and transporting coarse sands and small pebbles (Luey and Morris 2008). Fine-grained material (silts, clays, and organic detritus) is readily transported and either deposited in deepwater areas of the channel (Pinckard and Morris 2005, 2006) or transported toward the mouth of the estuary on ebb tides. The large tidal range and strong currents result in tidally mixed waters that are refreshed on a daily basis.

Water quality conditions near Cumberland Island were measured between 2000 and 2004. Dissolved nutrient concentrations (orthophosphate, total dissolved phosphorous, nitrate plus nitrite) were considered fair to good according to USEPA National Coastal Condition Report II criteria. In addition, bacterial concentrations (fecal coliform) were normal, but dissolved oxygen levels were sometimes critically low, especially in the summer (Alber et al. 2005). In addition, when the Crooked River was assessed in 2012, the overall water quality assessment status of the river was considered "good" (USEPA 2015a; 2015b).

For the last 15 years (1999–2015, with exception of 2000), estuarine water and sediment data have been collected from sites on the Crooked River, Kings Bay, and Cumberland Sound; and surface water runoff was collected from streams that discharge from SUBASE Kings Bay. In August 2015, samples were collected and analyzed as follows:

- estuarine water and surface water: analyzed for metals, nutrients, selected organics, biochemical oxygen demand, total coliform, and fecal coliform; and
- estuarine sediment: analyzed for total metals, nutrients, selected organics, percent moisture, and oil and grease.

In general, the results have been consistent over the 15-year period, and there are no noteworthy trends or observations in the data (Navy 2015a). Based on the relatively sparse shoreline and riverine development in the region, anthropogenic inputs that could affect water quality would be expected to be low.

4. Analysis of Potential Effects to Essential Fish Habitat

This section evaluates how and to what degree the activities described in Section 2.0 (Proposed Action) could impact EFH and HAPC in the Study Area. As outlined in Section 2.0, the Proposed Action consists of seven distinct projects spaced over a five-year period, from 2017 through 2022 (Table 2-1). The majority of the projects involve repairs or upgrades to existing structures with the primary impact to EFH and HAPCs occurring from the removal of old support piles and the placement of new ones. In addition, one of the projects, the TPS Off-shore Supply Vessel Berthing Modification Project (Project 4), involves the construction of a new pier that may have potential impacts on designated EFH and HAPCs.

The construction activities covered by the Proposed Action vary in intensity, frequency, duration, and location within the Study Area. The data available for these parameters is limited to what is presented in Section 2.2 (Proposed Action). Potential impacts of construction activities on designated EFH and HAPCs will be analyzed accordingly. In the case an adverse effect is likely, the magnitude and duration of the effect will be estimated. The duration of effects is based on either duration of the activity or recovery of the habitat:

- Temporary – stressor duration or recovery in hours, days, or weeks
- Short Term – stressor duration or recovery in less than 3 years
- Long Term – stressor duration or recovery in more than 3 years but less than 20 years
- Permanent – stressor duration or recovery in more than 20 years

Most of the repairs and upgrades that are part of the Proposed Action are located adjacent to waterfront areas that have already undergone extensive shoreline modification. Shorelines in the developed waterfront areas have manmade embankments comprised of artificially filled land and riprap. In most locations, muddy and/or sandy intertidal and shallow subtidal habitats occur as a narrow zone (e.g., less than 50 feet wide) between the riprap embankments and the deepwater channel. Salt marsh habitat may also be present as a narrow fringe above the intertidal flats along some of the developed shorelines (e.g., Site VI shoreline, western shoreline of Crab Island).

4.1 Emergent Wetlands

Most of the projects take place along the developed portion of the SUBASE waterfront where the shoreline has been armored and stabilized using riprap (Figure 2-2). Therefore, emergent wetlands would not be impacted through pile driving activities in these areas. In areas where wetlands are present in the vicinity of the Proposed Action, such as along the western shore of Crab Island (Project 1B) and along the shoreline of Site VI (Projects 4 and 6; Figure 2-3), activities will occur in pre-existing footprints and will not directly impact wetland areas.

The Access Pier at Crab Island requires the replacement of two piles, with the new piles being placed in the same general location as the originals. Piles are located away from existing marsh habitat; therefore, marsh habitat will not be impacted.

The new TPS Pier being constructed as part of Project 4A was originally designed to be a separate, individual pier to be positioned north of the existing TPS and Layberth piers. However, construction of the pier at this location would have resulted in the permanent loss of a swath of marsh habitat. As the North Trestle and existing TPS Pier are set to be demolished and removed under Project 6, the location of the new TPS Pier was repositioned to occupy the same footprint as the currently existing structure to avoid any impacts to the marsh habitat that exists along the shoreline (Figure 2-3).

Given the above, there will be no anticipated impacts on emergent wetlands designated as EFH for the penaeid shrimp and the snapper grouper complex within the vicinity of SUBASE Kings Bay as a result of the Proposed Action.

4.2 Oyster and Shell Habitat

Oyster and shell habitat is designated as a HAPC for the snapper-grouper complex. Many of the piles that will be removed during the course of Proposed Action contain some level of oyster colonization. Therefore, the removal of piles as part of each of the individual projects will result in a short-term reduction in available oyster habitat at a given location as the new replacement piles are being installed and colonized. However, in two of the projects (Projects 1A and 2) covered under the Proposed Action, more new piles will be installed than removed resulting in a net gain in hard structure suitable for oyster colonization at those two locations (Table 2-2). The exception would be Project 6, located at Site VI (Figure 2-3), where structures are being removed and the replacement structures (Project 4) have a smaller overall footprint and fewer support piles.

The projects under the Proposed Action will be implemented over a five-year period, providing for a more gradual transition process in losses and gains of oyster habitat (Table 2-2). This process will allow for the continual addition of new piles for colonization by oysters as old piles are removed; reducing the level of impact to the system at any given time.

The recruitment and subsequent colonization of new oysters to the impacted areas will occur rapidly. Oyster recruitment rates in Georgia are high (O'Beirn et al. 1995, 1996a, 1996b, 1997; Thoresen et al. 2005) and the state typically has an overabundance of annual natural oyster recruitment (Manley et al. 2008). In Georgia, once oyster larvae settle onto a hard substrate, they grow rapidly and become sexually mature within two months (O'Beirn et al 1996a). Therefore, spat that settle in April/May are sexually mature by early summer and able to contribute to spawning throughout the remainder of the summer and into fall. As a result, recovery of available oyster habitat within a localized project area should be well underway within several months to a year, depending upon the time of year the individual project took place.

Given that 1) the majority of oyster reefs within Cumberland Sound occur outside of the Proposed Action Area and will remain unaffected, 2) that only those oysters attached to piles being removed from the water at each project site would be impacted, and 3) the rapid recolonization of the new replacement piles, the potential adverse effects to oyster/shell habitat designated as HAPC for the snapper grouper complex within the vicinity of SUBASE Kings Bay as a result of the Proposed Action would be minimal and short-term in duration.

4.3 Subtidal and Intertidal Flats and Unconsolidated Bottom

Activities under the Proposed Action are expected to result in only localized, temporary degradation of the existing sediment conditions. There would be no direct discharge of wastes to the marine environment during construction. Effects to sediment quality would be limited to localized changes associated with disturbances of bottom sediments from pile removal and installation in a given project location over the duration of that project. Setting spuds and anchors for the barges, as required, and propeller wash from tugs represent other sources for disturbance of bottom sediments.

As a result of disturbances to the bottom sediments from construction activities, the use of flats and unconsolidated sediments as forage habitat by penaeid shrimp and snapper-grouper species will be disrupted for a period of time as projects are ongoing, thus interrupting their function as EFH. Following the completion of each of the projects, however, disruptions to these sediments will cease and conditions are expected to return to preconstruction levels rapidly.

Half of the projects covered under the Proposed Action involve the replacement of existing piles with new ones, resulting in little to no net gain or loss of soft bottom habitat (Projects 1, 3, and 5; Table 2-2). The exceptions are Projects 2, 4, and 6 which all occur at Site VI (Figure 2-3). Project 2 involves installing 55 additional piles to the eastern side of Layberth Pier facing Kings Bay to increase the structural support of the pier required for the installation and operation of an upgraded pneumatic fender. Project 6 involves the removal of 770 piles during the demolition of the existing TPS Pier and the North Trestle on the north side of Layberth Pier. These structures will be replaced as part of Project 4 which involves the construction of a new TPS Pier and trestle, as well as the installation of 215 new piles, in the footprint of the former structures (Figure 2-3). Project 2 will result in the conversion of soft sediments into hard structures along the eastern edge of the Layberth Pier, while Projects 4 and 6 will accomplish the opposite, with an overall reduction in the amount of hard structures in favor of more soft sediment habitat. When taking all of the projects occurring at Site VI into account, there will be an overall net gain in the amount of intertidal and subtidal flats and unconsolidated bottom EFH available to penaeid shrimp and members of the snapper-grouper complex for use as forage habitat.

4.4 Water Column

Under the Proposed Action, all pile repair, removal, and/or installation projects at SUBASE Kings Bay may result in involve some minor degree of re-suspension of sediments and increased turbidity that would result in temporary, localized reduction in the quality of water column EFH.

Pile repair, removal, and installation would require permitting under both Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. A Section 401 Water Quality Certification from the Georgia Environmental Protection Division would be obtained to minimize potential impacts to water quality. To minimize the impacts from temporary elevated turbidity, control floating debris, and to ensure that floating creosote-related contamination is constrained to the construction site, floating booms would be in place during the duration of the demolition and construction for both piers.

The construction activities during each of the projects under the Proposed Action would use equipment such as barge mounted cranes, construction crew support vessels, and pile driving equipment which has the potential to cause temporarily-increased turbidity, thereby reducing the quality of water column EFH in the vicinity of the activity. The activities that generate suspended sediments would be short-term and highly localized to the area immediately around the SUBASE Kings Bay waterfront, and suspended sediments are expected to disperse and settle rapidly. Elevated turbidity levels could also occur in stormwater runoff during construction where construction laydown areas are located.

During construction, the contractor may use petroleum products and lubricants in operating construction equipment. The storage of these materials would occur in the construction laydown areas. Construction laydown areas on the mainland would be located in previously disturbed upland locations in close proximity to the individual project under construction. Construction equipment and construction materials are anticipated to be present as long as construction is ongoing. The construction contractor will be required to follow all applicable base procedures and state and federal regulations, including preparing a project specific Spill Control and Countermeasure Plan and Construction Hazardous Waste Management Plan to prevent spills that could possibly impact the area's surface waters. In addition, the contractor will be required to contain and properly dispose of concrete truck process water and equipment washdown water generated during construction activities to prevent it from combining with stormwater or being discharged into nearby surface water bodies. With implementation of the Spill Control and Countermeasures Plan and Construction Hazardous Waste Management Plan, any impacts to surface water and/or storm water resulting from the use and storage of petroleum products during construction of the Proposed Action would be temporary and minor.

Overall, it is anticipated that construction activities under the Proposed Action would result in only minor, temporary impacts to water column EFH designated for coastal migratory pelagic species and sharks.

5. Conclusions

With the application of the standard operating procedures discussed in Section 2.3, it is anticipated that construction activities under the Proposed Action would have no more than a minimal impact on habitats designated as EFH or HAPC by the SAFMC or NMFS. The impacts were either no effect, minimal, or beneficial and ranged in duration from temporary to permanent, depending on the habitat impacted (Table 5-1).

Table 5-1. Potential Effects to EFH and HAPC Resulting from the Proposed Action

Habitat Type	Designation	Dependent Species or Management Unit	Effect Conclusion
Emergent wetlands	EFH	Penaeid shrimp, snapper-grouper complex	No effect
Oyster and shell habitat	HAPC	Snapper-grouper complex	Minimal, short-term habitat loss due to pile replacement in most locations
			Minimal, permanent loss of hard structure (piles) for oyster colonization at Site VI (more piles removed than installed)
Subtidal and intertidal flats, unconsolidated bottoms	EFH	Penaeid shrimp, snapper-grouper complex	Minimal, temporary adverse effects during construction activities
			Overall permanent increase in EFH quantity
Water column	EFH	Coastal migratory pelagics, sharks	Minimal, temporary adverse effects during construction activities

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7. List of Preparers

Taura Huxley-Nelson, Natural Resources Specialist, NAVFAC Southeast
M.P.A., Park University
B.Sc., Natural Resources, Cornell University

Jered Jackson, Natural Resources Specialist, NAVFAC Southeast
M.S., Marine Sciences, Troy University
B.Sc., Marine Biology, University of South Alabama

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APPENDIX E
BIOLOGICAL EVALUATION (USFWS)

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United States Department of the Interior

Fish and Wildlife Service
105 West Park Drive, Suite D
Athens, Georgia 30606

West Georgia Sub Office
Post Office Box 52560
Fort Benning, Georgia 31995

Coastal Sub Office
4980 Wildlife Drive, NE
Townsend, Georgia 31331

December16, 2015

Commanding Officer
Captain James W. Jenks
1063 USS Tennessee Avenue
Naval Submarine Base
Kings Bay, Georgia 31547-2606
Attention: Ms. Taura Huxley-Nelson

RE: USFWS Log Number 2016-I-0397

Dear Captain Jenks:

Thank you for your letter initiating informal section 7 consultation for the proposed Waterfront Pile Repair, Replacement, and Facilities Maintenance project on the Naval Submarine Base in Kings Bay, Georgia. The proposed project will entail the repair to several waterfront structures and construction of a new pier to support Transit Protection System functions on the Base. These comments are provided in accordance with the provisions of the Endangered Species Act of 1973, as amended; (16 U.S.C. 1531 *et seq.*) (ESA) to further the conservation of fish and wildlife resources and their habitats, including federally listed threatened and endangered species.

The Biological Assessment for this project identified habitats within the proposed project's action area that provide suitable habitats for the wood stork (*Mycteria americana*), red knot (*Calidris canutus rufa*), piping plover (*Charadrius melodus*), and West Indian manatee (*Trichechus manatus*). The bird species use habitats found elsewhere on the Base and in the surrounding landscape; however, the project actions will not impact these habitats. These species are transitory across the action area, and the anticipated effects of the action are anticipated to be insignificant and discountable. The manatee occurs seasonally in the tidal streams on the Base. The Environmental Assessment includes special conditions to be implemented to minimize risk of harm to this species.

authorization has been submitted to NMFS for Level B takes of marine mammals under its jurisdiction, and an EFH assessment has been submitted to the NMFS Division of Habitat Protection.

We respectfully request your concurrence with our conclusions no later than June 8, 2016. If you have any questions or need additional information in support of this request, please contact Ms. Taura Huxley-Nelson, Natural Resources Specialist, at commercial (904) 542-6307 or email: taura.a.huxley1@navy.mil.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the
Commanding Officer

Enclosure: Biological Evaluation for Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, Georgia

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV22/348
November 25, 2015

Mr. Chris Coppola
United States Fish and Wildlife Service
Brunswick Ecological Services Field Office
4980 Wildlife Drive NE
Townsend, GA 31331

SUBJECT: INFORMAL SECTION 7 CONSULTATION REGARDING WATERFRONT PILE REPAIR, REPLACEMENT, AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Navy proposes to repair several waterfront structures at Naval Submarine Base (SUBASE) Kings Bay and construct a new pier to support Transit Protection System (TPS) functions. These repairs, upgrades, and new construction would (1) address critical damage and mission and safety requirements, (2) where damage is less advanced, limit further deterioration and increase the useful life of the structures, and/or (3) upgrade infrastructure to meet the requirements of new submarine technology. The Proposed Action would occur in fiscal years (FY) 2017 through 2022.

The Navy has prepared a consultation package in accordance with the Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.) to assess the potential effects on threatened and endangered species and their critical habitats from activities associated with the proposed repair and modification activities at SUBASE Kings Bay.

The Navy identified all federally-listed species and designated critical habitats that may occur in the Action Area and, through NEPA analysis, determined that the Proposed Action may affect piping plovers, red knots, wood storks, and West Indian manatees. No critical habitat for these species is located within the Action Area.

The analysis of the potential effects of the Proposed Action contained in the enclosed biological evaluation (BE) is based on a review of the proposed activities, current and historical distribution and occurrence data for each species, best management practices, and protective measures. The BE is being provided to the U.S. Fish and Wildlife Service to initiate informal section 7 consultation on potential effects and seek concurrence on "may affect, but not likely to adversely affect" conclusions for the species under its jurisdiction.

A separate BE has been prepared and submitted to the National Marine Fisheries Service (NMFS) to address the potential effects of the Proposed Action on species under that agency's jurisdiction, including sea turtles (non-nesting), Atlantic, and shortnose sturgeon. Additionally, an application for a letter of authorization has been submitted to NMFS for Level B takes of marine mammals under its jurisdiction, and an Essential Fish Habitat assessment has been submitted to the NMFS Division of Habitat Protection.

5090
Ser EV22/348
November 25, 2015

We respectfully request your concurrence with our conclusions no later than June 8, 2016. If you have any questions or need additional information in support of this request, please contact Ms. Taura Huxley-Nelson, Natural Resources Specialist, at (904) 542-6307; or email: taura.a.huxley1@navy.mil.

Sincerely,

C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction
of the Commanding Officer

Enclosure: Biological Evaluation for Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, Georgia

BIOLOGICAL EVALUATION FOR WATERFRONT PILE REPAIR, REPLACEMENT, AND FACILITIES MAINTENANCE AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

Submitted to:

U.S. Fish and Wildlife Service
Coastal Georgia Sub Office
4890 Wildlife Drive NE
Townsend, GA 31331

Prepared by:

Naval Facilities Engineering Command, Southeast
Box 30, Building 903
NAS Jacksonville, FL 32212-0030

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1. Introduction

To ensure the Navy can continue its mission of supporting the Fleet Ballistic Missile System and Trident Submarine Program, the Navy proposes to repair in-water infrastructure at Naval Submarine Base (SUBASE) Kings Bay. Much of the work would be accomplished by repairing damaged and aged piles and installing new piles to ensure compliance with Department of Defense (DOD) and Navy security directives. The existing condition of in-water pile-supported structures and associated infrastructure do not comply with current DOD and Navy security directives, and do not provide adequate and stable mooring facilities for ships and submarines as a result of their deteriorated condition. The Proposed Action would occur during Fiscal Years (FY) 2017 through 2022.

This Biological Evaluation (BE) provides the information necessary to support informal consultation as required under section 7 of the Endangered Species Act (ESA) (50 Code of Federal Regulations [C.F.R.] sections 402.12 to 402.14). It is the intent of this BE to establish a basis upon which the U.S. Fish and Wildlife Service (USFWS) may concur with the Navy's effect determinations. A separate BE has been prepared to address the proposed action's effects on marine species that are under the jurisdiction of the National Marine Fisheries Service (NMFS).

This BE evaluates the potential effects of the proposed action on species under the jurisdiction of U.S. Fish and Wildlife Service (USFWS). The effects conclusions were based on an evaluation of available scientific data and literature, and on information collected for the *Draft Environmental Assessment for Waterfront Pile Repair, Replacement, and Facilities Maintenance at Naval Submarine Base Kings Bay, Georgia* (in preparation).

1.1 Background

A specific study of SUBASE Kings Bay waterfront support facilities found the conditions varied widely from good to seriously deteriorated (NAVFAC 2010). Continuous monitoring of these conditions by SUBASE Kings Bay logistical support staff confirm the advanced deterioration and critical nature of some issues that pose operational and safety risks. Additionally, other areas of initial deterioration were identified which require remedy in order to maintain the useful life of existing structures. Damage observed includes deteriorated concrete piles, pile caps, and deck components (cracked, spalled, delaminated, exposed/corroded internal reinforcing steel structures); marine pest (wood borer) damage on wooden piles; broken or unmaintained moorings fittings; and corrosion on steel piles and pile caps.

1.2 Project Location

All of the proposed repairs and maintenance would occur at the existing waterfront area (Figure 1) at SUBASE Kings Bay, located in Camden County, Georgia (Figure 2). All actions will occur within the existing footprint.

Figure 1. Waterfront Area at SUBASE Kings Bay

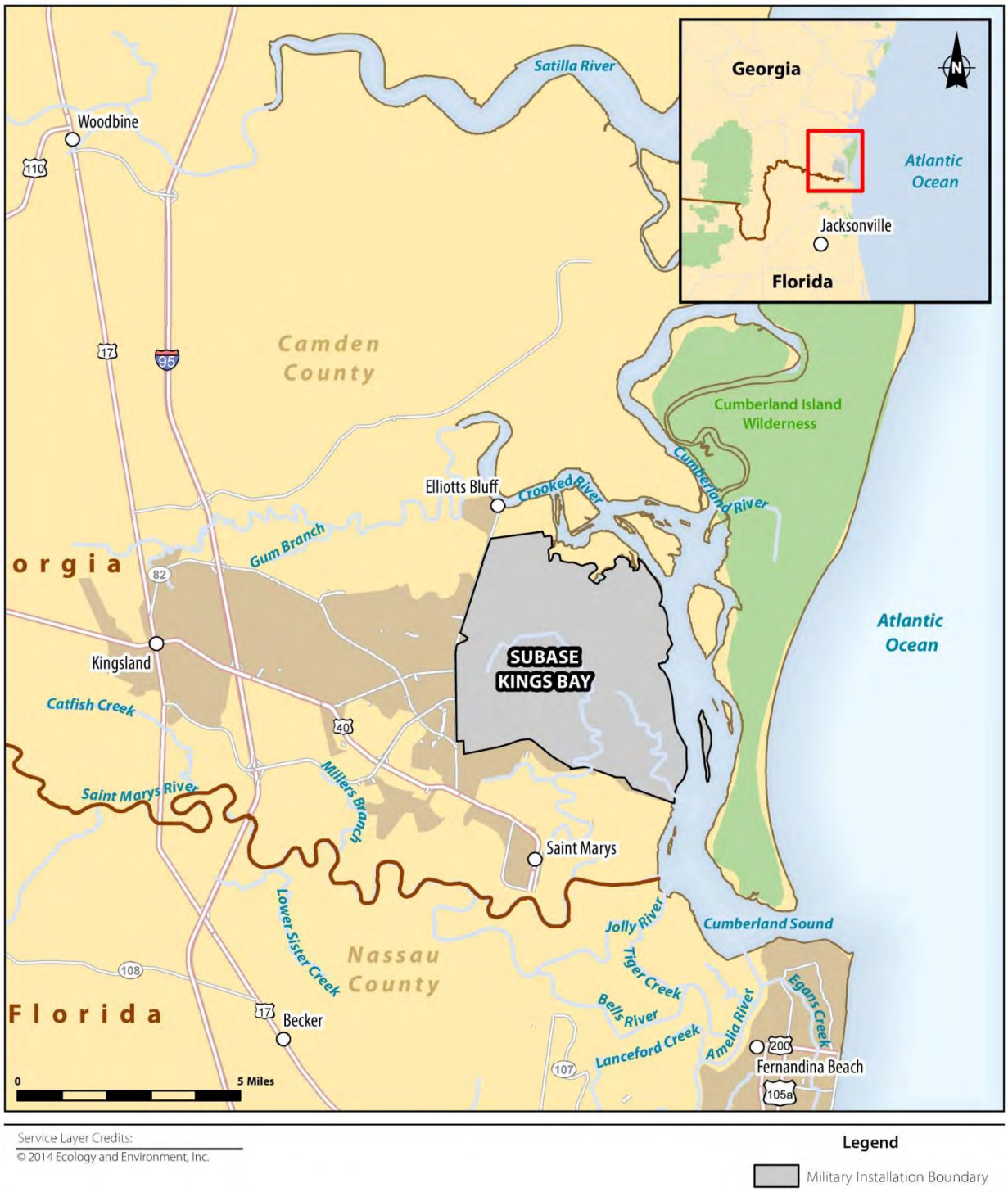

Figure 2. Naval Submarine Base Kings Bay, Camden County, Georgia

1.3 ESA-Listed Species Potentially Present in the Action Area

Based on a review of site conditions, existing records, and the USFWS' Information for Planning and Conservation (IPaC) system, five species under USFWS' jurisdiction have reasonable potential to occur in the action area and as such, may be affected by repair and maintenance activities (Table 1).

Table 1. ESA-listed and Candidate Species Potentially Occurring in the Action Area

Species		Status	Critical Habitat	DPS / ESU / Stock	Occurrence[1]
Common Name	**Scientific Name**				
Birds					
piping plover	*Charadrius melodus*	T	Designated – none in project area	--	rare
red knot	*Calidris canutus rufa*	T	Not designated	--	rare
wood stork	*Mycteria americana*	T	Not designated	--	rare
Mammals					
West Indian manatee	*Trichechus manatus*	E	Designated – none in project area	subspecies *latirostris*	seasonally common

[1]common = confirmed, regular sightings of the species inside the study area; rare = there have been few confirmed sightings/strandings in the vicinity, or the distribution of the species is near enough to the study area that the species could occur there; however, occurrences would be infrequent and/or in very small numbers; not expected = species is not expected to occur inside the study area based on unsuitability of habitat or conditions; unprecedented

2. Proposed Activities

The repair and maintenance activities considered in this biological evaluation are related to pier and wharf-related work (details are contained in Appendix A). All projects involve intermittent in-water extraction or driving of concrete, steel, or composite piles among other measures. The action area is defined as the immediate waterfront area and waters of Kings Bay and Cumberland Sound that may be exposed to elevated noise levels and temporary turbidity from repair and maintenance activities. No dredging is associated with these repair and maintenance projects.

Best management practices (BMPs) will be employed to protect harm to individuals of a protected species and to protect habitat. Practices to be employed include preparation of an environmental protection plan, control of chemicals such as petroleum, and other measures. A complete list of BMPs is included in Appendix B.

Mitigation measures will include marine species awareness training, marine observers, shutdown areas if a protected species enters a specified zone and others. A complete list of protective measures is included in Appendices C and D.

3. Environmental Baseline

3.1 ESA-listed Birds

3.1.1. Piping Plover

Piping plovers winter along Georgia's coast, preferring areas with open sand or mudflats for foraging (probing prey including marine worms, crustaceans, molluscs, insects, and larvae) (Maslo et al. 2012), and sand beaches for roosting and nesting. This habitat is not found in the action area and bird surveys on the base have not documented this species in the waterfront area (Bryan et al. 2012).

3.1.2 Red Knot

Coastal areas of Georgia serve as stopovers for migrating red knots during the spring and fall. During 2011, the first systematic surveys of red knots began in Georgia with substantial numbers observed on the Altamaha River between August and October (GADNR 2011). Like piping plovers, preferred habitat for red knots is not found in the action area, and they have not been documented during recurring avian surveys at the installation (Bryan et al. 2012).

3.1.3 Wood Stork

SUBASE Kings Bay is within a USFWS-designated core foraging area for wood storks (USFWS 2012), and they are routinely observed (Burst and Fleming 2005, Bryan et al. 2012), most frequently as they forage or rest near drainage ditches and retention ponds (Bryan, Jr. and Depkin 2009). Wood stork management practices on the installation focus on creation of feeding and nesting habitat throughout the installation by preserving wetlands, maintaining native vegetation in drainage canals, and constructing wood stork rookeries (Navy 2014). One hundred nesting platforms have been installed in the shallow water at Etowah Pond, but have not been used by wood storks to date. Wood storks are not expected to occur in the immediate action area due to the lack of suitable habitat and high levels anthropogenic activity.

3.2 ESA-listed Mammals

3.2.1. West Indian Manatee

Manatees can occur within the action area. The Navy has contributed to annual manatee surveys and a tagging and tracking effort began in June 2015. Manatees are more abundant during the warmer months and are typically observed in small groups (Fonnesbeck and George 2009). Kings Bay has a base instruction to protect manatees.

4. Assessment of Potential Effects

4.1 ESA-listed Birds

Based on the low likelihood of piping plovers, red knots, or wood storks occurring in the action area, the potential for physical disturbance or injury is minimal. Protective measures and BMPs will further decrease that potential. No disruption of breeding, foraging, or sheltering is anticipated as a result of physical disturbance. Therefore, potential effects to piping plovers, red knots, or wood storks would be insignificant and discountable.

4.1 ESA-listed Mammals

Vessels (typically barges) needed to conduct the work will be slow moving while entering and leaving the work area and will serve as stationary platforms for pile drivers, cranes, and other equipment. Implementation of installation manatee protection measures and use of marine mammal observers will greatly reduce the potential for interaction with slow-moving, low-draft vessels. Any avoidance behavior will be of short and temporary duration and is not anticipated to affect breeding, feeding, or sheltering. Potential effects to West Indian manatees from vessel movements would be insignificant and discountable.

4.3 Indirect Effects

The repair and maintenance activities would not result in significant changes to the environmental baseline in the action area. Combined with the absence of high quality habitat, and the BMPs and protection measures that will be implemented, indirect effects to ESA-listed species would be negligible.

4.4 Conclusions

Piping plovers, red knots, and wood storks have the potential to occur in the action area, but the likelihood is low based on the absence of quality habitat and existing levels of anthropogenic activity. Implementation of BMPs and protective measures further reduces the potential for adverse effects to these species. Pursuant to the ESA, the proposed repair and maintenance activities may affect, but are not likely to adversely affect, piping plovers, red knots, and wood storks.

The West Indian manatee is not expected to occur in the action area and the nature of the work to be conducted would pose little risk to the species. Slow moving barges and shore-based operations create little risk to manatees. Implementation of BMPs, mitigation measures, and the installation manatee protection plan should further reduce potential risks.
The activities would have no effect on critical habitat for these species, where designated.

5. Conclusions

The Navy's conclusions regarding potential effects of the proposed repair and maintenance activities on ESA-listed and candidate species are detailed in Table 2.

Table 2. Findings for ESA-listed and Candidate Species and Critical Habitat

Common Name	Scientific Name	Conclusions	
		Species	Critical Habitat
Birds			
piping plover	*Charadrius melodus*	May affect, not likely to adversely affect	No effect
red knot	*Calidris canutus rufa*	May affect, not likely to adversely affect	n/a
wood stork	*Mycteria americana*	May affect, not likely to adversely affect	n/a
Mammals			
West Indian manatee	*Trichechus manatus*	May affect, not likely to adversely affect	No effect

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Appendix A

Summary of Waterfront Activities

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Summary of Proposed Waterfront Repairs and Security-Related Upgrades

Primary Description		Project	Map ID	Description	Facility Number (FAC)	Projected Start (FY)
Ref #	Title					
1	Port Operations Waterfront Facilities Repairs	Tug Pier	1A	Repair concrete structural piles, pile caps, utility cover grates, headwall, mooring support and hardware, and deck undersides; replace wooden fender piles with concrete piles; and modify the fender system on the south side of access pier.	5926	2017
		General Access Pier Crab Island	1B	Install new guide piles, and repair brow and handrails.	5888	2017
2	Unspecified Minor Construction Layberth Fender Pile Modification P661 Project		2	Install additional fender piles to shorten the distance between existing piles and provide the required support for hydro-pneumatic fenders.	5976	2017
3	Waterfront Pile Repair and Replacement / Maintenance Program	Explosive Handling Wharf #2 Pier w/Capstans	3A	Repair high-density polyethylene (HDPE) fender pile wraps, sacrificial anodes attached to the steel fender piles, steel safety ladders and treated timber bracing; repair or replace various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings and two steel guide pipe piles on the diver's float.	5109	2017 / 2022
		(Dry Dock) Interface Wharf	3B	Replace timber fender bearing strips and wales, repair concrete deck, bullrail, edge beams, and mooring foundations; and repair, paint and recoat cathodic protection on the steel H Pile fender system and sheet pile.	5995	2021
		Refit Wharf #1	3C	Replace various pile caps, piles, and the outboard edge beam; and repair, clean, and paint several mooring fittings.	5909	2018
		Refit Wharf #2	3D	Replace or repair various pile caps, piles, outboard edge beams, and mooring foundations; and reattach underdeck lighting conduit and clean and repaint various mooring fittings.	5910	2017
		Refit Wharf #3	3E	Replace or repair various pile caps, piles, the outboard edge beams, and mooring foundations; and clean and repaint various mooring fittings.	5916	2018
		Warping Wharf w/Capstan	3F	Repair HDPE fender pile wraps; replace or repair various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings.	5877	2021
		Tug Pier	3G	Replace timber fender piles with guide piles and small boat access floats; paint mooring fittings; and repair concrete pile caps, concrete piles, concrete underdeck, and storm drain.	5926	2022
4	Transit Protection System (TPS) P617 Off-shore Supply Vessel (OSV) Berthing Project	New Pier - TPS Headquarters / Operational Support Facility	4A	Construct new pier to serve TPS Headquarters/Operational Support Facility functions. The new TPS pier would be provided with full hotel service capability including power; potable water; fire protection; sewage connections; Ship Overboard Drainage (SOD) collection; fuel; and telephone, cable, and Local Area Network (LAN) services.	n/a	2020
		Small Craft Berth Site VI	4B	Modifies the existing berthing pier on the north trestle at Site VI to comply with current DOD and Navy security directives. The pier and floating berthing slips would be provided with full hotel service capability. The berthing pier would consist of a pile supported reinforced concrete structure with floating sections. This project includes the installation of two-5,000 gallon above ground storage tanks and provides two associated truck off-loading connections and fuel dispensing units.	5936	2020
5	Magnetic Silent Facility with Cranes (RM14-1710 TRIREFFAC Waterfront Facilities Repair)		5	Replace timber fender piles, restraining chains, aluminum utility tray, and concrete pile utility guide bracket; and repair wooden hand rails and the cracked concrete deck underside.	5980	2017
6	Demolition of the Transit Protection System Pier and Layberth North Trestle	TPS Pier Demolition	6A	Remove the tip of the existing TPS pier.	5934	2022
		North Trestle Demolition	6B	Demolish North Layberth Trestle.	5977	2022

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Appendix B

Best Management Practices

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Best Management Practices

1. All work shall adhere to performance requirements of the Clean Water Act, Section 404 permit and Section 401 Water Quality Certification. No in-water work shall begin until after issuance of regulatory authorizations.

2. The construction contractor is responsible for preparation of an Environmental Protection Plan. The plan shall be submitted and implemented prior to the commencement of any construction activities and is a binding component of the overall contract. The plan shall identify construction elements and recognize spill sources at the site. The plan shall outline BMPs, responsive actions in the event of a spill or release, and notification and reporting procedures. The plan shall also outline contractor management elements such as personnel responsibilities, project site security, site inspections, and training.

3. No petroleum products, lime, chemicals, or other toxic or harmful materials shall be allowed to enter surface waters.

4. Washwater resulting from washdown of equipment or work areas shall be contained for proper disposal, and shall not be discharged unless authorized.

5. Equipment that enters surface waters shall be maintained to prevent any visible sheen from petroleum products.

6. No oil, fuels, or chemicals shall be discharged to surface waters, or onto land where there is a potential for re-entry into surface waters shall occur. Fuel hoses, oil drums, oil or fuel transfer valves, fittings, etc. shall be checked regularly for leaks, and be maintained and stored properly to prevent spills.

7. No cleaning solvents or chemicals used for tools or equipment cleaning shall be discharged to ground or surface waters.

8. Construction materials shall not be stored where high tides, wave action, or upland runoff could cause materials to enter surface waters.

9. Barge operations shall be restricted to tidal elevations adequate to prevent grounding of a barge.

10. A containment boom surrounding the work area shall be used during creosote-treated pile removal to contain and collect any floating debris and sheen. The boom may be lined with oil-absorbing material to absorb released creosote.

11. Oil-absorbent materials shall be used in the event of a spill if any oil product is observed in the water.

12. All creosote-treated material and associated sediments shall be disposed of in a landfill that meets Georgia environmental standards.

13. Removed piles and associated sediments (if any) shall be contained on a barge. If a barge is not utilized, piles and sediments may be stored in a containment area near the construction site.

14. Pilings that break or are already broken below the waterline may be removed by wrapping the piles with a cable or chain and pulling them directly from the sediment with a crane. If this is not possible, they shall be removed with a clamshell bucket. To minimize disturbance to bottom sediments and splintering of piling, the contractor shall use the minimum size bucket required to pull out piling based on pile depth and substrate. The clam shell bucket shall be emptied of piling and debris on a contained barge before it is lowered into the water. If the bucket contains only sediment, the bucket shall remain closed and be lowered to the mud line and opened to redeposit the sediment. In some cases (depending on access, location, etc.), piles may be cut below the mud line and the resulting hole backfilled with clean sediment.

15. Soft starts are performed at the beginning of impact pile driving. During a soft start, an initial set of strikes from the impact hammer are performed at reduced energy before it is able to be operated at full power and speed. The energy reduction of an individual hammer cannot be quantified because it varies between individual drivers. Also, the number of strikes will vary at reduced energy because raising the hammer at less than full power and then releasing it results in the hammer recoiling as it strikes the pile. Initiating impact driving at a lower power may allow ESA-listed or candidate species in the area to move away from the immediate vicinity before full driving power is reached, thereby reducing the potential for exposure to sound levels that could cause behavioral disturbance or injury.

16. Any floating debris generated during installation shall be retrieved. Any debris in a containment boom shall be removed by the end of the work day or when the boom is removed, whichever occurs first. Retrieved debris shall be disposed of at an upland disposal site.

17. Whenever activities that generate sawdust, drill tailings, or wood chips from treated timbers are conducted, tarps or other containment material shall be used to prevent debris from entering the water.

18. If excavation around piles to be replaced is necessary, hand tools or a siphon dredge shall be used to excavate around piles to be replaced.

19. Construction activities will occur only during daylight hours.

Appendix C

Protective Measures

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Mitigation Measures, Monitoring, and Reporting

Construction crews and barge operators will successfully complete Marine Species Awareness Training, and a general environmental awareness briefing that addresses terrestrial ESA-listed and candidate species and birds prior to the start of construction activities. Marine Species Awareness Training is designed to improve the effectiveness of visual observations for marine species, including marine mammals and sea turtles and provides information on sighting cues, visual observation tools and techniques, and sighting notification procedures.

During pile driving, construction crews will post lookouts dedicated solely to diligent observation of the air and surface of the water during in-water activities. Visual observation will occur from the best vantage point(s) practicable, and begin 30 minutes prior to starting work. Monitoring will occur throughout the duration pile driving / extraction. If a West Indian manatee or other marine mammal, sea turtle, or ESA-listed fish is observed entering the shutdown zone (calculated to avoid potential injury from acoustic sources – reference *Request for Regulation and Letter of Authorization for the Incidental Taking of Marine Mammals Resulting from Pile Driving Activities at Naval Submarine Base Kings Bay, Georgia*), in-water pile driving shall cease until the animal is observed leaving the area or it is not seen again for 30 minutes.

Activities associated with the Proposed Action would occur at wharves and piers that are pile supported, without vertical walls. However, boats and barges used during these activities that are over 100 feet in length shall deploy fenders or other equipment to maintain a minimum of three feet of space at maximum compression between the hull and the wharf in order to minimize or eliminate potential for injuries to West Indian manatees. Barges that are temporarily fixed in place by spuds are not required to observe this measure because mobility that causes the risk to manatees is eliminated. Navy ships and submarines, and those that support them (e.g., tug boats, security escorts) are also excluded from this requirement.

In the event an ESA-listed or candidate species is observed in the action area, the SUBASE Kings Bay natural resources manager is to be notified immediately for further instruction.

Standard in-water construction conditions (Appendix D) including *Kings Bay's Manatee Protection Measures*, shall be observed during in-water work. Measures specific to marine species under NMFS' jurisdiction - *Sea Turtle and Smalltooth Sawfish Construction Conditions*, and the *Southeast Regional Marine Mammal and Sea Turtle Viewing Guidelines* - may also benefit West Indian manatees (e.g., siltation barriers and maintaining minimum vessel distances).

If the Navy or its contractors encounter an injured, sick, or dead ESA-listed or candidate species, USFWS will be notified immediately. The Navy will provide USFWS with the species or description of the animal(s), the condition of the animal (including carcass condition if the animal is dead), location, the date and time of first discovery, observed behaviors (if alive), and photo or video (if available).

In preservation of biological materials from a dead animal, the observer has the responsibility to ensure that evidence associated with the specimen is not unnecessarily disturbed. Observers should not handle dead animals.

A draft report of any instances of ESA-listed or candidate species observed in the action area will be submitted to USFWS annually. A final version will be submitted within 30 days of receipt of comments on the draft report.

Appendix D

Standard In-Water Construction Conditions

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Special Provisions for Manatee

The following conditions are intended as a minimum to protect this species and its habitat during any activities that are in close proximity to the known locations of this species on this project.

1. The permittee agrees that all personnel associated with the project will be advised that there are civil and criminal penalties for harming, harassing or killing manatees, which are protected under the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972. The permittee and contractor will be held responsible for any manatee harmed, harassed, or killed as a result of construction activities.

2. All on-site project personnel are responsible for observing water-related activities for the presence of manatees. All construction and activities in open water will cease upon sighting of manatees within 100 feet of the project area. Construction activities will not resume until the manatees have left the project area for at least thirty minutes.

3. A trained spotter provided by the Contractor, shall be onsite for sightings of manatees during the construction of the project. Personnel designated by the Contractor shall receive training by the Georgia Department of Natural Resources, Coastal Resources Division, Brunswick, Georgia. The contact person for the Georgia Department of Natural Resources is Clay George at 912-262-3336.

4. Siltation barriers will be made of material in which manatees cannot become entangled, are properly secured, and are regularly monitored to avoid manatee entrapment. Barriers must not block manatee entry to or exit from essential habitat.

5. All vessels associated with the project will operate at “no wake/idle” speeds at all times while in the construction area. All vessels will follow routes of deep water whenever possible.

6. Propellers on all boats 21 feet or less in length shall be equipped with propeller guard systems, approved by the Project Manager, designed to prevent harm to manatees.

7. Extreme care will be taken in lowering equipment or materials, including, but not limited to piles, sheet piles, casings for drilled shaft construction, spuds, pile templates, anchors, etc., below the water surface and into the stream bed; taking any precaution not to harm any manatee(s) that may have entered the construction area undetected. All such equipment or materials will be lowered at the lowest possible speed.

8. Prior to initiation of construction, the permittee shall install at least two (2) temporary manatee awareness construction signs in locations clearly visible from the navigation channel (Attachment A). The signs shall be displayed and maintained throughout construction and shall be removed by the permittee upon completion of construction. Placement of all signs shall be as approved by the Georgia Department of Natural

Resources, Coastal Resources Division, Brunswick, Georgia. The contact person for the Georgia Department of Natural Resources is Clay George at 912-262-3336.

9. All temporary construction materials will be removed upon completion of the work, and salt marsh areas will be restored. No construction debris or trash will be discarded in the water.

10. Any dead manatee(s) found in the project area must be secured to a stable object to prevent the carcass from being moved by the current. The Contractor shall immediately notify the Government Project Manager who in turn will notify the Environmental Office at 912 573-4678. The Environmental Office will notify:

a. the U. S. Fish and Wildlife Service, Coastal Sub-Office at 912-832-8739 and,
b. the GDNR, Nongame Conservation Section at 912-262-3336.

11. The Contractor shall immediately report to the Government Project Manager any incident (e.g. collisions, injuries and mortalities) which occurs that causes harm or could be detrimental to the continued existence of the manatee along the project corridor. The Government Project Manager will in turn notify the Environmental Office at 912 573-4678. The Environmental Office will notify:

a. the U. S. Fish and Wildlife Service, Coastal Sub-Office at 912-832-8739 and,
b. the GDNR, Nongame Conservation Section at 912-262-3336 or,
800-2-SAVE-ME.

12. In the event of injury or mortality of a manatee, all aquatic activity in the project area must cease pending section 7 consultation under the Endangered Species Act with the U. S. Fish and Wildlife Service and the lead Federal agency.

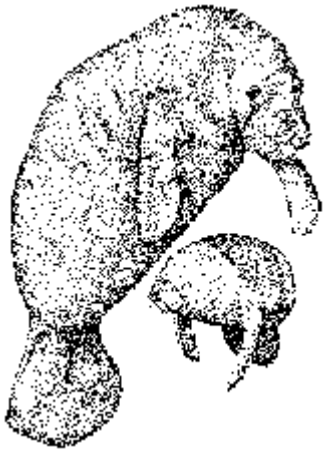
13. The Contractor shall keep a log detailing sightings, collisions, or injury to manatees, which have occurred during the contract period. Following project completion, the log and a report summarizing the any incidents and / or sightings of manatees will be submitted to the Government Project Manager and Environmental Office.

14. The Environmental office will submit above mentioned log to:

a. the U. S. Fish and Wildlife Service, 4980 Wildlife Drive, NE, Townsend, Georgia 31331 and,
b. the GDNR, Nongame Conservation Section, One Conservation Way, Brunswick, Georgia 31520

Attachment A

MARINE FACILITY
MANATEE SIGNS
PLACEMENT PROCEDURES



The West Indian manatee (*Trichechus manatus*) is an endangered species throughout its range. Manatees are protected at the Federal level by the Endangered Species Act of 1973 and the Marine Mammal Protection Act of 1972, as amended. Protection measures such as these signs are necessary to increase boater awareness. The increased level of Georgia coastal development and associated marinas and boat traffic will increase the probability of negative impacts to the seasonal manatee population. Manatees inhabit Georgia waters from March through November. The main threat to manatee populations is human related boat/barge collisions. Raising boater awareness and educating the public is necessary for manatee conservation in Georgia waters and has been proven effective.

The informational/educational display sign, "Manatee Habitat", is intended to increase boater awareness of manatees that are present in Georgia waters. This sign informs boaters of the potential threat boats pose to the animals and how to help decrease negative impacts caused by those vessels. Although the placement of these signs is mandatory and required by permit, they are informative and non-regulatory in nature.

<u>Procedure for Approval of Sign Installation</u>:

1. The applicant should forward a project site plan, including the proposed location for the permanent signs to: Manatee Sign Approval, Nongame Conservation Section, Department of Natural Resources, One Conservation Way, Brunswick, Georgia 31520. The applicant should also include a chart indicating the location of the facility in relation to waterways, location within a

given county (specify county name), Contact person with phone number, and the Permit and/or Lease number associated with the project

2. The Nongame Conservation Section of the Georgia Department of Natural Resources (GDNR) will review the proposed sign placement site plan and will respond to the applicant within 30 days. If the proposed location is unacceptable, guidance on an alternate site will be provided. The contact person should notify the Nongame Conservation Section when sign placement has been completed (912-264-7218). A photograph(s) of the posted manatee signage at your facility must be submitted with the required permit compliance form to the Marsh and Shore Regulatory Program of the Coastal Resources Division/Georgia Department of Natural Resources.

3. If during a site visit, approved signs, and their locations are found not to be in compliance with the instructions given in this document, relocation or addition of signs will be required. Annual site visits will be conducted to document sign placement and condition. All signs locations will be recorded in the GDNR manatee database.

Approved Sign Suppliers:

The signs are available through the companies listed below and may also be available from other local suppliers throughout the state. Permit/lease holders, marinas, and boat docking/launching facilities should contact sign companies directly to obtain pricing information and arrange for shipping and billing.

Approved Suppliers of Manatee Signs:

Grafix, Inc.
455 Montgomery Street
Post Office Box 1028
Savannah, Georgia 31402
Voice: 912-691-1117
Fax: 912-232-3845

Image Sign Company
785 King George Blvd., Bldg. 3
Savannah, Georgia 31419
Voice: 912-961-1444
Fax: 912-961-1499

Doug Bean Signs, Inc.
160 Dean Forest Rd
Savannah, Georgia 31408
Voice: 912-964-1900
Fax: 912-964-2900

Fendig Signs
411 Arnold Rd
Saint Simons Island, Georgia 31522

Good & Associates
Saint Simons Island, Georgia
(912) 638-7664

Temporary Construction Signs

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, FL 33701

SEA TURTLE AND SMALLTOOTH SAWFISH CONSTRUCTION CONDITIONS

The permittee shall comply with the following protected species construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of these species and the need to avoid collisions with sea turtles and smalltooth sawfish. All construction personnel are responsible for observing water-related activities for the presence of these species.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing sea turtles or smalltooth sawfish, which are protected under the Endangered Species Act of 1973.

c. Siltation barriers shall be made of material in which a sea turtle or smalltooth sawfish cannot become entangled, be properly secured, and be regularly monitored to avoid protected species entrapment. Barriers may not block sea turtle or smalltooth sawfish entry to or exit from designated critical habitat without prior agreement from the National Marine Fisheries Service's Protected Resources Division, St. Petersburg, Florida.

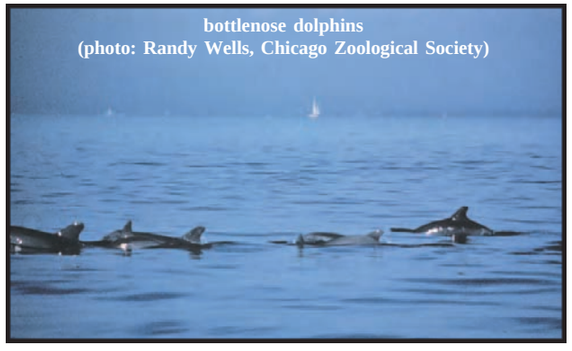
d. All vessels associated with the construction project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water depths where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will preferentially follow deep-water routes (e.g., marked channels) whenever possible.

e. If a sea turtle or smalltooth sawfish is seen within 100 yards of the active daily construction/dredging operation or vessel movement, all appropriate precautions shall be implemented to ensure its protection. These precautions shall include cessation of operation of any moving equipment closer than 50 feet of a sea turtle or smalltooth sawfish. Operation of any mechanical construction equipment shall cease immediately if a sea turtle or smalltooth sawfish is seen within a 50-ft radius of the equipment. Activities may not resume until the protected species has departed the project area of its own volition.

f. Any collision with and/or injury to a sea turtle or smalltooth sawfish shall be reported immediately to the National Marine Fisheries Service's Protected Resources Division (727-824-5312) and the local authorized sea turtle stranding/rescue organization.

g. Any special construction conditions, required of your specific project, outside these general conditions, if applicable, will be addressed in the primary consultation.

Revised: March 23, 2006
O:\forms\Sea Turtle and Smalltooth Sawfish Construction Conditions.doc



bottlenose dolphins
(photo: Randy Wells, Chicago Zoological Society)

Marine mammals have sensitive hearing and many species communicate by vocalizing underwater.

- Underwater sound produced by a vessel's engines and propellers can disturb these animals.

Cautiously move away from the animals if you observe any of the following behaviors:

- Rapid changes in direction or swimming speed.
- Erratic swimming patterns.
- Escape tactics such as prolonged diving, underwater exhalation, underwater course changes, or rapid swimming at the surface.
- Tail slapping or lateral tail swishing at the surface.
- Female attempting to shield a calf with her body or by her movements.

Even if approached by a marine mammal or sea turtle.

- Do not touch or swim with the animals.

Never feed or attempt to feed marine mammals or sea turtles.

- It can alter their natural behavior, make them dependent on handouts, and can be harmful to their health.
- Marine mammals, like all wild animals, may bite and inflict injuries to people who try to feed them.

Note: NMFS regulations at 50 CFR § 216.3 strictly prohibit feeding or attempting to feed a marine mammal in the wild.

Marine Mammals and the Law

The Marine Mammal Protection Act (MMPA) prohibits the take of all marine mammal species in U.S. waters. *Take* is defined as *"to harass, hunt, capture, or kill, or attempt to harass, hunt, capture, or kill any marine mammal."*

Harassment is defined in the MMPA as *"any act of pursuit, torment, or annoyance which has the potential to injure a marine mammal or marine mammal stock in the wild; or has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering."* Some exceptions are made for specifically authorized scientific research.

Take is further defined by regulation to include *feeding or attempting to feed a marine mammal in the wild.*

The Endangered Species Act (ESA) provides additional protection to species of marine mammals listed as endangered or threatened. The ESA prohibits the take of species listed as endangered or threatened. The definition of take is the same under the ESA as under the MMPA, except that the ESA adds the terms harm, pursue, shoot, wound, trap and collect.

The maximum fine for violating the MMPA is $20,000 and one year in jail. The maximum fine for violating the ESA is $50,000 and one year in jail.

clymene dolphin (photo: Keith Mullin, NMFS)

For more information please call:

Protected Resources Division
Southeast Regional Office
National Marine Fisheries Service
263 13th Avenue S.
St. Petersburg, FL 33701
(727) 824-5312
http://sero.nmfs.noaa.gov/pr/protres.htm

Southeast Enforcement Division
Southeast Regional Office
National Marine Fisheries Service
263 13th Avenue S.
St. Petersburg, FL 33701
(727) 824-5344
http://www.nmfs.noaa.gov/ole/Southeast/

To report harassment or other violations of the MMPA or ESA, please call the Toll free Enforcement Hotline: 1-800-853-1964

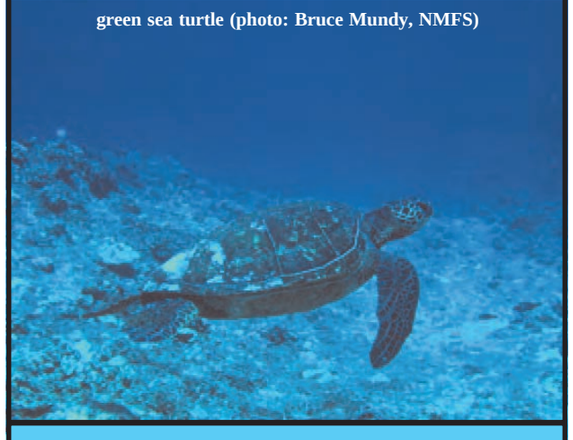
For stranded, injured or abandoned marine mammals, call the NMFS stranding hotline:
(305) 862-2850

For information on manatees or sea turtles:
U.S. Fish and Wildlife Service
6620 Southpoint Drive S., Ste. 310
Jacksonville, FL 32216-0912
(904) 232-2580
http://www.fws.gov/northflorida/

NMFS Southeast Region Marine Mammal and Sea TurtleViewing Guidelines

bottlenose dolphins (photo:Yugi Okino)

Protected Resources Management Division



green sea turtle (photo: Bruce Mundy, NMFS)

These guidelines are intended to inform the public about protection of marine wildlife. They are not a replacement for Federal legal requirements.

Marine Mammal and Sea Turtle Viewing "Code of Conduct"

1. Remain a respectful distance from marine mammals and sea turtles. The minimum recommended distances are:
dolphins, porpoises, seals = 50 yards
sea turtles = 50 yards
whales = 100 yards*

** Federal law prohibits all approaches to right whales within 500 yards.*

2. Time spent observing marine mammals and sea turtles should be limited to 1/2 hour.

3. Marine mammals and sea turtles should not be encircled or trapped between watercraft, or watercraft and shore.

4. If approached by a marine mammal or sea turtle, put your watercraft's engine in neutral and allow the animal to pass. Any vessel movement should be from the rear of the animal.*

** Pursuit of marine mammals and sea turtles is prohibited by Federal law.*

5. Never feed or attempt to feed marine mammals or sea turtles.*

** Federal law prohibits feeding or attempting to feed marine mammals.*

bottlenose dolphins
(photo: Randy Wells, Chicago Zoological Society)

green sea turtle (photo: George Balaz, NMFS)

Limit your viewing time.

- Prolonged exposure to one or more vessels increases the likelihood that marine mammals will be disturbed.
- Viewing periods of greater than ½ hour should be undertaken only if you are absolutely sure that you are not causing disturbance or any changes in behavior.
- Since individual animals' reactions will vary, carefully observe all animals and leave the vicinity if you see signs of disturbance.
- Your vessel may not be the only vessel in the day that approaches the same animal(s); please be aware of cumulative impacts.

Travel in a predictable manner.

- Marine mammals appear to be less disturbed by vessels that are traveling in a predictable manner.
- The departure from a viewing area has as much potential to disturb animals as the approach.
- If a marine mammal or sea turtle approaches, put your engine in neutral and allow the animal to pass.
- Never pursue or follow marine wildlife.
- Never attempt to herd, chase, or separate groups of marine mammals or females from their young.
- Avoid excessive speed or sudden changes in speed or direction in the vicinity of animals.

If you need to move around marine wildlife, do so from behind (i.e., never approach head-on).

- Vessels that wish to position themselves so that the animals would pass them, should do so in a manner that stays fully clear of the animal's path.

Be aware that marine mammals may surface in unpredictable locations.

- Breaching and flipper slapping whales may endanger people and/or vessels.

harbor seal (NMFS file photo)

Be on the look-out for seals.

- As their populations expand, seals are being found in southeastern states with increasing regularity, especially in North Carolina.
- Viewing or approaching seals hauled out on land should be done without the animal's awareness of your presence.
- Avoid detection by sight, smell, or sound (e.g., by staying hidden behind natural cover and approaching viewing areas quietly by avoiding conversation and noisy movements).
- Pups are often left alone when the mother is feeding.

  They are not abandoned and should be left alone.

To reduce the potential for wildlife viewing that inadvertently harms marine mammals or violates Federal law, the National Marine Fisheries Service (NMFS) provides the following information and guidelines for viewing whales, dolphins, seals, and sea turtles in the NMFS Southeast Region (from North Carolina to Texas, Puerto Rico and the U.S. Virgin Islands).

Close approaches by humans to marine mammals may cause them to lose their natural wariness and become aggressive towards people. They are also vulnerable to injury or death from entanglement in fishing gear or boat strikes. NMFS strongly encourages people to follow the guidelines presented here while spending time on or near the water.

Please review these guidelines and make the "Code of Conduct" personal practice. Bring binoculars along on a viewing excursion to assure a good view from the recommended viewing distances. Together we can assure marine mammal viewing will be as rewarding as it is today for many generations to come.

Marine mammals are more likely to be disturbed when more than one boat is near them.

- Avoid approaching the animals when another vessel is near.
- Always leave marine mammals an "escape route."
- When several vessels are in an area, communication between operators will help ensure that you do not cause disturbance.

northern right whale (photo: Center for Coastal Studies)

APPENDIX F
COASTAL CONSISTENCY DETERMINATION

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND SOUTHEAST
JACKSONVILLE, FL 32212-0030

5090
Ser EV21/011
January 14, 2016

Ms. Kelie Moore
Federal Consistency Coordinator
Coastal Resources Division
Georgia Department of Natural Resources
One Conservation Way
Brunswick, GA 31520-8687

SUBJECT: COASTAL CONSISTENCY DETERMINATION (CCD) FOR THE PROPOSED REPAIRS OF IN-WATER STRUCTURES AND CONSTRUCTION OF A NEW PIER AT NAVAL SUBMARINE BASE KINGS BAY, GEORGIA

The Department of the Navy (Navy) is preparing an Environmental Assessment (EA) for the proposed repairs (including direct repairs and repairs by replacement) to in-water structures along the waterfront and constructs a new pier to support TPS functions at Site VI at Navy Submarine Base (NSB) Kings Bay, Georgia. The draft EA is attached as enclosure (1). The Navy's Proposed Action is comprised of six distinct proposed projects. The titles of these six projects are listed below:

- Project 1: Port Operations Waterfront Facilities Repair
- Project 2: Unspecified Minor construction (UMC) Layberth Fender Pile Modification
- Project 3: Waterfront Repair and Replacement Maintenance Program
- Project 4: TPS Pier and Offshore Vessel Berthing Modification Project
- Project 5: Trident Refit Facility Waterfront Facilities Repair, Magnetic Silencing Facility (MSF) with Crane
- Project 6: Demolition of the TPS Pier and Layberth North Trestle.

Of those six projects, Projects 1, 3, 4 and 6 comprise multiple smaller projects. Project maps and a summary of the proposed projects are provided in enclosures (2) and (3).

In accordance with the Coastal Zone Management Act (CZMA) and 15 CFR 930, the Navy has prepared a Coastal Consistency Determination and is requesting coordination with the Georgia Department of Natural Resources Coastal Resources Division concerning the potential effects to coastal resources within the project area.

Based on the information and analysis presented in the EA and the Georgia Coastal Management Program Consistency Review prepared by the Navy, see enclosure (4), we have concluded that the proposed action will be undertaken in a manner consistent to the maximum extent practicable with the enforceable policies of the federally approved Georgia Coastal Management Program. In accordance with 15 CFR 930.36 the Navy requests concurrence with this determination. Please provide your response within 60 days of receiving this letter.

5090
Ser EV21/011
January 14, 2016

If further information is required or for any questions regarding this letter, please feel free to contact Ms. Nancy Allen at commercial (904) 542-6302 or email: nancy.p.allen@navy.mil.

Thank you very much for your assistance regarding this matter.

Sincerely,

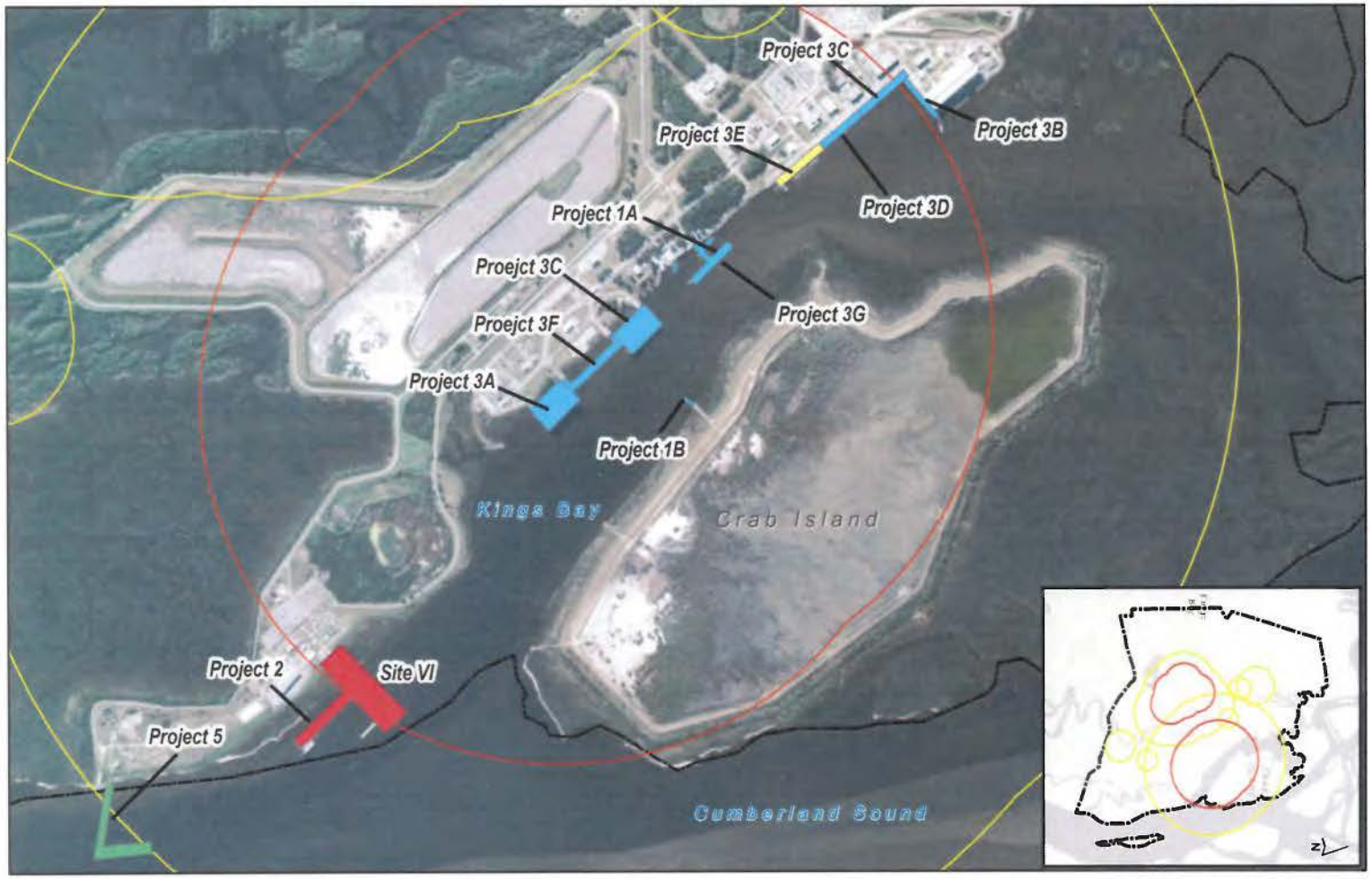
C. R. DESTAFNEY, PE
Environmental Business Line Coordinator
By direction of the
Commanding Officer

Enclosures: 1. Draft EA (CD)
2. Project Maps
3. Table 1. Summary of Proposed Waterfront Repairs and Security-Related Upgrades
4. Georgia Coastal Management Program Consistency Review

Naval Submarine Base Kings Bay Location Map

Enclosure (2)

General Locations of the Proposed Projects



Facility Condition

- C1 - Areas in Good Operating Condition
- C2 - Minor Deterioration
- C3 - Moderate Deterioration
- C4 - Severe Deterioration; Requires Immediate Repairs

ESQD Arc Type

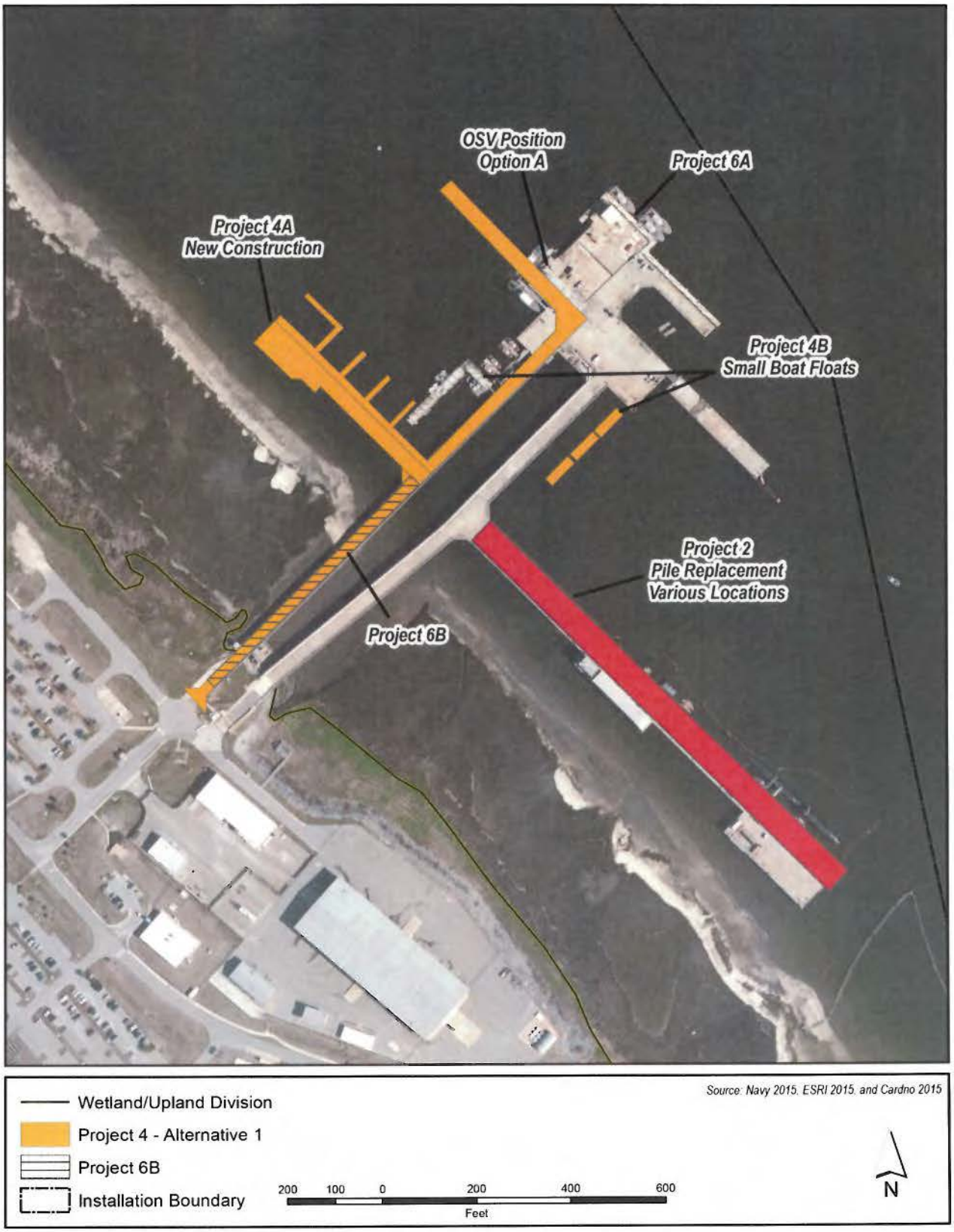
- Inhabited Building Distance
- Public Traffic Route
- Installation Boundary

Source: Navy 2015, ESRI 2015

1,500 750 0 1,500 3,000 4,500
Feet

Enclosure (2)

Location of Site VI Proposed Projects



Enclosure (2)

Table 1. Summary of Proposed Waterfront Repairs and Security-Related Upgrades

MAP ID	PROJECT DESCRIPTION	FACILITY NUMBER (FAC#)	SUMMARY
1	*Port Operations Waterfront Facilities Repair Project*	*No FAC #*	*Structural concrete and steel repairs and corrosion protection on two waterfront facilities (Tug Pier and General Access Pier Crab Island).*
1A	Tug Pier	5926	Repair concrete structural piles, pile caps, utility cover grates, headwall, mooring support and hardware, and deck undersides; replace wooden fender piles with concrete piles; and modify the fender system on the south side of access pier.
1B	General Access Pier Crab Island	5888	Install new guide piles, and repair brow and handrails.
2	*Unspecified Minor Construction (UMC) Layberth Fender Pile Modification P661 Project*	*5976*	*Install additional fender piles to shorten the distance between existing piles and provide the required support for hydro-pneumatic fenders.*
3	*Waterfront Pile Repair and Replacement/Maintenance Program*	*No FAC #*	*Repair and/or replace structurally unsound piles along the waterfront. This project includes eight individual projects and estimates for contingency requirements:*
3A	Explosive Handling Wharf #2 Pier W/Capstans (7)	5109	Repair high-density polyethylene (HDPE) fender pile wraps, sacrificial anodes attached to the steel fender piles, steel safety ladders and treated timber bracing; repair or replace various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings and two steel guide pipe piles on the diver's float.
3B	(Dry Dock) Interface Wharf	5995	Replace timber fender bearing strips and wales, repair concrete deck, bullrail, edge beams, and mooring foundations; and repair, paint and recoat cathodic protection on the steel H Pile fender system and sheet pile.
3C	Refit Wharf #1	5909	Replace various pile caps, piles, and the outboard edge beam; and repair, clean, and paint several mooring fittings.
3D	Refit Wharf #2	5910	Replace or repair various pile caps, piles, outboard edge beams, and mooring foundations; and reattach underdeck lighting conduit and clean and repaint various mooring fittings.
3E	Refit Wharf #3	5916	Replace or repair various pile caps, piles, the outboard edge beams, and mooring foundations; and clean and repaint various mooring fittings.
3F	Warping Wharf W/Capstan (4)	5877	Repair HDPE fender pile wraps; replace or repair various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings.
3G	Tug Pier	5926	Replace timber fender piles with guide piles and small boat access floats; paint mooring fittings; and repair concrete pile caps, concrete piles, concrete underdeck, and storm drain.
4	*Transit Protection System (TPS) P617 Off-shore Supply Vessel (OSV) Berthing Project*	*P617*	*The Transit Protection System (TPS) P617 Off-shore Supply Vessel (OSV) Berthing project includes the construction of a new pier associated with TPS functions, and the modification of the existing berthing pier on the north trestle at Site VI to comply with current DOD and Navy*

Table 1. Summary of Proposed Waterfront Repairs and Security-Related Upgrades

Map ID	Project Description	Facility Number (FAC#)	Summary
			security directives. • *New Facility P617 (Project 4A)* • *Small Craft Berth Site VI P617, FAC #5936 (Project 4B)*
4A	New Pier - TPS Headquarters/Operational Support Facility	New Construction (No FAC #)	Construct new pier to serve TPS Headquarters/Operational Support Facility functions. The new TPS pier would be provided with full hotel service capability including power; potable water; fire protection; sewage connections; Ship Overboard Drainage (SOD) collection; fuel; and telephone, cable, and Local Area Network (LAN) services.
4B	Small Craft Berth Site VI	5936	Modifies the existing berthing pier on the north trestle at Site VI to comply with current DOD and Navy security directives. The pier and floating berthing slips would be provided with full hotel service capability. The berthing pier would consist of a pile supported reinforced concrete structure with floating sections. This project includes the installation of two-5,000 gallon above ground storage tanks and provides two associated truck off-loading connections and fuel dispensing units.
5	*Magnetic Silent Facility with Cranes (RM14-1710 TRIREFFAC Waterfront Facilities Repair)*	*5980*	*Replace timber fender piles, restraining chains, aluminum utility tray, and concrete pile utility guide bracket; and repair wooden hand rails and the cracked concrete deck underside.*
6	*Demolition Project using Restoration Modernization Funds*	*No FAC #*	*Increase capacity of the existing pier.*
6A	TPS Pier Demolition	5934	Remove the tip of the existing TPS pier.
6B	North Trestle Demolition	5977	Demolish North Layberth Trestle.

Georgia Coast Management Program Consistency Review

Georgia's Coastal Management Plan (CMP) is composed of state statutes, which include the enforceable policies of the CMP. Statutes addressed as part of the Georgia's CMP Consistency Review and considered in the analysis of the Proposed Action are discussed in the Table below.

Georgia Coastal Management Program Consistency Determination

Statute	Scope	Consistency
Georgia Coastal Management Act (O.C.G.A. 12-5-320, *et seq.*) (1997)	Enables DNR to develop and implement plan · Provides authority to DNR to accept, spend, and grant funds · Provides authority to DNR to hold public hearings · Provides authority to Governor to review and approve coastal management plan and to submit it to federal government for approval	The proposed action will not have an effect on the state's coastal management plan.
Coastal Marshlands Protection Act (O.C.G.A. 12-5-280, *et seq.*)	Protects tidal wetlands · Requires permit for structures, dredging, filling · Establishes Coastal Marshlands -regulates how structures will be constructed, operated and maintained on tidal water bottoms.	The proposed action would require a Coastal Marsh Protection Act permit (LOP) for the placement of structures and/or fill in marsh areas. In addition, a permit would be required for shading of salt marsh under Alternative 2 only. The Navy would obtain all permits prior to the commencement of work.
Department of Natural Resources Authority (O.C.G.A. 12-2-1, *et seq.*) (1937)	Establishes structure, powers and duties of DNR, including EPD	NA
Endangered Wildlife Act (O.C.G.A. 27-3-130, *et seq.*) (1973)	Purpose is to identify/protect rare, unusual, or other animals in danger of extinction · Provides authority to DNR board to issue regulations for protection of protected species	The Proposed Action would have no effect on the striped newt; red-cockaded woodpecker; smalltooth sawfish; North Atlantic right whale; Eastern indigo snake; and nesting hawksbill, green, Kemp's ridley, leatherback, and loggerhead sea turtles. The Proposed Action may affect, but is not likely to adversely affect the piping plover; red knot; wood stork; Atlantic sturgeon; shortnose sturgeon; West Indian manage; gopher tortoise, or at-sea hawksbill, green, Kemp's ridley, leatherback, and loggerhead sea turtles. There would be no effect on the designated critical habitat for the piping plover, West Indian manatee, hawksbill sea turtle,

Statute	Scope	Consistency
		green sea turtle, leatherback sea turtle, and loggerhead sea turtle. A Biological Evaluation has been submitted to NMFS and USFWS for species under their regulatory purview, respectively. In addition, the Navy would require the construction contractors to adhere to the minimization and mitigation measures specified in the EA.
Game and Fish Code (O.C.G.A. 27-1-1, *et seq.*) (1977)	Designates Wildlife Resources Division to operate Wildlife Management Areas, to register aquaculture activities, and to protect wildlife resources · Establishes hunting, trapping, and fishing laws · Establishes Conservation Rangers	Essential Fish Habitat (EFH) consultation has been initiated and will be concluded prior to the signing of the Record of Determination (ROD). With the application of the standard operating procedures, General Construction and Pile removal and Installation BMPs, as well as Acoustic Minimization Measures (soft start) and Timing Restrictions (daylight hours), it is anticipated that construction activities under the Proposed Action would have no more than a minimal impact on habitats designated as EFH or HAPC by the SAFMC or NMFS.
Georgia Administrative Procedures Act (O.C.G.A. 50-13-4, *et seq.*) (1964)	Establishes requirements for adoption, amendment or repeal of rules and regulations Requires minimum of 30 days' notice of intended rules change	The proposed action will not affect administrative procedures.
Georgia Aquaculture Development Act (O.C.G.A. 27-4-251, *et seq.*) (1992)	Establishes Commission to study and promote aquaculture development in the State.	The proposed action will not have an effect on Aquaculture.
Georgia Air Quality Act (O.C.G.A. 12-9-2, *et seq.*) (1964)	Establishes ambient air quality standards, emissions limitations, emission control standards, etc.	The proposed action would produce minor emissions from construction but would not impact air quality overall in the region.
Historic Area Act (O.C.G.A. 12-3-50, *et seq.*) (1951)	Establishes law for preservation of historic sites in Georgia	The proposed action would not affect cultural resources of the state of Georgia as no known sites have been identified within the project footprint. However, should any cultural resources be discovered during construction the activity would cease and the discovery would be immediately

Statute	Scope	Consistency
		reported to the NSB Kings Bay Environmental Director and the Georgia State Historic Preservation Officer.
Georgia Boat Safety Act (O.C.G.A. 52-7-1, *et seq.*) (1994)	Governs abandoned vessels Sets enforceable rules for safe boating practices Establishes 1000' boating safety zones on Jekyll, Tybee, St. Simons, and Sea Islands.	The proposed action will not have an effect on the recreational or commercial use of boats.
Georgia Administrative Procedures Act (Revocable License Program) (O.C.G.A. 50-16-61, *et seq.*) (1863)	-Grants permission from the State of Georgia to utilize state-owned tidal water bottoms or other tidally influenced areas of the water column.	The proposed action will require the use of tidal water bottoms for placement, operation and maintenance of the structures outlined within six projects proposed. A Revocable License will be requested subject to the authorities reserved to the United States in the Submerged Lands Act, Title 43 U.S.C. Sections 1301-1315.
Georgia Comprehensive Solid Waste Management Act (O.C.G.A. 12-8-20, *et seq.*) (1972)	· Defines rules regarding solid waste disposal, including permit requirements for facilities	The proposed action will not require or have an effect on solid waste disposal. Any construction or demolition debris generated from construction of this project will be disposed of in accordance with all applicable regulations.
Georgia Environmental Policy Act (O.C.G.A. 12-16-1, *et seq.*) (1991)	· Requires preparation of an Environmental Effects Report for any governmental action that may significantly adversely affect the quality of the environment	The proposed action will not adversely affect the quality of the environment.
Georgia Erosion and Sedimentation Act (O.C.G.A. 12-7-1, *et seq.*) (1975)	Establishes minimum standards for land-disturbing activities · Requires each local government to establish procedures for land disturbing activities	The Proposed Action would occur within 200 feet of the bank of state waters and would require a Land Disturbing Activity permit, as well as a sedimentation control plan to be submitted to the Camden County Planning Director. The Navy would obtain this permit prior to the commencement of work.
Georgia Fisheries Law Pertaining to Shellfish (O.C.G.A. 27-1-4, *et seq.*) (1981)	· Protects public health & safety by setting minimum water quality standards for shellfish waters and seafood	The proposed action will not adversely affect water quality for shellfish or seafood.
Georgia Hazardous Waste Management Act (O.C.G.A. 12-8-60, *et seq.*) (1979)	· Establishes regulations for generation, storage, treatment, and disposal of hazardous wastes	The Proposed Action may result in the generation of minor amounts of hazardous waste. The construction contractors would prepare a project-specific

Statute	Scope	Consistency
		Hazardous Materials Management Plan. Any hazardous waste generated would be small in quantity and would be disposed of in accordance with all applicable regulations.
Georgia Heritage Trust Act of 1975 (O.C.G.A. 12-3-70, *et seq.*) (1975)	· Establishes Heritage Trust Commission · Seeks to preserve certain property in Georgia with unique natural characteristics, special historical value, or particular recreational value.	The proposed action will not have an effect on any historic or recreational property or any property with unique natural characteristics.
Georgia Natural Areas Act (O.C.G.A. 12-3-90, *et seq.*) (1966)	· Provides authority to identify and preserve areas of unusual ecological significance in a natural state	The proposed action will not have an effect on any areas of unusual ecological significance.
Georgia Oil and Gas and Deep Drilling Act (O.C.G.A. 12-4-40, *et seq.*) (1975)	· Provides protection to underground water supplies and environmentally sensitive areas from the effects of oil and gas drilling activities	The proposed action will not conduct oil or gas drilling activities and will not have an effect on underground water.
Georgia Safe Dams Act (O.C.G.A. 12-5-370, *et seq.*) (1978)	· Establishes inspection and permitting requirements for dams	The proposed action will not construct dams.
Georgia Safe Drinking Water Act (O.C.G.A. 12-5-170, *et seq.*) (1977)	· Establishes regulatory requirements for drinking water management programs	The proposed action will not have an effect on drinking water.
Georgia Scenic Rivers Act of 1969 (O.C.G.A. 12-5-350, *et seq.*) (1969)	· Defines scenic rivers · Names certain sections of rivers for preservation	The proposed action will not have an effect on any scenic rivers.
Georgia Scenic Trails Act (O.C.G.A. 12-3-110, *et seq.*) (1972)	· Provides authority to construct, manage and maintain a system of trails in Georgia	The proposed action will not have an effect on any scenic trails
Georgia Surface Mining Act (O.C.G.A. 12-4-70, *et seq.*) (1968)	Regulates all surface mining in Georgia	The proposed action will not conduct surface mining operations.
Georgia Underground Storage Tank Act (O.C.G.A. 12-13-1, *et seq.*) (1981)	· Establishes criteria for operating, detecting releases, and utilizing underground storage tanks	The proposed action will not operate or use underground storage tanks.
Georgia Water Quality Control Act (O.C.G.A. 12-9-1, *et seq.*) (1964)	Establishes regulatory requirements for water quality and quantity, permits for discharges into surface and subsurface waters, etc.	The Proposed Action would require a Section 401 Water Quality Certification from GA EPD for impacts to water quality from pile repair, removal and installation. The construction contractor would be required to prepare an Environmental Protection Plan; a project-specific

Statute	Scope	Consistency
		Spill Prevention, control, and Countermeasure Plan; and a project-specific Stormwater Pollution Prevention Plan.
Groundwater Use Act (O.C.G.A. 12-5-90, *et seq.*) (1972)	· Provides authority to establish regulations and permit requirements for withdrawal, drilling protocols, and water conservation plans	The proposed action will not have an effect on ground water.
Licenses to Dig, Mine, and Remove Phosphate Deposits (O.C.G.A. 12-4-100, *et seq.*) (1884)	· Authorizes the Office of the Secretary of State to regulate phosphate mining	The proposed action will not conduct phosphate mining.
Mountain and River Corridor Protection Act (O.C.G.A. 12-2-8, *et seq.*) (1981)	· Requires a 100' vegetative buffer · Requires consistency with Erosion and Sedimentation Act · Requires local governments to identify river corridors in land-use plans	The proposed action will not have an effect on any river vegetative buffers or cause erosion.
Protection of Tidewaters Act (O.C.G.A. 52-1-1, *et seq.*) (1992)	· Requires permit for vessels used for habitation and not transportation within the tidewaters of the State	The Proposed Action would not result in closure of areas within state tidewaters; the Proposed Action would take place in the already restricted area within Kings Bay.
Right of Passage Act (O.C.G.A. 52-1-30, *et seq.*) (1981)	· Requires vessel operators to stay to the right (starboard) side of streams and channels for traffic	The proposed action will not have an effect on the traffic on streams or rivers or waterways of the state. Access to this portion of Kings Bay is restricted to the public.
Title 31 – Health (Septic Tank Law) (O.C.G.A. Title 31 generally) (1981)	· Establishes authority to set statewide standard for septic tanks	The proposed action will not have an effect on septic tanks.
Shore Protection Act (O.C.G.A. 12-5-230, *et seq.*) (1979)	· Protects sand dunes, beaches, sandbars, and shoals · Limits construction activity to temporary structures by permit only · Prohibits motorized vehicles on dunes and beaches · Prohibits docks, marinas, boat ramps, storage facilities in dunes · Establishes Shore Protection Committee	The proposed action will not have an effect on shore areas, beaches , dunes sand bars, or shoals
Water Wells Standards Act (O.C.G.A. 12-5-120, *et seq.*) (1985)	· Provides standards for siting, construction, and operation of wells	The proposed action will not construct or operate water wells.
Wildflower Preservation Act (O.C.G.A. 12-6-170, *et seq.*) (1973)	· Provides for designation and preservation of rare, unusual, or endangered plant species	The proposed action will not have an effect on rare, unusual, or endangered plant species.

The Navy is obligated to ensure that its activities which affect any land or water use or natural resource of the coastal zone be consistent to the maximum extent practicable with the enforceable polices of federally approved state coastal management programs. The Navy has determined that through the application of standard manatee, smalltooth sawfish and sea turtle protections, as well as the use of BMPs and Mitigation Measures, the proposed repairs of in-water structures and construction of a new pier at Naval Submarine Base Kings Bay, Georgia, would be consistent to the maximum extent practicable with Georgia's Coastal Management Plan.

APPENDIX G
AIR QUALITY MODELING CALCULATIONS

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TAB A. SUBASE Kings Bay Construction Emissions Summary

Year	VOC T/yr	CO T/yr	NOx T/yr	SO2 T/yr	PM10 T/yr	PM2.5 T/yr	CO2e MT/yr
2017	0.28	8.66	4.95	0.55	0.21	0.20	836
2018	0.03	0.94	0.52	0.05	0.02	0.02	95
2020	0.36	9.46	6.66	0.79	0.28	0.27	1,014
2021	0.11	3.85	1.81	0.21	0.08	0.07	328
2022	0.42	15.87	7.24	0.84	0.31	0.30	1,344

TAB B. SUBASE Kings Bay Construction Emissions 2017

Table 1. **FY17 Construction Activities** Tasks 1, 2, 3a (initial work), 3d, and 5.

Total days of activity = 131

249 piles installed 187 piles removed

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	N2O g/gal	CH4 g/gal	CO2 g/hp-hr	Fuel gal/hp-hr
Excavator	1,048	232	0.59	0.31	0.75	4.00	0.11	0.13	0.13	0.26	0.58	536	0.060
Loader	1,048	197	0.23	0.31	0.75	4.00	0.11	0.13	0.13	0.26	0.58	536	0.060
Generators	1,048	40	0.43	0.28	1.53	4.73	0.18	0.34	0.33	0.26	0.58	536	0.050
Crane	520	800	0.42	0.17	0.76	4.10	0.11	0.13	0.13	0.26	0.58	530	0.060
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb	
				98	236	1,265	35	42	40	82	183	169,513	
				32	78	419	12	14	13	27	61	56,112	
				11	61	188	7	13	13	10	23	21,301	
				64	294	1,579	43	51	49	100	223	204,153	
			Tons/year:	**0.1**	**0.3**	**1.7**	**0.0**	**0.1**	**0.1**	**0.1**	**0.2**	**226**	
											CO2e in metric tons/year	**240**	
Off-road Equipment	**Hours of Operation**	**Engine HP**	**Load Factor**	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM10** g/hp-hr	**PM2.5** g/hp-hr	**N2O** g/hp-hr	**CH4** g/hp-hr	**CO2** g/hp-hr	
Tug - propulsion (3)	520	500	0.50	0.36	6.62	9.00	1.72	0.40	0.39	0.03	0.12	914	
Launch Boat	520	50	0.45	0.36	6.62	9.00	1.72	0.53	0.51	0.03	0.12	914	
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb	
				102.46	1,897.34	2,580.38	493.31	113.84	110.43	7.59	34.15	261,832.89	
				9.22	170.76	232.23	44.40	13.66	13.25	0.68	3.07	23,564.96	
			Tons/year:	**0.06**	**1.03**	**1.41**	**0.27**	**0.06**	**0.06**	**0.00**	**0.02**	**143**	
											CO2e in metric tons/year	**129**	

Table 2. Material Delivery

Construction Year	Material	Source Location	One way distance (mi)	Total Round Trip Time (hrs)	Total # of trips	Computed Total time (hrs)
2017	Materials Delivery	Talleyrand Marine Terminal/ JAXPORT	55	18.4	27	493

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	N2O g/hp-hr	CH4 g/hp-hr	CO2 g/hp-hr
Tug - propulsion	493	500	0.50	0.36	6.62	9.00	1.72	0.40	0.39	0.03	0.12	914
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb
			Tugs	97.23	1,800.48	2,448.66	468.13	108.03	104.79	7.20	32.41	248,466.56
			Tons/year:	**0.05**	**0.90**	**1.22**	**0.23**	**0.05**	**0.05**	**0.00**	**0.02**	**124**
											CO2e in metric tons/year	**113**

Table 3. Debris Removal

On-road Equipment	Mileage	Engine HP	VOC lb/mile	CO lb/mile	NOx lb/mile	SO2 lb/mile	PM10 lb/mile	PM2.5 lb/mile	N2O lb/mile	CH4 lb/mile	CO2 lb/mile
Semi Truck - Demo Removal	2,991	380	1.59E-03	8.31E-03	3.78E-02	1.79E-05	1.60E-03	1.6E-03	1.06E-05	1.12E-05	4.21
			VOCs Ton	**CO** Ton	**NOx** Ton	**SO_2** Ton	**PM_{10}** Ton	**$PM_{2.5}$** Ton	**N2O** Ton	**CH4** Ton	**CO2** Ton
Semi Truck - Demo Removal			0.00	0.01	0.06	0.00	0.00	0.00	0.00	0.00	6.29
										CO2e in metric tons/year	**6**

Table 4. Construction Worker POVs 38 miles one way from Jacksonville FL

Vehicles	# vehicles	# days	[4]mi/day	[3]VOCs lb/mi	[3]CO lb/mi	[3]NOx lb/mi	[3]SO_2 lb/mi	[3]PM_{10} lb/mi	[3]$PM_{2.5}$ lb/mi	[4,5]CO_2 g/mi	[4,5]CH_4 g/mi	[4,5]N_2O g/mi
passenger vehicles	90	123	76	1.089E-04	1.013E-02	8.840E-04	0.000E+00	4.73247E-05	4.40133E-05	182.00	0.02	0.02
carpool	38	123	76	1.269E-04	1.189E-02	9.205E-04	8.699E-07	3.68692E-05	3.46772E-05	519.00	0.04	0.05
				VOCs lb	**CO** lb	**NOx** lb	**SO_2** lb	**PM_{10}** lb	**$PM_{2.5}$** lb	**CO_2** g	**CH_4** g	**N_2O** g
				91.22	8485.55	740.44	0.00	39.64	36.86	152,439,706	13,401	13,401
				45.53	4267.66	330.42	0.31	13.23	12.45	186,301,901	12,923	16,871
			Tons per Year	**0.07**	**6.38**	**0.54**	**0.00**	**0.03**	**0.02**			
			Metric Tons per Year							**339**	**0.03**	**0.03**
										CO2e in metric tons/year	**348**	

Table 5. FY 2017 Construction Summary

VOC T/yr	CO T/yr	NOx T/yr	SO2 T/yr	PM10 T/yr	PM2.5 T/yr	CO2e MT/yr
0.28	**8.66**	**4.95**	**0.55**	**0.21**	**0.20**	**836**

TAB C. SUBASE Kings Bay Construction Emissions 2018

Table 1. **FY18 Construction Activities** Tasks 3c, 3e

Total days of activity = 26

2 piles installed 2 piles removed

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	N2O g/gal	CH4 g/gal	CO2 g/hp-hr	Fuel gal/hp-hr
Excavator	208	232	0.59	0.31	0.75	4.00	0.11	0.13	0.13	0.26	0.58	536	0.060
Loader	208	197	0.23	0.31	0.75	4.00	0.11	0.13	0.13	0.26	0.58	536	0.060
Generators	208	40	0.43	0.28	1.53	4.73	0.18	0.34	0.33	0.26	0.58	536	0.050
Crane	32	800	0.42	0.17	0.76	4.10	0.11	0.13	0.13	0.26	0.58	530	0.060
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb	
				19	47	251	7	8	8	16	36	33,644	
				6	16	83	2	3	3	5	12	11,137	
				2	12	37	1	3	3	2	5	4,228	
				4	18	97	3	3	3	6	14	12,563	
			Tons/year:	**0.0**	**0.0**	**0.2**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**31**	
											CO2e in metric tons/year	**33**	
Off-road Equipment	**Hours of Operation**	**Engine HP**	**Load Factor**	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM10** g/hp-hr	**PM2.5** g/hp-hr	**N2O** g/hp-hr	**CH4** g/hp-hr	**CO2** g/hp-hr	
Tug - propulsion (3)	32	500	0.50	0.36	6.62	9.00	1.72	0.40	0.39	0.03	0.12	914	
Launch Boat	32	50	0.45	0.36	6.62	9.00	1.72	0.53	0.51	0.03	0.12	914	
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb	
				6.31	116.76	158.79	30.36	7.01	6.80	0.47	2.10	16,112.79	
				0.57	10.51	14.29	2.73	0.84	0.82	0.04	0.19	1,450.15	
			Tons/year:	**0.00**	**0.06**	**0.09**	**0.02**	**0.00**	**0.00**	**0.00**	**0.00**	**9**	
											CO2e in metric tons/year	**8**	

Table 2. Material Delivery

Construction Year	Material	Source Location	One way distance (mi)	Total Round Trip Time (hrs)	Total # of trips	Computed Total time (hrs)
2018	Materials Delivery	Talleyrand Marine Terminal/ JAXPORT	55	18.4	3	55

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	N2O g/hp-hr	CH4 g/hp-hr	CO2 g/hp-hr
Tug - propulsion	55	500	0.50	0.36	6.62	9.00	1.72	0.40	0.39	0.03	0.12	914
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb
			Tugs	10.88	201.55	274.10	52.40	12.09	11.73	0.81	3.63	27,813.42
			Tons/year:	**0.01**	**0.10**	**0.14**	**0.03**	**0.01**	**0.01**	**0.00**	**0.00**	**14**
											CO2e in metric tons/year	**13**

Table 3. Debris Removal

On-road Equipment	Mileage	Engine HP	VOC lb/mile	CO lb/mile	NOx lb/mile	SO2 lb/mile	PM10 lb/mile	PM2.5 lb/mile	N2O lb/mile	CH4 lb/mile	CO2 lb/mile
Semi Truck - Demo Removal	184	380	1.59E-03	8.31E-03	3.78E-02	1.79E-05	1.60E-03	1.6E-03	1.06E-05	1.12E-05	4.21
			VOCs Ton	**CO** Ton	**NOx** Ton	**SO_2** Ton	**PM_{10}** Ton	**$PM_{2.5}$** Ton	**N2O** Ton	**CH4** Ton	**CO2** Ton
		Semi Truck - Demo Removal	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.39
										CO2e in metric tons/year	**0**

Table 4. Construction Worker POVs 38 miles one way from Jacksonville FL

Vehicles	# vehicles	# days	[4]mi/day	[3]VOCs lb/mi	[3]CO lb/mi	[3]NOx lb/mi	[3]SO_2 lb/mi	[3]PM_{10} lb/mi	[3]$PM_{2.5}$ lb/mi	[4,5]CO_2 g/mi	[4,5]CH_4 g/mi	[4,5]N_2O g/mi
passenger vehicles	10	120	76	1.089E-04	1.013E-02	8.840E-04	0.000E+00	4.73247E-05	4.40133E-05	182.00	0.02	0.02
carpool	5	120	76	1.269E-04	1.189E-02	9.205E-04	8.699E-07	3.68692E-05	3.46772E-05	519.00	0.04	0.05
				VOCs lb	**CO** lb	**NOx** lb	**SO_2** lb	**PM_{10}** lb	**$PM_{2.5}$** lb	**CO_2** g	**CH_4** g	**N_2O** g
				9.93	923.95	80.62	0.00	4.32	4.01	16,598,400	1,459	1,459
				5.78	542.13	41.97	0.04	1.68	1.58	23,666,400	1,642	2,143
			Tons per Year	**0.01**	**0.73**	**0.06**	**0.00**	**0.00**	**0.00**			
			Metric Tons per Year							**40**	**0.00**	**0.00**
										CO2e in metric tons/year	**41**	

Table 5. FY 2018 Construction Summary

VOC T/yr	CO T/yr	NOx T/yr	SO2 T/yr	PM10 T/yr	PM2.5 T/yr	CO2e MT/yr
0.03	**0.94**	**0.52**	**0.05**	**0.02**	**0.02**	**95**

TAB D. SUBASE Kings Bay Construction Emissions 2020

Table 1. **FY20 Construction Activities** Task 4

Total days of activity = 174

245 piles installed 151 piles removed

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	N2O g/gal	CH4 g/gal	CO2 g/hp-hr	Fuel gal/hp-hr
Excavator	1,392	232	0.59	0.31	0.75	4.00	0.11	0.13	0.13	0.26	0.58	536	0.060
Loader	1,392	197	0.23	0.31	0.75	4.00	0.11	0.13	0.13	0.26	0.58	536	0.060
Generators	1,392	40	0.43	0.28	1.53	4.73	0.18	0.34	0.33	0.26	0.58	536	0.050
Crane	704	800	0.42	0.17	0.76	4.10	0.11	0.13	0.13	0.26	0.58	530	0.060
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb	
				130	314	1,680	47	55	54	109	244	225,154	
				43	104	556	15	18	18	36	81	74,531	
				15	81	250	10	18	17	14	31	28,292	
				87	399	2,138	58	69	67	136	302	276,391	
			Tons/year:	**0.1**	**0.4**	**2.3**	**0.1**	**0.1**	**0.1**	**0.1**	**0.3**	**302**	
											CO2e in metric tons/year	**321**	
Off-road Equipment	**Hours of Operation**	**Engine HP**	**Load Factor**	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM10** g/hp-hr	**PM2.5** g/hp-hr	**N2O** g/hp-hr	**CH4** g/hp-hr	**CO2** g/hp-hr	
Tug - propulsion (3)	704	500	0.50	0.36	6.62	9.00	1.72	0.40	0.39	0.03	0.12	914	
Launch Boat	704	50	0.45	0.36	6.62	9.00	1.72	0.53	0.51	0.03	0.12	914	
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb	
				138.71	2,568.71	3,493.44	667.86	154.12	149.50	10.27	46.24	354,481.45	
				12.48	231.18	314.41	60.11	18.49	17.94	0.92	4.16	31,903.33	
			Tons/year:	**0.08**	**1.40**	**1.90**	**0.36**	**0.09**	**0.08**	**0.01**	**0.03**	**193**	
											CO2e in metric tons/year	**175**	

Table 2. Material Delivery

Construction Year	Material	Source Location	One way distance (mi)	Total Round Trip Time (hrs)	Total # of trips	Computed Total time (hrs)
2020	Materials Delivery	Talleyrand Marine Terminal/ JAXPORT	55	18.4	41	755

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	N2O g/hp-hr	CH4 g/hp-hr	CO2 g/hp-hr
Tug - propulsion	755	500	0.50	0.36	6.62	9.00	1.72	0.40	0.39	0.03	0.12	914
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb
			Tugs	148.74	2,754.47	3,746.08	716.16	165.27	160.31	11.02	49.58	380,116.75
			Tons/year:	**0.07**	**1.38**	**1.87**	**0.36**	**0.08**	**0.08**	**0.01**	**0.02**	**190**
											CO2e in metric tons/year	**172**

Table 3. Debris Removal

On-road Equipment	Mileage	Engine HP	VOC lb/mile	CO lb/mile	NOx lb/mile	SO2 lb/mile	PM10 lb/mile	PM2.5 lb/mile	N2O lb/mile	CH4 lb/mile	CO2 lb/mile
Semi Truck - Demo Removal	2,832	380	1.59E-03	8.31E-03	3.78E-02	1.79E-05	1.60E-03	1.6E-03	1.06E-05	1.12E-05	4.21
			VOCs Tons	**CO** Tons	**NOx** Tons	**SO_2** Tons	**PM_{10}** Tons	**$PM_{2.5}$** Tons	**N2O** Tons	**CH4** Tons	**CO2** Tons
		Semi Truck - Demo Removal	0.00	0.01	0.05	0.00	0.00	0.00	0.00	0.00	5.96
										CO2e in metric tons/year	**5**

Table 4. Construction Worker POVs 38 miles one way from Jacksonville FL

Vehicles	# vehicles	# days	[4]mi/day	[3]VOCs lb/mi	[3]CO lb/mi	[3]NOx lb/mi	[3]SO_2 lb/mi	[3]PM_{10} lb/mi	[3]$PM_{2.5}$ lb/mi	[4,5]CO_2 g/mi	[4,5]CH_4 g/mi	[4,5]N_2O g/mi
passenger vehicles	90	120	76	1.089E-04	1.013E-02	8.840E-04	0.000E+00	4.73247E-05	4.40133E-05	182.00	0.02	0.02
carpool	38	120	76	1.269E-04	1.189E-02	9.205E-04	8.699E-07	3.68692E-05	3.46772E-05	519.00	0.04	0.05
				VOCs lb	**CO** lb	**NOx** lb	**SO_2** lb	**PM_{10}** lb	**$PM_{2.5}$** lb	**CO_2** g	**CH_4** g	**N_2O** g
				89.00	8278.58	722.38	0.00	38.67	35.97	148,721,664	13,074	13,074
				44.42	4163.57	322.37	0.30	12.91	12.14	181,757,952	12,607	16,460
			Tons per Year	**0.07**	**6.22**	**0.52**	**0.00**	**0.03**	**0.02**			
			Metric Tons per Year							**330**	**0.03**	**0.03**
									CO2e in metric tons/year	**340**		

Table 5. FY 2020 Construction Summary

VOC T/yr	CO T/yr	NOx T/yr	SO2 T/yr	PM10 T/yr	PM2.5 T/yr	CO2e MT/yr
0.36	**9.46**	**6.66**	**0.79**	**0.28**	**0.27**	**1,014**

TAB E. SUBASE Kings Bay Construction Emissions 2021

Table 1. **FY21 Construction Activities** Tasks 3b, 3f.

Total days of activity = 43

107 piles installed 107 piles removed

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	N2O g/gal	CH4 g/gal	CO2 g/hp-hr	Fuel gal/hp-hr
Excavator	344	232	0.59	0.31	0.75	4.00	0.11	0.13	0.13	0.26	0.58	536	0.060
Loader	344	197	0.23	0.31	0.75	4.00	0.11	0.13	0.13	0.26	0.58	536	0.060
Generators	344	40	0.43	0.28	1.53	4.73	0.18	0.34	0.33	0.26	0.58	536	0.050
Crane	152	800	0.42	0.17	0.76	4.10	0.11	0.13	0.13	0.26	0.58	530	0.060
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb	
				32	78	415	12	14	13	27	60	55,642	
				11	26	137	4	5	4	9	20	18,418	
				4	20	62	2	4	4	3	8	6,992	
				19	86	462	12	15	14	29	65	59,675	
			Tons/year:	**0.0**	**0.1**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**	**0.1**	**70**	
											CO2e in metric tons/year	**75**	
Off-road Equipment	**Hours of Operation**	**Engine HP**	**Load Factor**	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM10** g/hp-hr	**PM2.5** g/hp-hr	**N2O** g/hp-hr	**CH4** g/hp-hr	**CO2** g/hp-hr	
Tug - propulsion (3)	152	500	0.50	0.36	6.62	9.00	1.72	0.40	0.39	0.03	0.12	914	
Launch Boat	152	50	0.45	0.36	6.62	9.00	1.72	0.53	0.51	0.03	0.12	914	
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb	
				29.95	554.61	754.27	144.20	33.28	32.28	2.22	9.98	76,535.77	
				2.70	49.91	67.88	12.98	3.99	3.87	0.20	0.90	6,888.22	
			Tons/year:	**0.02**	**0.30**	**0.41**	**0.08**	**0.02**	**0.02**	**0.00**	**0.01**	**42**	
											CO2e in metric tons/year	**38**	

Table 2. Material Delivery

Construction Year	Material	Source Location	One way distance (mi)	Total Round Trip Time (hrs)	Total # of trips	Computed Total time (hrs)
2021	Materials Delivery	Talleyrand Marine Terminal/ JAXPORT	55	18.4	13	239

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	N2O g/hp-hr	CH4 g/hp-hr	CO2 g/hp-hr
Tug - propulsion	239	500	0.50	0.36	6.62	9.00	1.72	0.40	0.39	0.03	0.12	914
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb
			Tugs	47.16	873.37	1,187.78	227.08	52.40	50.83	3.49	15.72	120,524.82
			Tons/year:	**0.02**	**0.44**	**0.59**	**0.11**	**0.03**	**0.03**	**0.00**	**0.01**	**60**
											CO2e in metric tons/year	**55**

Table 3. Debris Removal

On-road Equipment	Mileage	Engine HP	VOC lb/mile	CO lb/mile	NOx lb/mile	SO2 lb/mile	PM10 lb/mile	PM2.5 lb/mile	N2O lb/mile	CH4 lb/mile	CO2 lb/mile
Semi Truck - Demo Removal	799	380	1.59E-03	8.31E-03	3.78E-02	1.79E-05	1.60E-03	1.6E-03	1.06E-05	1.12E-05	4.21
			VOCs Tons	**CO** Tons	**NOx** Tons	**SO_2** Tons	**PM_{10}** Tons	**$PM_{2.5}$** Tons	**N2O** Tons	**CH4** Tons	**CO2** Tons
		Semi Truck - Demo Removal	0.00	0.00	0.02	0.00	0.00	0.00	0.00	0.00	1.68
										CO2e in metric tons/year	**2**

Table 4. Construction Worker POVs 38 miles one way from Jacksonville FL

Vehicles	# vehicles	# days	[4]mi/day	[3]VOCs lb/mi	[3]CO lb/mi	[3]NOx lb/mi	[3]SO_2 lb/mi	[3]PM_{10} lb/mi	[3]$PM_{2.5}$ lb/mi	[4,5]CO_2 g/mi	[4,5]CH_4 g/mi	[4,5]N_2O g/mi
passenger vehicles	45	120	76	1.089E-04	1.013E-02	8.840E-04	0.000E+00	4.73247E-05	4.40133E-05	182.00	0.02	0.02
carpool	17	120	76	1.269E-04	1.189E-02	9.205E-04	8.699E-07	3.68692E-05	3.46772E-05	519.00	0.04	0.05
				VOCs lb	**CO** lb	**NOx** lb	**SO_2** lb	**PM_{10}** lb	**$PM_{2.5}$** lb	**CO_2** g	**CH_4** g	**N_2O** g
				44.70	4157.77	362.80	0.00	19.42	18.06	74,692,800	6,566	6,566
				19.67	1843.25	142.71	0.13	5.72	5.38	80,465,760	5,581	7,287
			Tons per Year	**0.03**	**3.00**	**0.25**	**0.00**	**0.01**	**0.01**			
			Metric Tons per Year							**155**	**0.01**	**0.01**
										CO2e in metric tons/year	**160**	

Table 5. FY 2021 Construction Summary

VOC T/yr	CO T/yr	NOx T/yr	SO2 T/yr	PM10 T/yr	PM2.5 T/yr	CO2e MT/yr
0.11	**3.85**	**1.81**	**0.21**	**0.08**	**0.07**	**328**

TAB F. SUBASE Kings Bay Construction Emissions 2022

Table 1. **FY22 Construction Activities** Tasks 3a, 3g, 6a and 6b.

Total days of activity = 154

90 piles installed 860 piles removed

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	N2O g/gal	CH4 g/gal	CO2 g/hp-hr	Fuel gal/hp-hr
Excavator	1,232	232	0.59	0.31	0.75	4.00	0.11	0.13	0.13	0.26	0.58	536	0.060
Loader	1,232	197	0.23	0.31	0.75	4.00	0.11	0.13	0.13	0.26	0.58	536	0.060
Generators	1,232	40	0.43	0.28	1.53	4.73	0.18	0.34	0.33	0.26	0.58	536	0.050
Crane	576	800	0.42	0.17	0.76	4.10	0.11	0.13	0.13	0.26	0.58	530	0.060
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb	
				115	278	1,487	41	49	47	97	216	199,275	
				38	92	492	14	16	16	32	71	65,964	
				13	72	221	8	16	15	12	27	25,040	
				71	326	1,749	47	56	54	111	247	226,138	
			Tons/year:	**0.1**	**0.4**	**2.0**	**0.1**	**0.1**	**0.1**	**0.1**	**0.3**	**258**	
											CO2e in metric tons/year	**275**	
Off-road Equipment	**Hours of Operation**	**Engine HP**	**Load Factor**	**VOC** g/hp-hr	**CO** g/hp-hr	**NOx** g/hp-hr	**SO2** g/hp-hr	**PM10** g/hp-hr	**PM2.5** g/hp-hr	**N2O** g/hp-hr	**CH4** g/hp-hr	**CO2** g/hp-hr	
Tug - propulsion (3)	576	500	0.50	0.36	6.62	9.00	1.72	0.40	0.39	0.03	0.12	914	
Launch Boat	576	50	0.45	0.36	6.62	9.00	1.72	0.53	0.51	0.03	0.12	914	
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb	
				113.49	2,101.67	2,858.27	546.43	126.10	122.32	8.41	37.83	290,030.28	
				10.21	189.15	257.24	49.18	15.13	14.68	0.76	3.40	26,102.73	
			Tons/year:	**0.06**	**1.15**	**1.56**	**0.30**	**0.07**	**0.07**	**0.00**	**0.02**	**158**	
											CO2e in metric tons/year	**143**	

Table 2. Material Delivery

Construction Year	Material	Source Location	One way distance (mi)	Travel speed (mph)	Total Round Trip Time (hrs)	Total # of trips	Computed Total time (hrs)
2022	Materials Delivery	Talleyrand Marine Terminal/ JAXPORT	55		18.4	56	1,031

Off-road Equipment	Hours of Operation	Engine HP	Load Factor	VOC g/hp-hr	CO g/hp-hr	NOx g/hp-hr	SO2 g/hp-hr	PM10 g/hp-hr	PM2.5 g/hp-hr	N2O g/hp-hr	CH4 g/hp-hr	CO2 g/hp-hr
Tug - propulsion	1,031	500	0.50	0.36	6.62	9.00	1.72	0.40	0.39	0.03	0.12	914
				VOC lb	**CO** lb	**NOx** lb	**SO2** lb	**PM10** lb	**PM2.5** lb	**N2O** lb	**CH4** lb	**CO2** lb
			Tugs	203.16	3,762.20	5,116.59	978.17	225.73	218.96	15.05	67.72	519,183.85
			Tons/year:	**0.10**	**1.88**	**2.56**	**0.49**	**0.11**	**0.11**	**0.01**	**0.03**	**260**
											CO2e in metric tons/year	**235**

Table 3. Debris Removal

On-road Equipment	Mileage	Engine HP	VOC lb/mile	CO lb/mile	NOx lb/mile	SO2 lb/mile	PM10 lb/mile	PM2.5 lb/mile	N2O lb/mile	CH4 lb/mile	CO2 lb/mile
Semi Truck - Demo Removal	5,413	380	1.59E-03	8.31E-03	3.78E-02	1.79E-05	1.60E-03	1.6E-03	1.06E-05	1.12E-05	4.21
			VOCs Tons	**CO** Tons	**NOx** Tons	**SO_2** Tons	**PM_{10}** Tons	**$PM_{2.5}$** Tons	**N2O** Tons	**CH4** Tons	**CO2** Tons
		Semi Truck - Demo Removal	0.00	0.02	0.10	0.00	0.00	0.00	0.00	0.00	11.39
										CO2e in metric tons/year	**10**

Table 4. Construction Worker POVs 38 miles one way from Jacksonville FL

Vehicles	# vehicles	# days	[4]mi/day	VOC lb/mi	CO lb/mi	NOx lb/mi	SO2 lb/mi	PM10 lb/mi	PM2.5 lb/mi	CO_2 g/mi	CH_4 g/mi	N_2O g/mi
passenger vehicles	90	240	76	1.089E-04	1.013E-02	8.840E-04	0.000E+00	4.73247E-05	4.40133E-05	182.00	0.02	0.02
carpool	38	240	76	1.269E-04	1.189E-02	9.205E-04	8.699E-07	3.68692E-05	3.46772E-05	519.00	0.04	0.05
				VOCs lb	**CO** lb	**NOx** lb	**SO_2** lb	**PM_{10}** lb	**$PM_{2.5}$** lb	**CO_2** g	**CH_4** g	**N_2O** g
				177.99	16557.16	1444.77	0.00	77.34	71.93	297,443,328	26,149	26,149
				88.85	8327.15	644.73	0.61	25.82	24.29	363,515,904	25,215	32,920
			Tons per Year	**0.13**	**12.44**	**1.04**	**0.00**	**0.05**	**0.05**			
			Metric Tons per Year							**661**	**0.05**	**0.06**
									CO2e in metric tons/year	**680**		

Table 5. FY 2022 Construction Summary

VOC T/yr	CO T/yr	NOx T/yr	SO2 T/yr	PM10 T/yr	PM2.5 T/yr	CO2e MT/yr
0.42	**15.87**	**7.24**	**0.84**	**0.31**	**0.30**	**1,344**

TAB G. PROJECT CONSTRUCTION ASSUMPTIONS

VH = vibratory hammer IH = pile impact hammer

Project	Project Start (FY)	# Installed	Install Method	# Removed	Removal Method	Est. Work days	mob/demob	other tasks		
1A Tug Pier	17	166	IH	159	VH	65	3	10		
1B General Access Pier - Crab Island	17	2	VH	2	VH	2	inc. above	inc. above		
2 UMC Layberth Fender Pile Mod	17	55		0		7	1	5		
3A Explosive Handling Wharf 2 Pier	17	2	IH	2	VH	2	3	2		
3D Refit Wharf 2	17	6	IH	6	VH	2		10		
5 Trident Refit Facility Repair, Magnetic Silencing Facility with Crane	17	18	IH	18		6	3	10		
Total		**249**		**187**		**84**	**10**	**37**	43%	36
3C Refit Wharf 1	18	6	IH	6	VH	2	1	10		
3E Refit Wharf 3	18	6	IH	6	VH	2	1	10		
Total		**12**		**12**		**4**	**2**	**20**	50%	2
4A New Facility	20	215	IH	121	VH	80	3	60		
4B Small Craft Berth Site	20	30	IH	30	VH	8	3	20		
Total		**245**		**151**		**88**	**6**	**80**	38%	34
3B Dry Dock (interface) Wharf	21	99	IH	99	VH	15	2	10		
3F Warping Wharf	21	8	IH	8	VH	4	2	10		
Total		**107**		**107**		**19**	**4**	**20**	50%	10
3A Explosive Handling Wharf 2 Pier	22	13	IH	13	VH	9	2	5		
3G Tug Pier	22	77	IH	77	VH	16	4	18		
6A Demo of TPS Pier	22	0		649	VH	41	4	30		
6B Demo of Layberth North Trestle	22	0		121	VH	6	4	15		
Total		**90**		**860**		**72**	**14**	**68**	91%	65

The majority of construction materials would be brought to SUBASE Kings Bay by barge
Construction and Demolition Debris is hauled away by semi to Chesser Island Landfill, Folkston GA (Waste Management facility) - 41 miles one way

Task 1 - all in 2017 — Repair concrete structural piles, pile caps, utility cover grates, headwall, mooring support and hardware, and deck undersides; replace wooden fender piles with concrete piles; and modify the fender system on the south side of access pier. Install new guide piles, and repair brow and handrails.

Task 2 - 2017 — Install additional fender piles to shorten the distance between existing piles and provide the required support for hydro-pneumatic fenders.

Task 3 - 2017	Repair high-density polyethylene (HDPE) fender pile wraps, sacrificial anodes attached to the steel fender piles, steel safety ladders and treated timber bracing; repair or replace various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings and two steel guide pipe piles on the diver's float. Replace or repair various pile caps, piles, outboard edge beams, and mooring foundations; and reattach underdeck lighting conduit and clean and repaint various mooring fittings.
Task 5 - 2017	Replace timber fender piles, restraining chains, aluminum utility tray, and concrete pile utility guide bracket; and repair wooden hand rails and the cracked concrete deck underside.
Task 3 - 2018	Replace various pile caps, piles, and the outboard edge beam; and repair, clean, and paint several mooring fittings. Replace or repair various pile caps, piles, the outboard edge beams, and mooring foundations; and clean and repaint various mooring fittings.
Task 4 - 2020	Construct a new pier with full hotel service capability including power; potable water; fire protection; sewage connections; Ship Overboard Drainage (SOD) collection; fuel; and telephone, cable, and Local Area Network (LAN) services . Once the new TPS pier is constructed, floating berthing slips would be constructed and provided with full hotel service capability. The berthing pier would consist of a pile-supported, reinforced concrete structure with floating sections. This project includes the installation of two 5,000-gallon above ground storage tanks and provides two associated truck off-loading connections and fuel dispensing units.
Task 3 - 2021	Replace timber fender bearing strips and wales, repair concrete deck, bullrail, edge beams, and mooring foundations; and repair, paint and recoat cathodic protection on the steel H-pile fender system and sheet pile. Repair HDPE fender pile wraps; replace or repair various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings.
Task 3 - 2022	Repair high-density polyethylene (HDPE) fender pile wraps, sacrificial anodes attached to the steel fender piles, steel safety ladders and treated timber bracing; repair or replace various pile caps, piles, and mooring foundations; and clean and repaint mooring fittings and two steel guide pipe piles on the diver's float. Replace timber fender piles with guide piles and small boat access floats; paint mooring fittings; and repair concrete pile caps, concrete piles, concrete underdeck, and storm drain.
Task 6 - 2022	Remove the tip of the existing TPS Pier. Demolish the North Layberth Trestle.

EPA. 2010. Exhaust and Crankcase Emissions Factors for Nonraod Engine Modeling - Compression-Ignition. July.
CEQ. 2012. Federal Greenhouse Gas Accounting and Reporting Guidance, Technical Support Document. June.